SET-1

Series QQARR/1

प्रश्न-पत्र कोड
Q.P. Code **31/1/1**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **11** हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **15** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains **11** printed pages.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **15** questions.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान

SCIENCE

निर्धारित समय : 2 घण्टे *अधिकतम अंक : 40*

Time allowed : 2 hours *Maximum Marks : 40*

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **15** प्रश्न हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *यह प्रश्न-पत्र **तीन** खण्डों में विभाजित किया गया है – **क, ख** एवं **ग** ।*

(iii) ***खण्ड क** – प्रश्न संख्या **1** से **7** तक लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **2** अंकों का है ।*

(iv) ***खण्ड ख** – प्रश्न संख्या **8** से **13** भी लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **3** अंकों का है ।*

(v) ***खण्ड ग** – प्रश्न संख्या **14** और **15** प्रकरण-आधारित प्रश्न हैं । प्रत्येक प्रश्न **4** अंकों का है ।*

(vi) *कुछ प्रश्नों में आंतरिक चयन प्रदान किया गया है । इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए ।*

खण्ड क

1. (क) नीचे दिए गए कार्बन के यौगिकों के आण्विक सूत्र लिखिए :

(i) मेथेन

(ii) प्रोपेन

(ख) कार्बन के यौगिकों के गलनांक और क्वथनांक निम्न होते हैं । क्यों ? *2*

2. दो तत्त्वों X और Y के परमाणुओं में इलेक्ट्रॉन तीन कोशों में विभाजित हैं तथा इनके बाह्यतम कोश में क्रमशः 1 और 7 इलेक्ट्रॉन हैं ।

(क) इन तत्त्वों की आधुनिक आवर्त सारणी में समूह संख्या लिखिए ।

(ख) X और Y के संयोग से बनने वाले यौगिक का आण्विक सूत्र लिखिए ।

(ग) इन दोनों तत्त्वों में से कौन-सा विद्युत-धनात्मक है ? *2*

3. (क) नीचे दिए गए पुष्पों में से किसमें स्वपरागण की संभावना उच्चतर है ?

सरसों, पपीता, तरबूज, गुड़हल

(ख) उभयलिंगी पुष्प के दो जननांगों की सूची बनाइए । *2*

4. दो बहुकोशिक जीवों — स्पाइरोगायरा और प्लेनेरिया में से कौन पुनर्जनन (पुनरुद्भवन) द्वारा जनन करता है और क्यों ? किसी एक अन्य ऐसे जीव का उदाहरण दीजिए जो इसी प्रक्रिया द्वारा जनन कर सकता है । *2*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises **15** questions. **All** questions are compulsory.*

(ii) *This question paper is divided into **three** sections – **A**, **B** and **C**.*

(iii) ***Section A** – Questions No. **1** to **7** are short answer type questions. Each question carries **2** marks.*

(iv) ***Section B** – Questions No. **8** to **13** are also short answer type questions. Each question carries **3** marks.*

(v) ***Section C** – Questions No. **14** and **15** are case-based questions. Each question carries **4** marks.*

(vi) *Internal choices have been provided in some questions. Only one of the alternatives has to be attempted.*

SECTION A

1. (a) Write the molecular formula of the following carbon compounds :

(i) Methane

(ii) Propane

(b) Carbon compounds have low melting and boiling points. Why ? *2*

2. The electrons in the atoms of two elements X and Y are distributed in three shells having 1 and 7 electrons respectively in their outermost shells.

(a) Write the group numbers of these elements in the Modern Periodic Table.

(b) Write the molecular formula of the compound formed when X and Y combine with each other.

(c) Which of the two is electropositive ? *2*

3. (a) Which of the following flowers will have higher possibility of self-pollination ?

Mustard, Papaya, Watermelon, Hibiscus

(b) List the two reproductive parts of a bisexual flower. *2*

4. Which one of the two multicellular organisms — Spirogyra and Planaria reproduces by regeneration and why ? Give an example of any other organism which can also reproduce by the same process. *2*

5. (क) विभिन्नता किसे कहते हैं ? उन दो प्रमुख कारणों की सूची बनाइए जिनके कारण किसी समष्टि में विभिन्नता उत्पन्न होती है । *2*

अथवा

(ख) (i) बैंगनी पुष्पों वाले पौधों और श्वेत पुष्पों वाले पौधों के मध्य संकरण द्वारा उत्पन्न F_1 संतति के पौधों के लक्षणों का उल्लेख कीजिए ।

(ii) यदि F_1 संतति के पौधों का स्वपरागण कराया जाए, तो F_2 संतति के पौधों में क्या प्रेक्षण होंगे ?

(iii) यदि F_2 संतति में 100 पौधे प्राप्त होते हैं, तो उनमें से कितने पौधे अप्रभावी लक्षण दर्शाएँगे ? *2*

6. (क) (i) उस नियम का नाम और वह नियम लिखिए जो किसी एकसमान चुम्बकीय क्षेत्र में क्षेत्र के लम्बवत् किसी धारावाही सीधे चालक पर लगने वाले बल की दिशा निर्धारित करता है ।

(ii) कोई ऐल्फा कण किसी चुम्बकीय क्षेत्र में गुज़रते समय उत्तर दिशा में प्रक्षिप्त हो जाता है । यदि इसी चुम्बकीय क्षेत्र में कोई इलेक्ट्रॉन गुज़रता है, तो वह किस दिशा में प्रक्षिप्त होगा ? *2*

अथवा

(ख) (i) परिनालिका किसे कहते हैं ?

(ii) किसी परिनालिका जिससे कोई स्थायी धारा प्रवाहित हो रही है, के चुम्बकीय क्षेत्र की चुम्बकीय क्षेत्र रेखाओं का पैटर्न खींचिए । *2*

7. (क) ओज़ोन क्या है ? पृथ्वी के वायुमण्डल के उच्चतर स्तरों पर यह किस प्रकार निर्मित होती है ? ओज़ोन हमारे पारितंत्र को किस प्रकार प्रभावित करती है ? *2*

अथवा

(ख) (i) दो मानव-निर्मित पारितंत्रों की सूची बनाइए । *1*

(ii) "हम किसी तालाब की सफाई उस ढंग से नहीं करते हैं जिस ढंग से हम अपनी जलजीवशाला की सफाई करते हैं ।" इस कथन की कारण सहित पुष्टि कीजिए । *1*

5. (a) What is variation ? List two main reasons that may lead to variation in a population. *2*

OR

(b) (i) In a cross between violet flowered plants and white flowered plants, state the characteristics of the plants obtained in the F_1 progeny.

(ii) If the plants of F_1 progeny are self-pollinated, then what would be observed in the plants of F_2 progeny ?

(iii) If 100 plants are produced in F_2 progeny, then how many plants will show the recessive trait ? *2*

6. (a) (i) Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it.

(ii) An alpha particle while passing through a magnetic field gets projected towards north. In which direction will an electron project when it passes through the same magnetic field ? *2*

OR

(b) (i) What is a solenoid ?

(ii) Draw the pattern of magnetic field lines of the magnetic field produced by a solenoid through which a steady current flows. *2*

7. (a) What is ozone ? How is it formed in the upper layers of the Earth's atmosphere ? How does ozone affect our ecosystem ? *2*

OR

(b) (i) List two human-made ecosystems. *1*

(ii) "We do not clean a pond in the same manner as we do in an aquarium." Give reason to justify this statement. *1*

खण्ड ख

8. (क) आधुनिक आवर्त सारणी में किसी तत्त्व की परमाणु संख्या को तत्त्वों के वर्गीकरण के आधार के रूप में अपनाने के दो लाभों की सूची बनाइए ।

(ख) तत्त्वों X (परमाणु संख्या 13) और Y (परमाणु संख्या 20) के इलेक्ट्रॉनिक विन्यास लिखिए । *3*

9. (क) उस संतृप्त हाइड्रोकॉर्बन, जिसके अणु में चार कार्बन परमाणु हैं, की संभावित दो विभिन्न संरचनाएँ खींचिए । समान आण्विक सूत्र के इस हाइड्रोकार्बन की दो संरचनाओं को क्या कहते हैं ? इस यौगिक का सामान्य नाम और आण्विक सूत्र लिखिए । इस यौगिक के ऐल्काइन का आण्विक सूत्र लिखिए । *3*

अथवा

(ख) (i) बेन्ज़ीन का आण्विक सूत्र लिखिए और इसकी संरचना खींचिए ।

(ii) बेन्ज़ीन के अणु में उपस्थित एकल सहसंयोजी आबन्धों और द्वि सहसंयोजी आबन्धों की संख्या लिखिए ।

(iii) किन यौगिकों को ऐल्काइन कहते हैं ? *3*

10. (क) मानव नर जनन तंत्र के नीचे दिए गए प्रत्येक अंग का एक-एक कार्य लिखिए :

(i) वृषण

(ii) वृषण कोश

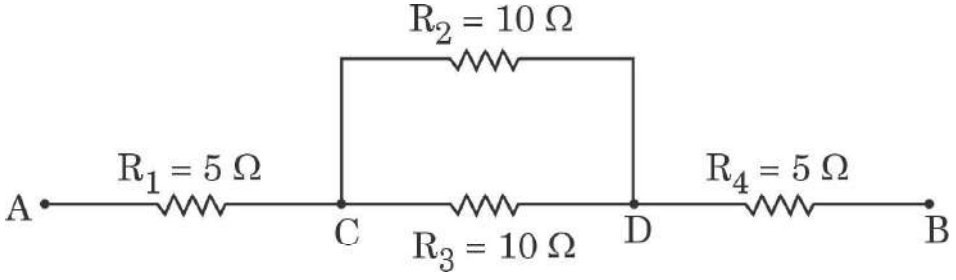
(iii) शुक्रवाहिनी

(iv) प्रॉस्टेट ग्रंथि

(ख) उस जनन-कोशिका के प्रकार का नाम लिखिए (i) जो गतिशील होती है तथा (ii) जिसमें भोजन का भंडार संचित होता है । *3*

11. (क) तीन प्रतिरोधक R_1, R_2 और R_3 पार्श्व में संयोजित हैं और यह संयोजन एक बैटरी, एक ऐमीटर, एक वोल्टमीटर तथा एक कुंजी से जुड़ा है । इन परिपथ अवयवों की व्यवस्था को दर्शाने के लिए उपयुक्त परिपथ आरेख खींचिए और विद्युत् धारा के प्रवाह की दिशा को दर्शाइए ।

(ख) नीचे दिए गए नेटवर्क का तुल्य प्रतिरोध परिकलित कीजिए : *3*



SECTION B

8. (a) List two advantages of adopting the atomic number of an element as the basis of classification of elements in the Modern Periodic Table.

(b) Write the electronic configurations of the elements X (atomic number 13) and Y (atomic number 20). *3*

9. (a) Draw two different possible structures of a saturated hydrocarbon having four carbon atoms in its molecule. What are these two structures of the hydrocarbon having same molecular formula called ? Write the molecular formula and the common name of this compound. Also write the molecular formula of its alkyne. *3*

OR

(b) (i) Write the molecular formula of benzene and draw its structure.

(ii) Write the number of single and double covalent bonds present in a molecule of benzene.

(iii) Which compounds are called alkynes ? *3*

10. (a) Mention one function each of the following organs in human male reproductive system :

(i) Testis

(ii) Scrotum

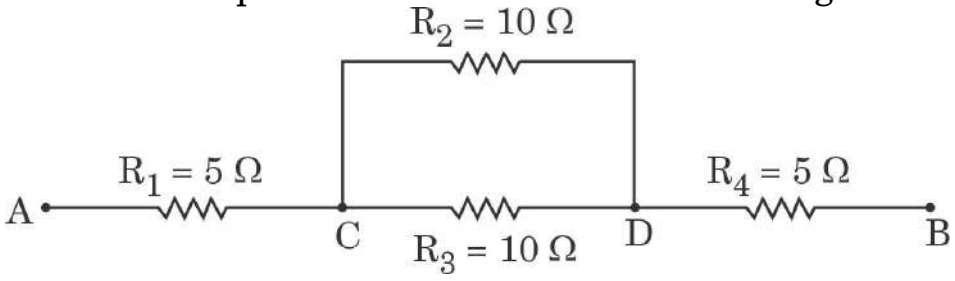
(iii) Vas deferens

(iv) Prostate gland

(b) Name the type of germ cell which (i) is motile, and (ii) stores food. *3*

11. (a) Three resistors R_1, R_2 and R_3 are connected in parallel and the combination is connected to a battery, an ammeter, a voltmeter and a key. Draw suitable circuit diagram to show the arrangement of these circuit components along with the direction of current flowing.

(b) Calculate the equivalent resistance of the following network : *3*



12. (क) (i) विद्युत् शक्ति की परिभाषा दीजिए और इसका SI मात्रक लिखिए । $\frac{1}{2}+\frac{1}{2}$

(ii) 100 W; 220 V और 60 W; 220 V अनुमतांक के दो बल्ब 220 V के किसी विद्युत् मेन्स से पार्श्व में संयोजित हैं । बल्बों द्वारा मेन्स से ली गई विद्युत धारा ज्ञात कीजिए । *2*

अथवा

(ख) (i) जूल का तापन नियम लिखिए । इसे गणितीय रूप में उस परिस्थिति में व्यक्त कीजिए जिसमें प्रतिरोध R की कोई युक्ति किसी V वोल्टता के स्रोत से संयोजित है तथा उससे समय t के लिए धारा I प्रवाहित होती है ।

(ii) कोई प्रतिरोधक जिसका प्रतिरोध 5 Ω है, 6 वोल्ट की किसी बैटरी के सिरों से संयोजित है । 10 सेकण्ड में ऊष्मा के रूप में क्षयित ऊर्जा परिकलित कीजिए । *3*

13. (क) जीवों के उस समूह का नाम लिखिए जिनसे सभी आहार शृंखलाओं का पहला पोषी स्तर बनता है । इन्हें यह नाम क्यों दिया गया है ?

(ख) मानव जैव-आवर्धन से सबसे अधिक दुष्प्रभावित क्यों होते हैं ?

(ग) किसी प्राकृतिक पारितंत्र से अपमार्जकों (अपघटकों) की अनुपस्थिति का एक दुष्परिणाम लिखिए । *3*

खण्ड ग

*इस खण्ड में **2** प्रकरण-आधारित प्रश्न (**14** और **15**) हैं । प्रत्येक प्रकरण में **3** उप-भाग (क), (ख) और (ग) हैं । भाग (क) और (ख) **अनिवार्य** हैं । भाग (ग) में आंतरिक चयन प्रदान किया गया है ।*

14. वह प्रक्रिया जिसके द्वारा किसी व्यष्टि का लिंग निर्धारित होता है, लिंग-निर्धारण कहते हैं । मानवों में किसी नवजात का लिंग-निर्धारण आनुवंशिक आधार पर किया जाता है, जबकि कुछ अन्य में ऐसा नहीं होता है । मानवों में 46 (23 जोड़े) गुणसूत्र होते हैं । इनमें से 44 (22 जोड़े) गुणसूत्र शारीरिक लक्षणों को नियंत्रित करते हैं तथा दो (एक जोड़ा) गुणसूत्र को लिंग गुणसूत्र कहते हैं । लिंग गुणसूत्र दो प्रकार के होते हैं — X गुणसूत्र और Y गुणसूत्र । निषेचन के समय नवजात शिशु का लिंग निर्धारण इस तथ्य पर निर्भर करता है कि नर युग्मक का कौन-सा प्रकार मादा युग्मक के साथ संलयन करता है ।

(क) मानवों में लिंग गुणसूत्रों का जोड़ा, प्रकार और साइज़ के पदों में, परिपूर्ण जोड़ा क्यों नहीं होता है ? $\frac{1}{2}+\frac{1}{2}$

(ख) नर और मादा में से किसमें लिंग गुणसूत्रों का जोड़ा परिपूर्ण होता है ? परिपूर्ण जोड़े की स्थिति में, क्या सभी उत्पन्न होने वाले युग्मक एक ही प्रकार के होंगे अथवा भिन्न प्रकार के होंगे ? *1*

12. (a) (i) Define Electric Power and write its SI unit. $\frac{1}{2}+\frac{1}{2}$

(ii) Two bulbs rated 100 W; 220 V and 60 W; 220 V are connected in parallel to an electric mains of 220 V. Find the current drawn by the bulbs from the mains. *2*

OR

(b) (i) State Joule's law of heating. Express it mathematically when an appliance of resistance R is connected to a source of voltage V and the current I flows through the appliance for a time t.

(ii) A 5 Ω resistor is connected across a battery of 6 volts. Calculate the energy that dissipates as heat in 10 s. *3*

13. (a) Name the group of organisms which form in the first trophic level of all food chains. Why are they called so ?

(b) Why are the human beings most adversely affected by bio-magnification ?

(c) State one ill-effect of the absence of decomposers from a natural ecosystem. *3*

SECTION C

*This section has **2** case-based questions (**14** and **15**). Each case is followed by **3** sub-questions (a), (b) and (c). Parts (a) and (b) are **compulsory**. However, an internal choice has been provided in Part (c).*

14. The mechanism by which the sex of an individual is determined is called sex-determination. In human beings, sex of a newborn is genetically determined, whereas in some others it is not. There are 46 (23 pairs) chromosomes in human beings. Out of these, 44 (22 pairs) control the body characters and 2 (one pair) are known as sex chromosomes. The sex chromosomes are of two types — X chromosome and Y chromosome. At the time of fertilisation, depending upon which type of male gamete fuses with the female gamete, the sex of the newborn child is decided.

(a) Why is a pair of sex chromosomes in human beings called a mismatched pair in terms of type and size ? $\frac{1}{2}+\frac{1}{2}$

(b) Out of male or female, which of them has a perfect pair of sex chromosomes ? In case of a perfect pair, will the gametes produced be of the same kind or of a different kind ? *1*

(ग) (i) उन दो जीवों के नाम लिखिए जिनका लिंग निर्धारण आनुवंशिक आधार पर नहीं होता । इनके लिंग निर्धारण की प्रक्रिया की व्याख्या कीजिए । *1+1*

अथवा

(ii) केवल प्रवाह आरेख की सहायता से, यह दर्शाइए कि मानवों में आनुवंशिक रूप से लिंग निर्धारण किस प्रकार होता है । *1+1*

15. कोई छात्रा किसी चिपचिपे पदार्थ का उपयोग करके ड्राइंग बोर्ड पर एक सफेद कागज़ की शीट लगाती है । वह इसके बीचों-बीच एक छड़ चुम्बक रखती है तथा इस छड़ चुम्बक के चारों ओर, नमक-छितरावक का उपयोग करके, एकसमान रूप से कुछ लौह-चूर्ण छितराती है । बोर्ड को धीरे-धीरे थपथपाने पर वह यह प्रेक्षण करती है कि लौह-चूर्ण स्वयं ही एक विशेष पैटर्न में व्यवस्थित हो गया है ।

(क) लौह-चूर्ण के इस पैटर्न को दर्शाने के लिए आरेख खींचिए । *1*

(ख) किसी छड़ चुम्बक की चुम्बकीय क्षेत्र रेखाओं का चित्रण कीजिए । इस पर छड़ चुम्बक के ध्रुवों और चुम्बकीय क्षेत्र रेखाओं की दिशा दर्शाइए । *1*

(ग) (i) किसी बिन्दु पर चुम्बकीय क्षेत्र की दिशा क्षेत्र रेखाओं का उपयोग करके किस प्रकार ज्ञात की जाती है ? दो चुम्बकीय क्षेत्र रेखाएँ एक-दूसरे का प्रतिच्छेदन क्यों नहीं करती हैं ? *2*

अथवा

(ii) छोटी दिक्सूची का उपयोग करके किसी छड़ चुम्बक की चुम्बकीय क्षेत्र रेखाएँ कैसे खींची जाती हैं ? चुम्बक के दोनों ओर एक-एक चुम्बकीय क्षेत्र रेखा खींचिए । *2*

(c) (i) Name two animals whose sex is not genetically determined. Explain the process of their sex determination. *1+1*

OR

(ii) With the help of a flowchart only, show how sex is genetically determined in human beings. *1+1*

15. A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt-sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern.

(a) Draw a diagram to show this pattern of iron filings. *1*

(b) Draw the magnetic field lines of a bar magnet showing the poles of the bar magnet as well as the direction of the magnetic field lines. *1*

(c) (i) How is the direction of magnetic field at a point determined using the field lines ? Why do two magnetic field lines not cross each other ? *2*

OR

(ii) How are the magnetic field lines of a bar magnet drawn using a small compass needle ? Draw one magnetic field line each on both sides of the magnet. *2*

Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE - 086
(PAPER CODE –31/1/1)

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
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4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totaling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totalling on the title page.
    - Wrong totalling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.
    - Wrong transfer of marks from the answer book to online award list.
    - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

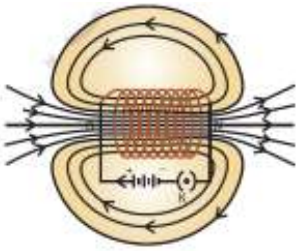
MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE–086
[PAPER CODE :31/1/1]

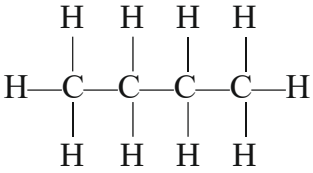
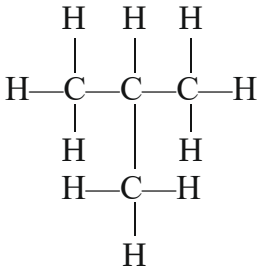
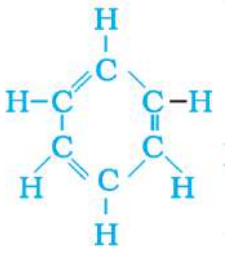
Instructions:-

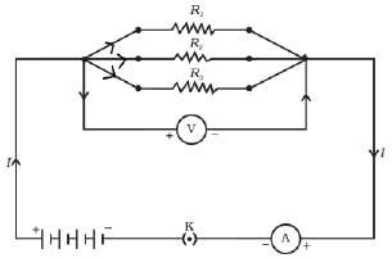
- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

Maximum Marks : 40

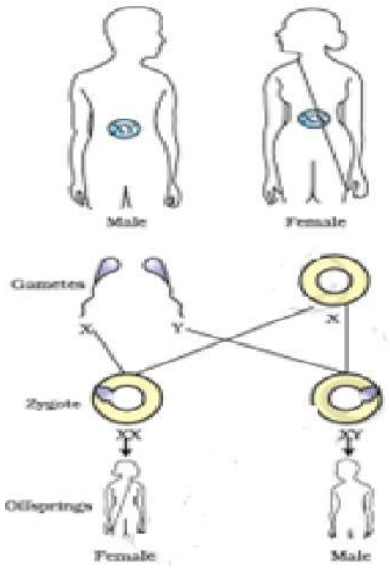
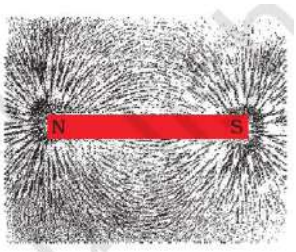
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(a) (i) CH_4 (ii) C_3H_8 (b) Intermolecular forces are weak / not strong	 ½ ½ 1	2
2.	(a) X Y Group Number 1 17 (b) XY (c) X	 ½+½ ½ ½	2
3.	a) Mustard and Hibiscus b) Stamens and Pistil / Carpel	½+½ ½ + ½	2
4.	• Planaria • Regeneration is carried out by specialised cells which are not present in spirogyra. • Hydra	½ 1 ½	2
5.	a) • The differences in the traits shown by the individuals of a species. • Two reasons : i) Inaccurate / Error in DNA copying ii) Sexual reproduction	 1 ½ ½	
5.	b) **OR** (i) F1 Progeny : Violet flowered plants (ii) F2 Progeny : Violet as well as white flowered plants (iii) 25 plants	 ½ 1 ½	2

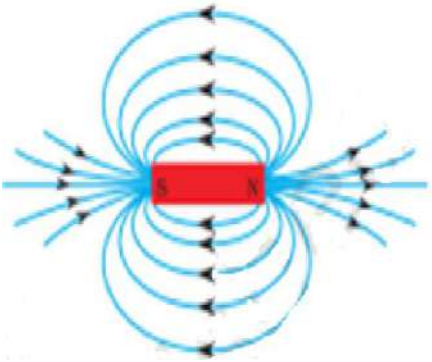
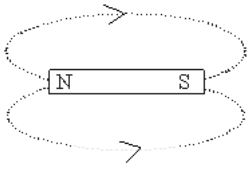
6.	(a) i) • Fleming's left-hand rule • Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. ii) South	½ 1 ½	
6.	**OR** b) i) A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder. ii) 	1 1	2
7.	a) • Ozone is a molecule formed by three atoms of oxygen. • UV radiations split some molecular oxygen (O_2) into free oxygen atoms (O + O). These atoms then combine with molecular oxygen to form ozone. / $O_2 \xrightarrow{UV} O + O$ $O + O_2 \rightarrow O_3$ (Ozone) • Ozone layer shields the surface of the earth from damaging UV radiation of the sun. / Depletion of ozone layer causes harmful effects on the organism.	½ 1 ½	
7.	**OR** b) i) Aquarium, crop field, gardens, etc. (any two) ii) A pond is a natural ecosystem. It has decomposers whereas an aquarium is an artificial ecosystem and does not contain decomposers. Therefore it needs regular cleaning for proper functioning.	½+½ 1	2
	SECTION—B		
8.	(a) • Atomic number is more fundamental property and it decides the properties of an element.		

	• Atomic number increases by one in going from one element to the next, so arrangement of elements becomes more systematic. • Prediction of properties of elements could be made with more precision when the elements are arranged in increasing order of their atomic numbers. **(Any two)** (b) Electronic configuration of X - 2, 8, 3 Electronic configuration of Y - 2, 8, 8, 2	1+1 ½ + ½	3
9.	a) •  •  • Isomers • C_4H_{10} • Butane • C_4H_6	½ ½ ½ ½ ½	
	OR		
9.	b) i) • C_6H_6 •  ii) • Single bond 9 • Double bond 3 iii) Hydrocarbons containing triple bond	½ ½ ½ ½ 1	3

10.	(a) (i) Testis—To produce male gametes or sperms / To produce testosterone or male sex hormone (ii) To provide lower temperature for sperm formation (iii) Vas deferens—Transport of sperms (iv) Prostate gland— Secretion of fluid for easier transport and nutrition of sperms (b) (i) Sperm (ii) Egg / Ovum	½ x 4 ½ ½	3
11.	(a)  Circuit diagram with given components Direction (b) Resistance between *C* and *D* is given by $\frac{1}{R_{CD}} = \frac{1}{10} + \frac{1}{10} = \frac{2}{10} = \frac{1}{5}$ $R_{CD} = 5\ \Omega$ *D* and *B* = $R_4 = 5\ \Omega$ ∴ Total resistance is $R_S = R_{CD} + R_1 + R_4$ $R_{total} = 5\ \Omega + 5\ \Omega + 5\ \Omega$ $= 15\ \Omega$	1 ½ ½ ½ ½	3
12.	(a) (i) The rate at which electric energy is dissipated or consumed in an electric circuit. S.I. unit—watt / V. A / joule per second (ii) • Current drawn by first bulb $I_1 = \frac{100\ \text{W}}{220\ \text{V}} = \frac{100}{220}$ ampere • Current drawn by second bulb	½ ½ ½	

	$I_2 = \frac{60\text{ W}}{220\text{ V}} = \frac{60}{220}$ ampere	½	
	Both the bulbs are in parallel	½	
	Total current, $I = I_1 + I_2$	½	
	$= \left(\frac{100}{220} + \frac{60}{220}\right)$ ampere $= \frac{160}{220}\text{ A} = 0{\cdot}73\text{ A}$		
	(Accept any other method)		
	OR		
12.	(b) i) This law states that heat produced in a resistor is—		
	• directly proportional to the square of current for a given resistance / *(H α I^2)*		
	• directly proportional to the resistance for a given current / *(H α R)*		
	• directly proportional to the time for which the current flows through the resistor / *(H α t)*	1	
	• *H = V I t*	½	
	ii) $V = 6\text{ V};\ R = 5\ \Omega;\ t = 10\text{ s}$		
	Energy dissipated as heat in *t* = 10 s is		
	$H = \frac{V^2}{R}t$	½	
	$= \frac{(6\text{ V})^2}{5\ \Omega} \times 10\text{ s}$	½	
	$= 72\text{ J}$	½	3
13.	(a) Producers, as they can manufacture food by the process of photosynthesis.	½ + ½	
	(b) When non-degradable harmful chemicals (pesticides / DDT, etc.) enter a food chain, they get progressively accumulated at each trophic level. Human beings occupy the top level in any food chain, therefore the maximum concentration of these chemicals get accumulated in their bodies.	1	
	(c) Ill effects of absence of decomposers from natural ecosystem :		
	(i) Earth would be covered with dead bodies & foul smell		
	(ii) Recycling of minerals will not take place		

	(iii) Soil will not get replenished (iv) Ecosystem will get disrupted **(any other relevant point) (any one)**	1	3
	SECTION—C		
14.	(a) • XY • Y is shorter than X (b) • Mother/Female • Same kind (c) i) • Reptiles & Snails • In reptiles, the temperature at which fertilised eggs are kept determines whether the animal developing in the eggs would be a male or a female. In snails, they can change their sex during their life time. **OR** (c) ii)  Diagram Labelling	½+½ ½+½ ½ + ½ ½ ½ 1 1	4
15.	(a)  	1	

	(b) 	1	
	(c) i) • By placing a compass needle on magnetic field lines, direction of north pole will give direction of magnetic field.	1	
	• If they cross or intersect , it means that at the point of intersection the compass needle would point into two directions, which is not possible. / If they cross or intersect, it means that at the point of intersection there will be direction of two resultant fields which is not possible.	1	
	OR		
	(c) ii) • Take a small bar magnet, place it in the centre of the drawing sheet fixed on a drawing board and mark its boundary.	½	
	• Place a small compass needle near the north pole of the magnet, south pole of the compass needle points towards the north pole.	½	
	• Mark the position of two ends of the needle. Now move the needle to a new position such that the south pole of needle occupies the position previously occupied by the north pole and again mark the new position of the north pole. In this way proceed step by step till you reach the south pole of the magnet. Join the points marked to get a field line. Similarly draw one more field line on the other side of the magnet.	½	
	• 	½	4

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Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
(PAPER CODE –31/1/2)

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8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totalling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totalling on the title page.
    - Wrong totalling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.
    - Wrong transfer of marks from the answer book to online award list.
    - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

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14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

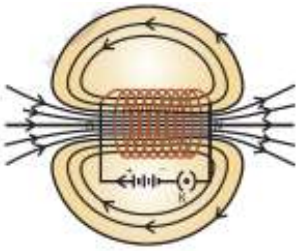
MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE–086
[PAPER CODE : 31/1/2]

Instructions:-

- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

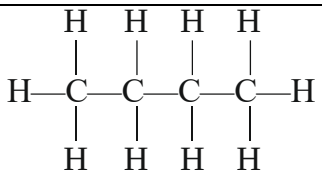
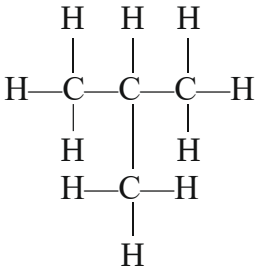
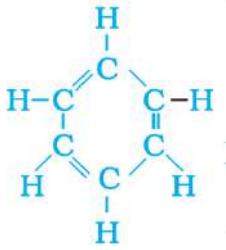
Maximum Marks : 40

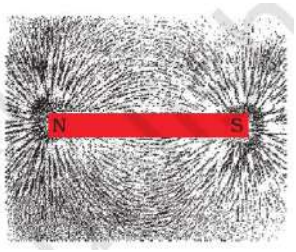
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	a) • Ozone is a molecule formed by three atoms of oxygen. • UV radiations split some molecular oxygen (O_2) into free oxygen atoms (O + O). These atoms then combine with molecular oxygen to form ozone. / $O_2 \xrightarrow{UV} O + O$ $O + O_2 \rightarrow O_3$ (Ozone) • Ozone layer shields the surface of the earth from damaging UV radiation of the sun. / Depletion of ozone layer causes harmful effects on the organism. **OR** b) i) Aquarium, crop field, gardens, etc. (any two) ii) A pond is a natural ecosystem. It has decomposers whereas an aquarium is an artificial ecosystem and does not contain decomposers. Therefore it needs regular cleaning for proper functioning.	½ 1 ½ ½+½ 1	2
2.	(a) i) • Fleming's left-hand rule • Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. ii) South **OR** **2.** (b) i) A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder.	½ 1 ½ 1	

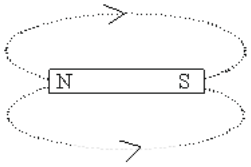
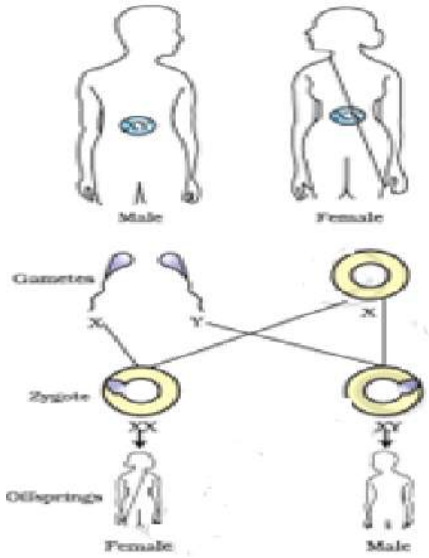
	ii) 	1	2
3.	a) • The differences in the traits shown by the individuals of a species. • Two reasons : i) Inaccurate / Error in DNA copying ii) Sexual reproduction	1 ½ ½	
3.	b) **OR** (i) F1 Progeny : Violet flowered plants (ii) F2 Progeny : Violet as well as white flowered plants (iii) 25 plants	½ 1 ½	2
4.	a) Mustard and Hibiscus b) Stamens and Pistil / Carpel	½+½ ½ + ½	2
5.	(a) • Regeneration • It is a process in which each cut or broken up pieces of an individual grows into a new individual through specialised cells. (b) • Specialized cells	½ 1 ½	2
6.	• When three elements with similar properties are arranged in order of their increasing atomic masses, the atomic mass of the middle element is roughly the average of the atomic masses of the other two elements. • The atomic mass of phosphorus is not the average of the atomic masses of nitrogen and arsenic. / Average of atomic mass of N and As $= \frac{14+75}{2} = 44.5$ But atomic mass of phosphorus is 31 So N, P and As cannot be classified as Dobereiner's Triad	1 1	2
7.	(a) • x is 2 • y is 4	½ ½	

	(b) • *A* is Ethyne • *B* is Propyne	½ ½	2
	SECTION—B		
8.	(a) Producers, as they can manufacture food by the process of photosynthesis. (b) When non-degradable harmful chemicals (pesticides / DDT, etc.) enter a food chain, they get progressively accumulated at each trophic level. Human beings occupy the top level in any food chain, therefore the maximum concentration of these chemicals get accumulated in their bodies. (c) Ill effects of absence of decomposers from natural ecosystem : (i) Earth would be covered with dead bodies & foul smell (ii) Recycling of minerals will not take place (iii) Soil will not get replenished (iv) Ecosystem will get disrupted **(any other relevant point) (any one)**	½ + ½ 1 1	3
9.	(a) (i) The rate at which electric energy is dissipated or consumed in an electric circuit. S.I. unit—watt / V.A / joule per second (a) (ii) • Current drawn by first bulb $I_1 = \frac{100\ \text{W}}{220\ \text{V}} = \frac{100}{220}$ ampere • Current drawn by second bulb $I_2 = \frac{60\ \text{W}}{220\ \text{V}} = \frac{60}{220}$ ampere Both the bulbs are in parallel Total current, $I = I_1 + I_2$ $= \left(\frac{100}{220} + \frac{60}{220}\right)\text{ampere} = \frac{160}{220}\text{A} = 0{\cdot}73\text{ A}$ **(Accept any other method)**	½ ½ ½ ½ ½ ½	3
9.	**OR** (b) i) This law states that heat produced in a resistor is—		

	• directly proportional to the square of current for a given resistance / $(H \alpha I^2)$ • directly proportional to the resistance for a given current /$(H \alpha R)$ • directly proportional to the time for which the current flows through the resistor / $(H \alpha t)$ • $H = V I t$ ii) $V = 6$ V; $R = 5\ \Omega$; $t = 10$ s Energy dissipated as heat in t = 10 s is $H = \frac{V^2}{R} t$ $= \frac{(6\text{ V})^2}{5\ \Omega} \times 10$ s $= 72$ J	1 ½ ½ ½ ½	3
10.	(a) Given : Length of the wire = 2 m Area of cross section = $1{\cdot}55\times10^{-6}$ m^2 Resistivity, $\rho = 2{\cdot}8\times10^{-8}\ \Omega$m $R = \rho\frac{l}{a}$ $= \frac{2{\cdot}8\times10^{-8}\text{ ohm metre}\times 2\text{ metre}}{1{\cdot}55\times10^{-6}\text{ (metre)}^2}\ \Omega$ $= 3{\cdot}6\times10^{-2}\ \Omega$ **(deduct half mark if no or incorrect unit is given)** (b) Alloys used for heating element have generally high melting point / high resistivity / Do not get oxidised at high temperature.	½ ½ 1 1	3
11.	(a) Green; It is the dominant trait (b) Purple stemmed plants in F2 progeny are 25% (c) GG : gg 1:1	½ + ½ 1 1	3
12.	a) •	½	

	 •  • Isomers • C_4H_{10} • Butane • C_4H_6 **OR** b) i) • C_6H_6 •  ii) • Single bond 9 • Double bond 3 iii) Hydrocarbons containing triple bond	½ ½ ½ ½ ½ ½ ½ ½ 1	3
13.	(a) • Atomic number is more fundamental property and it decides the properties of an element. • Atomic number increases by one in going from one element to the next, so arrangement of elements becomes more systematic.		

	• Prediction of properties of elements could be made with more precision when the elements are arranged in increasing order of their atomic numbers. **(Any Two**) (b) Electronic configuration of X - 2, 8, 3 Electronic configuration of Y - 2, 8, 8, 2	1+1 ½ + ½	3
	SECTION—C		
14.	(a) 	1	
	(b) • Iron filings experience a force due to which they arrange themselves along the direction of force experienced . • Force is maximum at poles.	1	
	(c) i) • By placing a compass needle on magnetic field lines, direction of north pole will give direction of magnetic field. • If they cross or intersect , it means that at the point of intersection the compass needle would point into two directions, which is not possible. / If they cross or intersect, it means that at the point of intersection there will be direction of two resultant fields which is not possible.	1 1	
	OR		
	(c) ii) • Take a small bar magnet, place it in the centre of the drawing sheet fixed on a drawing board and mark its boundary. • Place a small compass needle near the north pole of the magnet, south pole of the compass needle points towards the north pole. • Mark the position of two ends of the needle. Now move the needle to a new position such that the south pole of needle occupies the position previously occupied by the north pole and again mark the new position of the north pole. In this way proceed step by step till you reach the south pole of the magnet. Join the points marked to get a field line. Similarly draw one more field line on the other side of the magnet4.	½ ½ ½	

		½	4
15.	(a) • XY • Y is shorter than X (b) Fusion of egg with sperm (female gamete with male gamete) results in formation of zygote which restores the original number of chromosomes. / Egg (n) + Sperm (n) = Zygote (2 n) (where n is number of chromosomes) (c) i) • Reptiles & Snails • In reptiles, the temperature at which fertilised eggs are kept determines whether the animal developing in the eggs would be a male or a female. In snails, they can change their sex during their life time. **OR** (c) ii)  Diagram Labelling	½+½ 1 ½ + ½ ½ ½ 1 1	4

* **

Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
(PAPER CODE –31/1/3)

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
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MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE–086
[PAPER CODE: 31/1/3]

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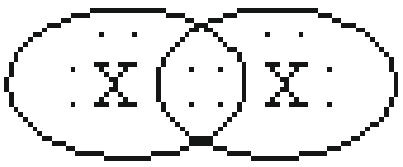
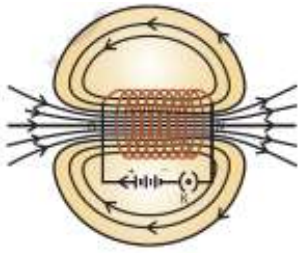
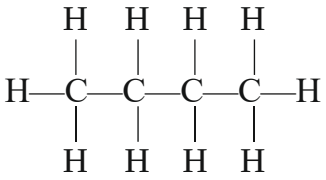
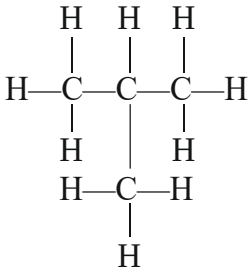
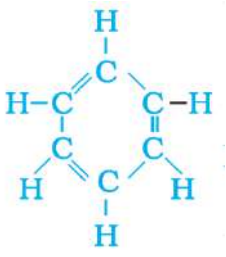
Maximum Marks : 40

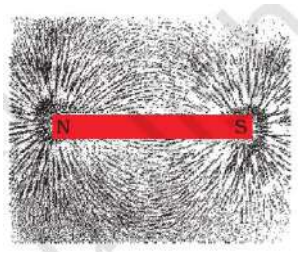
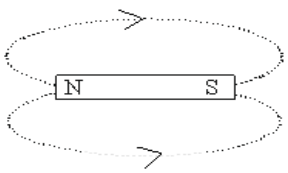
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(a) • Atomic size of A is greater than atomic size of B • Atomic size decreases in moving from left to right along a period due to increased effective nuclear charge. (b) • Metallic character of A is more than metallic character of B. • Because the tendency to lose electrons decreases from left to right along a period.	½ ½ ½ ½	2
2.	(a) • Period number—2 • Group number—16 (b) 	½ ½ 1	2
3.	• Planaria • Regeneration is carried out by specialised cells which are not present in spirogyra. • Hydra	½ 1 ½	2
4.	(a) If the egg is not fertilized, it lives for about one day and the uterine lining formed to receive the fertilized egg slowly breaks and comes out through the vagina as blood and mucous along with unfertilized egg. (b) Bacterial infection: Gonorrhoea/Syphilis. Viral infection: Warts / AIDS. **(Any one in each case)**	1 ½+½	2
5.	(a) i) • Fleming's left-hand rule	½	

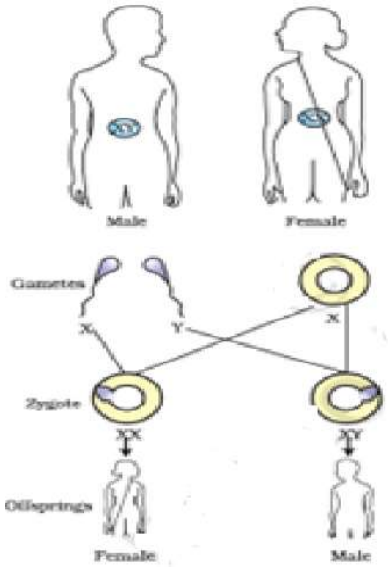
	• Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. ii) South **OR** b) i) A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder. ii) 	1 ½ 1 1	2
6.	a) • Ozone is a molecule formed by three atoms of oxygen. • UV radiations split some molecular oxygen (O_2) into free oxygen atoms (O + O). These atoms then combine with molecular oxygen to form ozone. / $O_2 \xrightarrow{UV} O + O$ $O + O_2 \rightarrow O_3$ (Ozone) • Ozone layer shields the surface of the earth from damaging UV radiation of the sun. / Depletion of ozone layer causes harmful effects on the organism. **OR** b) i) Aquarium, crop field, gardens, etc. (any two) ii) A pond is a natural ecosystem. It has decomposers whereas an aquarium is an artificial ecosystem and does not contain decomposers. Therefore it needs regular cleaning for proper functioning.	½ 1 ½ ½+½ 1	2
7.	a) • The differences in the traits shown by the individuals of a species. • Two reasons : i) Inaccurate / Error in DNA copying ii) Sexual reproduction **OR**	1 ½ ½	

	b) (i) F1 Progeny : Violet flowered plants (ii) F2 Progeny : Violet as well as white flowered plants (iii) 25 plants	½ 1 ½	2
	SECTION— B		
8.	a) •  •	½	
		½	
	• Isomers • C_4H_{10} • Butane • C_4H_6	½ ½ ½ ½	
8.	**OR**		
	b) i) • C_6H_6 • 	½ ½	
	ii) • Single bond 9 • Double bond 3 iii) Hydrocarbons containing triple bond	½ ½ 1	3
9.	(a)		

	• Atomic number is more fundamental property and it decides the properties of an element. • Atomic number increases by one in going from one element to the next, so arrangement of elements becomes more systematic. • Prediction of properties of elements could be made with more precision when the elements are arranged in increasing order of their atomic numbers. **(Any two)** *(b)* Electronic configuration of X - 2, 8, 3 Electronic configuration of Y - 2, 8, 8, 2	1+1 ½ + ½	3
10.	Given : P = 4 kW = 4000 W V = 220 V (a) $P = VI$ $I = \frac{P}{V} = \frac{4000\ \text{W}}{220\ \text{V}} = 18{\cdot}18\ \text{A}$ (b) $E = P\ X\ t$ $= 4\ \text{kW} \times 2\ \text{h} = 8\ \text{kWh}$ (c) Cost of 1 kW = ₹ 4·50 Then 8 kWh = 8 × 4·50 = ₹ 36·0	 ½ ½ ½ ½ 1	3
11.	(a) The F1 progeny is only red eyed individuals. So, the red eye is the dominant trait. (b) The traits that cannot express themselves in the presence of a dominant trait. (c) • 3 white eyed individuals. • red eyed : white eyed 3 : 1	1 1 ½ + ½	3
12.	(a) Producers, as they can manufacture food by the process of photosynthesis. (b) When non-degradable harmful chemicals (pesticides / DDT, etc.) enter a food chain, they get progressively accumulated at each trophic level. Human beings occupy the top level in any food chain, therefore the maximum concentration of these chemicals get accumulated in their bodies. (c) Ill effects of absence of decomposers from natural ecosystem : (i) Earth would be covered with dead bodies & foul smell (ii) Recycling of minerals will not take place	½ + ½ 1	

	(iii) Soil will not get replenished (iv) Ecosystem will get disrupted **(any other relevant point) (any one)**	1	3
13.	(a) (i) The rate at which electric energy is dissipated or consumed in an electric circuit. S.I. unit—watt / V.A / joule per second (a) (ii) • Current drawn by first bulb $I_1 = \frac{100\ \text{W}}{220\ \text{V}} = \frac{100}{220}$ ampere • Current drawn by second bulb $I_2 = \frac{60\ \text{W}}{220\ \text{V}} = \frac{60}{220}$ ampere Both the bulbs are in parallel Total current, $I = I_1 + I_2$ $= \left(\frac{100}{220} + \frac{60}{220}\right)$ ampere $= \frac{160}{220}\ \text{A} = 0{\cdot}73\ \text{A}$ **(Accept any other method)** **OR** (b) i) This law states that heat produced in a resistor is— • directly proportional to the square of current for a given resistance / *($H \alpha I^2$)* • directly proportional to the resistance for a given current / *($H \alpha R$)* • directly proportional to the time for which the current flows through the resistor / *($H \alpha t$)* • $H = V\,I\,t$ ii) $V = 6\ \text{V};\ R = 5\ \Omega;\ t = 10\ \text{s}$ Energy dissipated as heat in t = 10 s is $H = \frac{V^2}{R}t$ $= \frac{(6\ \text{V})^2}{5\ \Omega} \times 10\ \text{s}$	½ ½ ½ ½ ½ 1 ½ ½ ½	

	= 72 J	½	3
	SECTION—C		
14.	(a) 	1	
	(b) In the field of bar magnet iron filings experience a force which is different at different points in terms of magnitude and direction. The iron filings, being free to move arrange themselves along the direction of force.	1	
	(c) i) • By placing a compass needle on magnetic field lines, direction of north pole will give direction of magnetic field. • If they cross or intersect , it means that at the point of intersection the compass needle would point into two directions, which is not possible. / If they cross or intersect, it means that at the point of intersection there will be direction of two resultant fields which is not possible.	1 1	
	OR		
	(c) ii) • Take a small bar magnet, place it in the centre of the drawing sheet fixed on a drawing board and mark its boundary. • Place a small compass needle near the north pole of the magnet, south pole of the compass needle points towards the north pole. • Mark the position of two ends of the needle. Now move the needle to a new position such that the south pole of needle occupies the position previously occupied by the north pole and again mark the new position of the north pole. In this way proceed step by step till you reach the south pole of the magnet. Join the points marked to get a field line. Similarly draw one more field line on the other side of the magnet. 	½ ½ ½	

		½	4
15.	(a) • 50% male , 50% female / 1 : 1 / Equal probability of male and female child.	½	
	• All children will inherit X chromosome from the mother but the one who inherits X chromosome from the father will be a girl and the one who inherits Y chromosome will be a boy.	½	
	(b) • Mother/Female	½	
	• Same kind	½	
	(c)(i) • Reptiles & Snails	½ + ½	
	• In reptiles, the temperature at which fertilised eggs are kept determines whether the animal developing in the eggs would be a male or a female. In snails, they can change their sex during their life time.	½	
	OR	½	
	(c) (ii) 		
	Diagram	1	
	Labelling	1	4

* **

Series : QQCRR/2

SET-1

प्रश्न–पत्र कोड
Q.P. Code **31/2/1**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न–पत्र कोड को उत्तर–पुस्तिका के मुख–पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न–पत्र में मुद्रित पृष्ठ **12** हैं ।
- प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए प्रश्न–पत्र कोड को छात्र उत्तर–पुस्तिका के मुख–पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न–पत्र में **15** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर–पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न–पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न–पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न–पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर–पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।

- Please check that this question paper contains **12** printed pages.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **15** questions.
- **Please write down the Serial Number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान
SCIENCE

*निर्धारित समय : **2** घण्टे* | *अधिकतम अंक : **40***

*Time allowed : **2** hours* | *Maximum Marks : **40***

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **15** प्रश्न हैं। **सभी** प्रश्न अनिवार्य हैं।*

(ii) *यह प्रश्न-पत्र **तीन** खण्डों में विभाजित है – खण्ड-**क, ख** एवं **ग**।*

(iii) *खण्ड– **क** : प्रश्न संख्या **1** से **7** लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **2** अंक का है।*

(iv) *खण्ड– **ख** : प्रश्न संख्या **8** से **13** भी लघु-उत्तरीय प्रकार के प्रश्न हैं। प्रत्येक प्रश्न **3** अंक का है।*

(v) *खण्ड– **ग** : प्रश्न संख्या **14** और **15** प्रकरण आधारित प्रश्न हैं। प्रत्येक प्रश्न **4** अंक का है।*

(vi) *कुछ प्रश्नों में आंतरिक चयन प्रदान किया गया है। इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए।*

*

खण्ड – क

1. "कार्बन उत्कृष्ट गैस विन्यास प्राप्त करने के लिए अपने संयोजकता इलेक्ट्रॉन खोने अथवा प्राप्त करने की बजाय कार्बन के अन्य परमाणुओं अथवा अन्य तत्त्वों के परमाणुओं के साथ अपने संयोजकता इलेक्ट्रॉनों की साझेदारी करने को प्रायिकता देता है।" इस कथन की कारण सहित पुष्टि कीजिए। **2**

2. तत्त्व 'X' की परमाणु संख्या 11 है।

   (i) X का इलेक्ट्रॉन विन्यास लिखिए और इसकी संयोजकता ज्ञात कीजिए।

   (ii) इसके ऑक्साइड का सूत्र और प्रकृति लिखिए। **2**

3. कारण दीजिए :

   (i) भ्रूण के विकास के लिए प्लैसेन्टा अतिशय रूप से आवश्यक है।

   (ii) निषेचन के पश्चात् गर्भाशय की भित्ति माँसल और स्पाँजी हो जाती है। **2**

4. (a) डबल रोटी की फफूँदी (राइजोपस) के जनन में भाग लेने वाले और जनन में भाग न लेने वाले भागों का नाम लिखिए।

   (b) कायिक प्रवर्धन के किन्हीं दो लाभों की सूची बनाइए। **2**

General Instructions :

Read the following instructions carefully and strictly follow them :

(i) *This question paper contains **15** questions. **All** questions are compulsory.*

(ii) *This question paper is divided into **three** Sections viz. Section **A, B** and **C.***

(iii) *Section **A** – Question numbers **1** to **7** are short answer type questions. Each question carries **two** marks.*

(iv) *Section **B** – Question numbers **8** to **13** are also short answer type questions. Each question carries **three** marks.*

(v) *Section **C** – Question numbers **14** and **15** are case based questions. Each question carries **four** marks.*

(vi) *Internal choices have been provided in some questions. Only one of the alternatives has to be attempted.*

SECTION – A

1. "Carbon prefers to share its valence electrons with other atoms of carbon or with atoms of other elements rather than gaining or losing the valence electrons in order to attain noble gas configuration." Give reasons to justify this statement. **2**

2. The atomic number of an element 'X' is 11.

   (i) Write the electronic configurations of X and find its valency.

   (ii) Write the formula and nature of its oxide. **2**

3. Give reasons :

   (i) Placenta is extremely essential for foetal development.

   (ii) Uterine lining becomes thick and spongy after fertilisation. **2**

4. (a) Name the reproductive and non-reproductive parts of bread mould (Rhizopus).

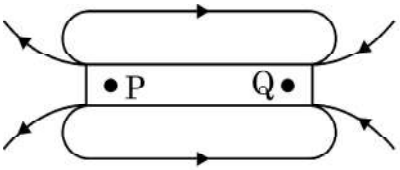
   (b) List any two advantages of vegetative propagation. **2**

5. किसी आवृतबीजी के जननांगों के नाम लिखिए । यह भाग कहाँ स्थित होते हैं ? इसके नर जननांग की संरचना की व्याख्या कीजिए । **2**

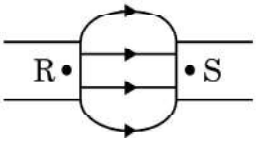
अथवा

यौवनावस्था किसे कहते हैं ? किशोरावस्था के आरम्भिक वर्षों में लड़कों व लड़कियाँ दोनों में होने वाले किन्हीं दो सामान्य परिवर्तनों का उल्लेख कीजिए ।

6. (a) नीचे दिए गए आरेखों 'a' और 'b' में चुम्बकों के ध्रुवों P, Q, R और S के नाम लिखिए : **½+½+1=2**



आरेख 'a'



आरेख 'b'

(b) इन आरेखों के आधार पर चुम्बकीय क्षेत्र रेखाओं की दिशाओं के बारे में निकलने वाला निष्कर्ष लिखिए ।

अथवा

एकसमान चुम्बकीय क्षेत्र में स्थित किसी सीधे धारावाही चालक पर लगने वाला बल (i) कब अधिकतम ; और (ii) कब निम्नतम होता है ? **1 + 1 = 2**

7. नीचे दी गयी आहार शृंखला में मोर को मात्र 2 जूल ऊर्जा ही उपलब्ध थी । घास में कितनी ऊर्जा उपस्थित रही होगी ? अपने उत्तर की पुष्टि कीजिए । **2**

घास → टिड्डा → मेंढक → सर्प → मोर

अथवा

(a) कूड़ा-कर्कट से क्या तात्पर्य है ? उन दो वर्गों की सूची बनाइए जिनमें इसे वर्गीकृत किया जाता है ।

(b) उस समय हमारा यह कहने का वास्तविक अर्थ क्या होता है कि "एन्ज़ाइम अपनी क्रिया में विशिष्ट होते हैं ।"

5. Name the reproductive parts of an angiosperm. Where are these parts located ? Explain the structure of its male reproductive part. **2**

OR

What is puberty ? Mention any two changes that are common to both boys and girls in early teenage years.

6. (a) Name the poles P, Q, R and S of the magnets in the following figures 'a' and 'b' : **½+½+1=2**

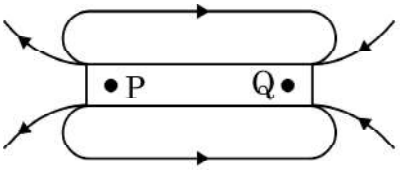


Figure 'a'

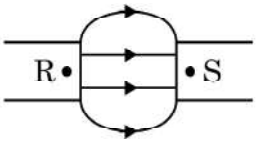


Figure 'b'

(b) State the inference drawn about the direction of the magnetic field lines on the basis of these diagrams.

OR

When is the force experienced by a current – carrying straight conductor placed in a uniform magnetic field. **1 + 1 = 2**

(i) Maximum ;

(ii) Minimum ?

7. In the following food chain, only 2J of energy was available to the peacocks. How much energy would have been present in Grass ? Justify your answer. **2**

GRASS → GRASS HOPPER → FROG → SNAKE → PEACOCK

OR

(a) What is meant by garbage ? List two classes into which garbage is classified.

(b) What do we actually mean when we say that the "enzymes are specific in their action" ?

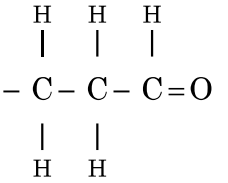
खण्ड – ख

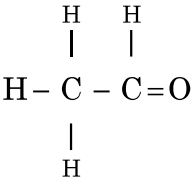
8. (a) न्यूलैन्ड्स का अष्टक नियम लिखिए । **1+1+½+½ = 3**

(b) किसी उदाहरण द्वारा डॉबेराइनर के त्रिक की व्याख्या कीजिए ।

(c) 'a' और 'b' में किए गए प्रयासों में प्रत्येक की एक-एक सीमा की सूची बनाइए ।

9. नीचे दिए गए कार्बनिक यौगिकों पर विचार कीजिए : **3**

(i) 

(ii) 

(a) इन यौगिकों में उपस्थित प्रकार्यात्मक समूह का नाम लिखिए ।

(b) इस प्रकार्यात्मक समूह के यौगिकों के लिए सामान्य सूत्र लिखिए ।

(c) इन यौगिकों के बीच संबंध लिखिए और इसी प्रकार्यात्मक समूह के किसी अन्य यौगिक की संरचना खींचिए ।

अथवा

(a) एथाइन की इलेक्ट्रॉन बिन्दु संरचना खींचिए । **1+2 = 3**

(b) सहसंयोजी यौगिकों और आयनी यौगिकों के बीच दो अन्तरों की सूची बनाइए ।

10. (a) मानव नरों द्वारा उत्पन्न दो प्रकार के युग्मनों के प्रकार लिखिए । **½+½**

(b) क्या कोई नर शिशु (लड़का) अपने पिता से X गुणसूत्र वंशानुगत करता है ? अपने उत्तर की पुष्टि कीजिए । **½+1**

(c) मानव मादा द्वारा कितने प्रकार के युग्मक उत्पन्न किए जाते हैं ? **½**

11. (a) ओम का नियम लिखिए । इसका गणितीय निरूपण कीजिए । **3**

(b) 1 ओम की परिभाषा लिखिए ।

(c) उस चालक का प्रतिरोध क्या है जिसके सिरों पर 2 V विभवान्तर लगाने पर उससे 0.5 A धारा प्रवाहित होती है ?

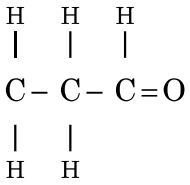
SECTION – B

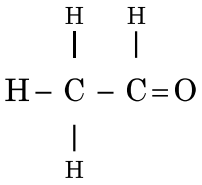
8. (a) State Newland Law of Octaves. **1+1+½+½ = 3**

(b) With an example, explain Dobereiner's Triads.

(c) List one limitation each of both the attempts mentioned in 'a' & 'b'.

9. Consider the following organic compounds : **3**

(i)


(ii)


(a) Name the functional group present in their compounds.

(b) Write the general formula for the compounds of this functional group.

(c) State the relationship between these compounds and draw the structure of any other compound having similar functional group.

OR

(a) Draw the electron dot structure for ethyne. **1+2 = 3**

(b) List two differences between the properties exhibited by covalent compounds and ionic compounds.

10. (a) Name the two types of gametes produced by men. **½+½**

(b) Does a male child inherit X chromosome from his father ? Justify. **½+1**

(c) How many types of gametes are produced by a human female ? **½**

11. (a) State Ohm's Law. Represent it mathematically. **3**

(b) Define 1 ohm.

(c) What is the resistance of a conductor through which a current of 0.5 A flows when a potential difference of 2 V is applied across its ends ?

12. (a) उन कारकों की सूची बनाइए जिन पर किसी दिये गए पदार्थ के एकसमान बेलनाकार चालक का प्रतिरोध निर्भर करता है । **2+1**

(b) त्रिज्या 0.01 cm के किसी तार का प्रतिरोध 10 Ω है । यदि इस तार की प्रतिरोधकता 50×10^{-8} Ω m है, तो तार की लम्बाई ज्ञात कीजिए ।

अथवा

(a) किसी वैद्युत युक्ति की विद्युत शक्ति से क्या तात्पर्य है ? इसका SI मात्रक लिखिए । **1½**

(b) 2kW की किसी विद्युत केतली का उपयोग 2 घण्टे तक किया गया है । उपभुक्त ऊर्जा का (i) किलोवाट घण्टा, और (ii) जूल में परिकलन कीजिए । **1½**

13. (a) हम तालाबों और झीलों की सफाई नहीं करते, परन्तु जलजीवशाला को नियमित सफाई की आवश्यकता होती है । क्यों ? **1+2**

(b) वायुमण्डल के उच्चतर स्तरों पर ओज़ोन की परत की क्षति क्यों हो रही है ? इस क्षति के एक दुष्प्रभाव का उल्लेख कीजिए ।

खण्ड – ग

इस खण्ड में 02 प्रकरण आधारित प्रश्न (14 और 15) हैं ।

प्रत्येक प्रकरण के पश्चात् **03** उपप्रश्न (a, b और c) दिए गए हैं ।

भाग (a) और (b) अनिवार्य हैं, परन्तु भाग (c) में आंतरिक चयन प्रदान किया गया है ।

14. मेंडल ने अपने विज्ञान और गणितीय ज्ञान का समिश्रण करके उसका उपयोग प्रत्येक पीढ़ी के एक-एक जीव द्वारा प्रदर्शित विशेष लक्षणों का रिकार्ड रखने और गणना करने में किया । उन्होंने खेत में मटर के पौधों में कई स्थूल रूप से दिखाई देने वाले विपर्यासी (विकल्पी) लक्षणों का प्रेक्षण किया । उन्होंने बहुत से नियंत्रित प्रयोग किए जिनसे उन्हें वंशागत नियमों तक पहुँचने में सहायता मिली ।

(a) गोल बीज वाले लम्बे पौधों और झुर्रीदार बीज वाले बौने पौधों के संकरण से प्राप्त F1 संतति कैसी दिखाई देती है ?

(b) उपरोक्त प्रकरण में अप्रभावी लक्षणों का नाम लिखिए ।

(c) यदि F1 संतति के पौधों में स्वपरागण होता है तो F2 संतति में प्राप्त पौधों में नए संयोजनों के प्रकार और उनके अनुपात का उल्लेख कीजिए । **1+1+2 = 4**

अथवा

12. (a) List the factors on which the resistance of a uniform cylindrical conductor of a given material depends. **2+1**

(b) The resistance of a wire of 0.01 cm radius is 10 Ω. If the resistivity of the wire is 50×10^{-8} Ω m, find the length of this wire.

OR

(a) What is the meaning of electric power of an electrical device ? Write its SI unit. **1½**

(b) An electric kettle of 2kW is used for 2h. Calculate the energy consumed in

(i) kilowatt hour and

(ii) joules. **1½**

13. (a) We do not clean ponds or lakes, but an aquarium needs to be cleaned regularly. Why ? **1+2**

(b) Why is ozone layer getting depleted at the higher levels of the atmosphere ? Mention one harmful effect caused by its depletion.

SECTION – C

This section has 02 case based questions (14 and 15).

Each case is followed by **03** sub-questions (a, b and c).

Part (a) and (b) are compulsory. However an internal choice has been provided in Part (c).

14. Mendel blended his knowledge of Science and mathematics to keep the count of the individuals exhibiting a particular trait in each generation. He observed a number of contrasting visible characters controlled in pea plants in a field. He conducted many experiments to arrive at the laws of inheritance.

(a) What do the F1 progeny of tall plants with round seeds and short plants with wrinkled seeds look like ?

(b) Name the recessive traits in above case.

(c) Mention the type of the new combinations of plants obtained in F2 progeny along with their ratio, if F1 progeny was allowed to self pollinate. **1+1+2 = 4**

OR

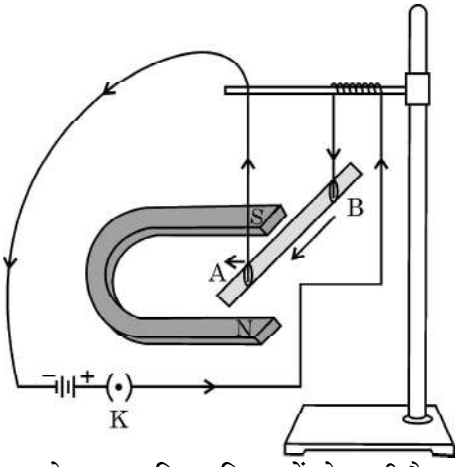
यदि F2 संतति में 1600 पौधे प्राप्त हुए, तो :

(i) गोल बीज वाले लम्बे पौधों, तथा

(ii) झुर्रीदार बीज वाले बौने पौधों की संख्या लिखिए ।

उपरोक्त प्रयोग का निष्कर्ष लिखिए ।

15. किसी छात्र से, चुम्बकीय क्षेत्र में स्थित किसी धारावाही चालक पर लगने वाले बल का अध्ययन करने के लिए, प्रयोग करने के लिए कहा गया । उसने एक छोटी एलुमिनियम की छड़ AB, एक प्रबल नाल चुम्बक, कुछ संयोजक तार, एक बैटरी और एक कुण्डली लेकर उन्हें आरेख में दर्शाए अनुसार संयोजित किया । उसने यह प्रेक्षण किया कि विद्युत धारा प्रवाहित करने पर छड़ विस्थापित होती है तथा धारा की दिशा उत्क्रमित करने पर विस्थापन की दिशा भी उत्क्रमित हो जाती है । अपनी इस परिघटना की समझ के आधार पर नीचे दिए गए प्रश्नों के उत्तर दीजिए : **4**



(a) विद्युत धारा प्रवाहित करने पर छड़ विस्थापित क्यों हो जाती है ?

(b) चालक AB पर लगने वाले बल की दिशा निर्धारित करने वाला नियम लिखिए ।

(c) (i) यदि U आकृति के चुम्बक को ऊर्ध्वाधरत: रखें तथा एलुमिनियम की छड़ को क्षैतिजत: इस प्रकार निलंबित करें कि इसका सिरा B ठीक उत्तर की ओर हो तो छड़ में B से A की ओर धारा प्रवाहित करने पर छड़ किस दिशा में विस्थापित होगी ?

(ii) ऐसी किन्हीं दो युक्तियों का नाम लिखिए जिनमें धारावाही चालक और चुम्बकीय क्षेत्र का उपयोग किया जाता है ?

अथवा

किसी क्षैतिज कार्डबोर्ड पर ऊर्ध्वाधरत: स्थित किसी धारावाही सीधे चालक द्वारा उसके चारों ओर उत्पन्न चुम्बकीय क्षेत्र रेखाओं का पैटर्न खींचिए । चालक से प्रवाहित धारा और चुम्बकीय क्षेत्र रेखाओं की दिशा दर्शाइए ।

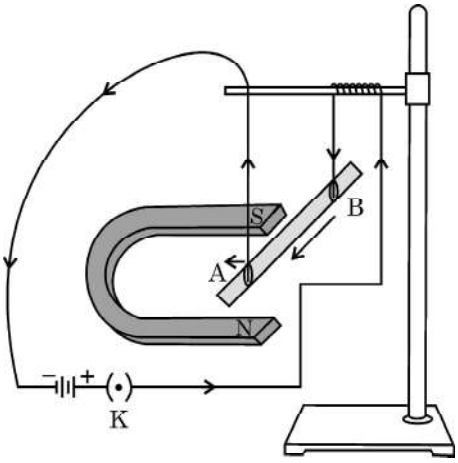
If 1600 plants were obtained in F2 progeny, write the number of plants having traits :

(i) Tall with round seeds

(ii) Short with wrinkled seeds

Write the conclusion of the above experiment.

15. A student was asked to perform an experiment to study the force on a current carrying conductor in a magnetic field. He took a small aluminum rod AB, a strong horse shoe magnet, some connecting wires, a battery and a switch and connected them as shown. He observed that on passing current, the rod gets displaced. On reversing the direction of current, the direction of displacement also gets reversed. On the basis of your understanding of this phenomenon, answer the following questions : **4**



(a) Why does the rod get displaced on passing current through it ?

(b) State the rule that determines the direction of the force on the conductor AB.

(c) (i) If the U shaped magnet is held vertically and the aluminum rod is suspended horizontally with its end B towards due north, then on passing current through the rod from B to A as shown, in which direction will the rod be displaced ?

(ii) Name any two devices that use current carrying conductors and magnetic field.

OR

Draw the pattern of magnetic field lines produced around a current carrying straight conductor held vertically on a horizontal cardboard. Indicate the direction of the field lines as well as the direction of current flowing through the conductor.

*

Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE - 086
[Paper Code : 31/2/1]

General Instructions :

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3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark (√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks 0-40 has to be used. Please do not hesitate to award full marks if the answer deserves it.

11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
12. Ensure that you do not make the following common types of errors committed by the Examiner in the past: -
    - Leaving answer or part thereof unassessed in an answer book.
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    - Wrong totalling of marks awarded on a reply.
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    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

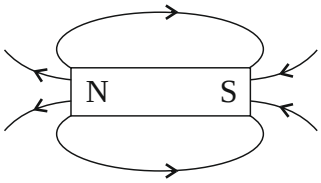
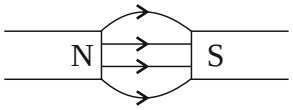
MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE – 086
[PAPER CODE : 31/2/1]

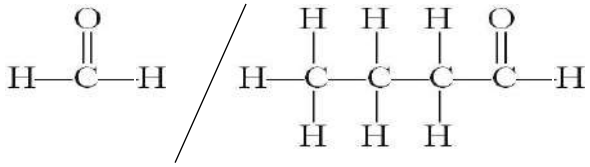
Instructions:-

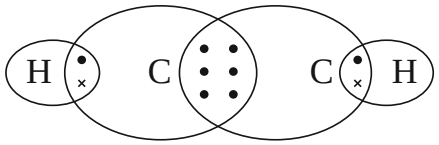
- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

Maximum Marks : 40

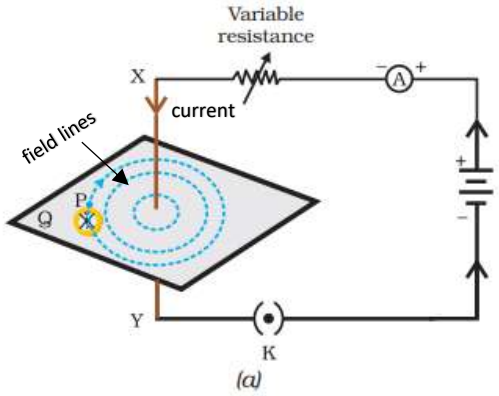
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	• If carbon atom gains four electrons to form C^{4-} anion, it would be *difficult for its nucleus with six protons to hold on to ten electrons*.	1	2
	• If carbon atom loses four electrons to form C^{4+} cation, it would require *large amount of energy to remove four electrons* leaving behind a carbon cation with *six protons in its nucleus holding on to just two electrons*.	1	
	Alternative answer :-		
	It is difficult for carbon atom to gain 4 electrons (C^{4-} anion) or lose 4 electrons (C^{4+} cation) as it becomes unstable in terms of energy.	2	
2.	(i) • Electronic configuration of X is 2, 8, 1	½	2
	• Valency is 1 / +1	½	
	(ii) • X_2O / Na_2O	½	
	• Basic	½	
3.	(i) Placenta is extremely essential because it		2
	• provides nutrients /glucose / oxygen to the growing embryo.	½	
	• removes waste generated by embryo by transferring them into mother's blood through it.	½	
	(ii) Uterine lining becomes thick and spongy which is required to provide nourishment to the fertilised egg (embryo).	1	
4.	(a) Reproductive part of bread mould—Sporangia / Spores	½	
	Non-reproductive part of bread mould—Hyphae	½	

	(b) (i) Plants raised by vegetative propagation can bear flowers and fruits much earlier than those produced from seeds. (ii) It is important for plants that have lost the capacity to produce seeds. (iii) All plants formed by this method are genetically similar to the parent plant and have all its characteristics. **(Or any other) (Any *two* points)**	½ +½	2
5.	• Stamen • Pistil / Carpel • Located in the flower • The male reproductive part consists of <u>anther and filament</u> . (give full credit to labelled diagram of stamen)	½ ½ ½ ½	
	OR		
5.	• The stage at which rate of general body growth begins to slow down and the reproductive tissues begin to mature. Two common changes (i) Thick hair growing in armpits and genital area. (ii) Skin becomes oily. (iii)Thin hair on legs and arms. **(or any other) (any two)**	1 ½+½	2
6.	(a)  ***a*** or P – North pole ; Q – South pole	½	
	 ***b*** or R – North pole ; S – South pole	½	
	(b) The magnetic field lines emerge from the North-pole and merge to South-pole outside the magnet. (Inside the magnet the direction is from South pole to North pole.) **Alternative answer** :- Closed curves which emerge from North pole and merge at the South pole.	1	
	OR		
6.	(i) Maximum - when the direction of current (current carrying conductor) is perpendicular to the direction of magnetic field. (ii) Minimum - (zero) when the direction of current (current carrying conductor) is parallel / antiparallel / along the direction of magnetic field.	1 1	2

7.	• 20,000 J • Only 10% usable energy / amount of organic matter is transferred from one trophic level to the next higher trophic level in a food chain and rest 90% is lost to the environment as heat. **OR**	1 1	
7.	(a) • Waste material generated in day-to-day lives. • Biodegradable and Non-biodegradable substances. (b) Specific enzymes are needed for the breakdown of a particular / specific substance.	½ ½ 1	2
	SECTION—B		
8.	(a) "When the elements are arranged in the order of their increasing atomic masses, then every eighth element has properties similar to the first element." (b) When the elements of a triad are arranged in the order of their increasing atomic masses, the atomic mass of the middle element is equal to the average of the atomic masses of other two elements. Examples: • Li Na K • Ca Sr Ba • Cl Br I **(Any one example)** (c) Limitations of :- • Newlands' Law : Applicable till Calcium / assumed that only 56 elements existed / unlike elements placed in the same column (Co, Ni). • Dobereiner's Triads : Only three triads were formed.	1 ½ ½ ½ ½	3
9.	(a) Aldehyde (b) $C_nH_{2n+1}CHO$ / $R-CHO$ (c) They are homologues.  **(or any other)** **OR**	1 1 ½ ½	
9.		1	

	(a)  (b) **Covalent Compounds** — **Ionic Compounds** * low melting point — high melting point * low boiling point. — high boiling point. * poor conductors of electricity. — good conductors of electricity in molten state or aqueous solution. **(or any other difference)** **(Any Two)**	1+1	3
10.	(a) Sperm having X chromosome and sperm having Y chromosome (b) No. As male child gets only Y chromosome from his father and X chromosome from mother to have XY chromosome. (c) One type / only ovum / egg	½ + ½ ½ 1 ½	3
11.	(a) The potential difference*(V)* across the ends of a given metallic wire or conductor is directly proportional to the current(I) flowing through it, provided the temperature / physical conditions of the conductor remains the same. $V \alpha I$ V/I = Constant $V = I R$ (b) If the potential difference across the two ends of a conductor is 1 V and the current through it is 1 A, then the resistance *R* of the conductor is 1 ohm. **Alternative answer**: $1\ ohm = \frac{1\ volt}{1\ ampere}$ (c) • $R = \frac{V}{I}$ $R = \frac{2V}{0.5\ A}$ • 4 ohm	½ ½ 1 ½ ½	3
12.	(a) (i) Length of the conductor (*l*) (ii) Area of cross-section of the conductor (A)	1 1	

12.	(b) Radius of wire, $r = 0 \cdot 01$ cm $= 0 \cdot 01 \times 10^{-2}$ m Resistance, $R = 10\ \Omega$ Resistivity, $\rho = 50 \times 10^{-8}\ \Omega$m $R = \rho \frac{l}{A} = \rho \frac{l}{\pi r^2} \Rightarrow l = \frac{R\pi r^2}{\rho}$ $l = \frac{10\Omega \times 22 \times (0 \cdot 01 \times 10^{-2})^2 \text{m}}{7 \times 50 \times 10^{-8}\Omega\text{m}}$ $= \frac{22}{35}\text{m} = 0 \cdot 629$ m / 0.628 m / 0.62 m **OR** (a) Rate at which electric energy is dissipated / consumed in an electric circuit SI unit : watt / joule per second / volt . ampere (b) $E = P \times t$ (i) 2 kW × 2h = 4kWh (ii) 4 × 3.6 × 10^6 joules = 14.4×10^6 J / 1.44×10^7 J	½ ½ 1 ½ ½ ½ ½	3
13.	(a) ▪ A pond is a natural ecosystem having its own cleaning system in the form of decomposers whereas an aquarium is a man-made or artificial ecosystem having no decomposers. (b) ▪ It is due to release of chlorofluorocarbons (CFCs) in the atmosphere. ▪ The harmful UV radiations would reach earth and cause damage to different life forms on the earth / cause skin cancer in human beings.	1 1 1	3
	SECTION—C		
14.	(a) Tall with round seeds (b) Short with wrinkled seeds (c) Tall with wrinkled seeds : Short with round seeds 3 : 3 1 : 1 **OR** (c) • i) 900 ii) 100 • When two individuals showing two different contrasting characteristics are bred with each other, then in F2 progeny new combinations are seen / visible as traits are independently inherited.	1 1 1 1 ½ ½ 1	4
15.	(a) A force is exerted on the current carrying rod when it is placed perpendicular to the magnetic field.	1	

	(b) Fleming's left-hand rule : Stretch the thumb, forefinger and middle finger of your left-hand such that they are mutually perpendicular. If the first finger points to the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. (c) (i) Towards left or towards west / Into U shape magnet (ii) Electric motor/ electric generator/ loudspeakers/ microphones/ electrical measuring instruments **(any two)** **OR** (c)  Direction of current - downward Direction of field lines – clockwise **Alternatively**, If the direction of current is marked upwards then direction of field lines will be anticlockwise. (Credit full marks if direction of current and field lines are marked in the diagram)	1 1 ½ + ½ 1 ½ ½	4

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Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
[Paper Code : 31/2/2]

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    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

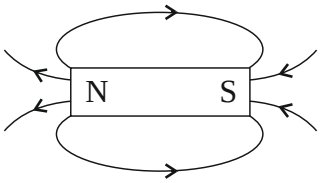
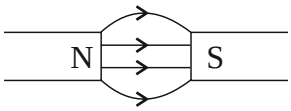
17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE – 086
[PAPER CODE : 31/2/2]

Instructions:-

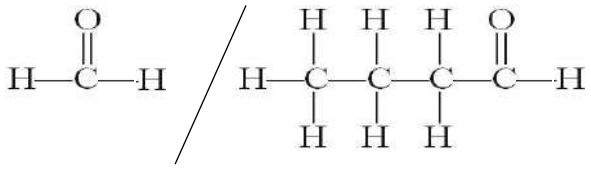
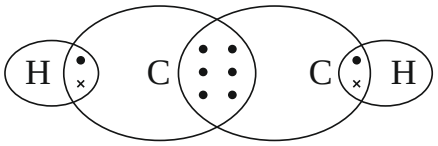
- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

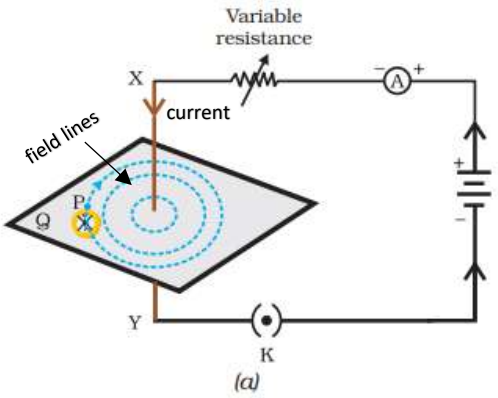
Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	• 20,000 J • Only 10% usable energy / amount of organic matter is transferred from one trophic level to the next higher trophic level in a food chain and rest 90% is lost to the environment as heat.	1 1	
	OR		
1.	(a) • Waste material generated in day-to-day lives. • Biodegradable and Non-biodegradable substances. (b) Specific enzymes are needed for the breakdown of a particular / specific substance.	½ ½ 1	2
2.	(a)  ***a*** or P – North pole ; Q – South pole	½	
	 ***b*** or R – North pole ; S – South pole	½	
	(b) The magnetic field lines emerge from the North-pole and merge to South-pole outside the magnet. (Inside the magnet, the direction is from South pole to North pole.)	1	
	Alternative answer :- Closed curves which emerge from North pole and merge at the South pole.		
	OR		
2.	(i) Maximum - when the direction of current (current carrying conductor) is perpendicular to the direction of magnetic field.	1	
	(ii) Minimum - (zero) when the direction of current (current carrying conductor) is parallel / antiparallel / along the direction of magnetic field.	1	2

3.	• Stamen • Pistil / Carpel • Located in the flower • The male reproductive part consists of <u>anther and filament</u> . (give full credit to labelled diagram of stamen) **OR**	½ ½ ½ ½	
3.	• The stage at which rate of general body growth begins to slow down and the reproductive tissues begin to mature. Two common changes 1) Thick hair growing in armpits and genital area. 2) Skin becomes oily. 3) Thin hair on legs and arms. **(or any other)** **(any two)**	1 ½+½	2
4.	(a) Reproductive part of bread mould—Sporangia / Spores Non-reproductive part of bread mould—Hyphae (b) (i) Plants raised by vegetative propagation can bear flowers and fruits much earlier than those produced from seeds. (ii) It is important for plants that have lost the capacity to produce seeds. (iii) All plants formed by this method are genetically similar to the parent plant and have all its characteristics. **(Or any other)** **(Any *two* points)**	½ ½ ½ +½	2
5.	• A - Plumule B – Cotyledon C - Radicle • B provides stored food for the embryo.	½ ½ ½ ½	2
6.	(a) (i) AF_2 (ii) E_2B (b) (i) C (ii) D	½+½ ½+½	2
7.	CH_3OH, C_2H_5OH (or any other two consecutive homologues) (i) Increases (ii) Increases / decreases / follow gradation	½+½ ½ ½	2
	SECTION—B		
8.	(a) ▪ A pond is a natural ecosystem having its own cleaning system in the form of decomposers whereas an aquarium is a man-made or artificial ecosystem having no decomposers. (b) ▪ It is due to release of chlorofluorocarbons (CFCs) in the atmosphere.	1 1	

	▪ The harmful UV radiations would reach earth and cause damage to different life forms on the earth / cause skin cancer in human beings.	1	3
9.	(a) (i) Length of the conductor (l) (ii) Area of cross-section of the conductor (A) (b) Radius of wire, $r = 0 \cdot 01$ cm $= 0 \cdot 01 \times 10^{-2}$ m Resistance, $R = 10\ \Omega$ Resistivity, $\rho = 50 \times 10^{-8}\ \Omega$m $R = \rho \frac{l}{A} = \rho \frac{l}{\pi r^2} \Rightarrow l = \frac{R\pi r^2}{\rho}$ $l = \frac{10\Omega \times 22 \times (0 \cdot 01 \times 10^{-2})^2 \text{m}}{7 \times 50 \times 10^{-8} \Omega\text{m}}$ $= \frac{22}{35}\text{m} = 0 \cdot 629$ m = 0.628 m = 0.62 m **OR**	1 1 ½ ½	
9.	(a) Rate at which electric energy is dissipated / consumed in an electric circuit SI unit : watt / joule per second / volt . ampere (b) $E = P \times t$ (i) 2 kW × 2h = 4kWh (ii) 4 × 3.6 × 10^6 joules = 14.4×10^6 J / 1.44×10^7 J	1 ½ ½ ½ ½	3
10.	(i) $R_S = R_1 + R_2$ Here $R_S = 10\ \Omega + 50\ \Omega = 60\ \Omega$ $R_3 = 30\ \Omega$ $\frac{1}{R_P} = \frac{1}{R_S} + \frac{1}{R_3}$ $\therefore R = \frac{R_S R_3}{R_S + R_3} = \frac{60\ \Omega \times 30\ \Omega}{(60+30)\Omega} = 20\ \Omega$ (ii) $I = \frac{V}{R}$ $= \frac{6\ V}{20\ \Omega} = 0.3\ A$	½ ½ ½ ½ ½ ½	3
11.	(i) Green (ii) Green stem : Purple stem 3 : 1 (iii) Conclusion: In two contrasting characters or alternative forms one of the forms is dominant over the other which is recessive. / Green stem colour is dominant over purple stem / dominant traits are expressed in the presence of recessive trait.	1 1 1	3

12.	(a) Aldehyde	1	
	(b) $C_nH_{2n+1}CHO$ / $R-CHO$	1	
	(c) They are homologues.	½	
	 **(or any other)**	½	
	OR		
12.	(a) 	1	
	(b) **Covalent Compounds** / **Ionic Compounds** * low melting point / high melting point * low boiling point. / high boiling point. * poor conductors of electricity. / good conductors of electricity in molten state or aqueous solution. **(or any other)**	1+1	
	(Any Two)		3
13.	(a) "When the elements are arranged in the order of their increasing atomic masses, then every eighth element has properties similar to the first element."	1	
	(b) When the elements of a triad are arranged in the order of their increasing atomic masses, the atomic mass of the middle element is equal to the average of the atomic masses of other two elements.	½	
	Examples: • Li Na K • Ca Sr Ba • Cl Br I **(Any one example)**	½	
	(c) Limitations of :- • Newlands' Law : Applicable till Calcium / assumed that only 56 elements existed / unlike elements placed in the same column (Co, Ni).	½	
	• Dobereiner's Triads : Only three triads were formed.	½	
			3

	SECTION—C		
14.	(a) When a current carrying conductor is placed perpendicular to the magnetic field, it experiences a force.	1	
	(b) Fleming's left-hand rule : Stretch the thumb, forefinger and middle finger of your left-hand such that they are mutually perpendicular. If the first finger points to the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor.	1	
	(c) (i) No change in the direction of displacement	1	
	(ii) Electric motor/ electric generator/ loudspeakers/ microphones/ electrical measuring instruments **(any two)**	½ + ½	
	OR		
	(c)  (a)	1	
	Direction of current - downward	½	
	Direction of field lines – clockwise	½	
	Alternatively, if the direction of current is marked upwards then direction of field lines will be anticlockwise.		
	(Credit full marks if direction of current and field lines are marked in the diagram)		4
15.	(a) Dominant character is expressed, i.e., tallness, out of the two forms of the character inherited.	1	
	(b) Short	1	
	(c) Short / no new combinations /		
	<table><tr><td></td><td>T</td><td>t</td></tr><tr><td>T</td><td>TT</td><td>Tt</td></tr><tr><td>t</td><td>Tt</td><td>tt</td></tr></table>	2	
	Tall : Short		

	3 : 1 **OR** (c) i) 900 ii) 100 • When two individuals showing two different contrasting characteristics are bred with each other, then in F2 progeny new combinations are seen / visible, as traits are independently inherited.	 ½ ½ 1	 4

* * *

Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE - 086
[Paper Code : 31/2/3]

General Instructions :

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per

day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totalling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totalling on the title page.
    - Wrong totalling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.
    - Wrong transfer of marks from the answer book to online award list.
    - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

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MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE 086
[PAPER CODE : 31/2/3]

Instructions:-

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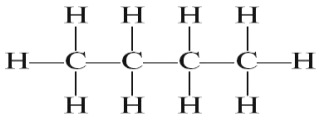
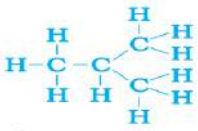
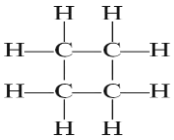
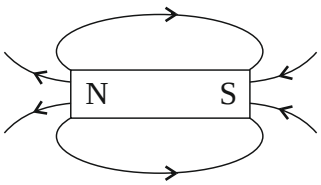
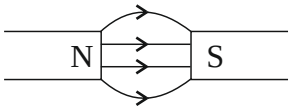
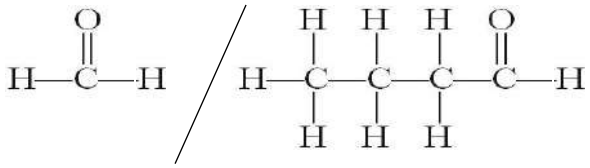
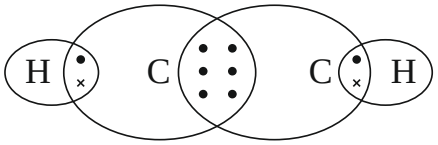
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

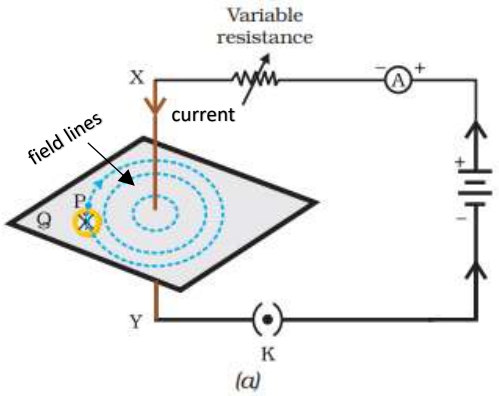
Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(i) X – 2, 8, 8, 2 (ii) Group - 2; Period - 4 (iii) Basic (iv) Beryllium/Magnesium/Strontium/Barium	½ ½ ½ ½	2
2.	(i) Butane :  Isobutane  Cyclobutane  (ii) No. of bonds 13 / No. of bonds 13 / No. of bonds 12	½ ½ 1	2
3.	(a) Reproductive part of bread mould—Sporangia / Spores Non-reproductive part of bread mould—Hyphae (b) (i) Plants raised by vegetative propagation can bear flowers and fruits much earlier than those produced from seeds. (ii) It is important for plants that have lost the capacity to produce seeds. (iii) All plants formed by this method are genetically similar to the parent plant and have all its characteristics. **(Or any other) (Any *two* points)**	½ ½ ½ +½	2
4.	(a) (i) change hormonal balance leading to side effects/cause hormonal imbalance (ii) Irritation in the uterus (b) ● mechanical barrier ● Prevents transmission of infections like STD's	½ ½ ½ ½	2

5.	(a)  ***a*** or P – North pole ; Q – South pole  ***b*** or R – North pole ; S – South pole (b) The magnetic field lines emerge from the North-pole and merge to South-pole outside the magnet. (Inside the magnet the direction is from South pole to North pole.) **Alternative answer** :- Closed curves which emerge from North pole and merge at the South pole. **OR** i. Maximum - when the direction of current (current carrying conductor) is perpendicular to the direction of magnetic field. ii. Minimum - (zero) when the direction of current (current carrying conductor) is parallel / antiparallel / along the direction of magnetic field.	½ ½ 1 1 1	2
6.	• 20,000 J • Only 10% usable energy / amount of organic matter is transferred from one trophic level to the next higher trophic level in a food chain and rest 90% is lost to the environment as heat. **OR** (a) • Waste material generated in day-to-day lives. • Biodegradable and Non-biodegradable substances. (b) Specific enzymes are needed for the breakdown of a particular / specific substance.	1 1 ½ ½ 1	2
7.	• Stamen • Pistil / Carpel • Located in the flower • The male reproductive part consists of <u>anther and filament</u> . (give full credit to labelled diagram of stamen) **OR** • The stage at which rate of general body growth begins to slow down and the reproductive tissues begin to mature. Two common changes 1) Thick hair growing in armpits and genital area. 2) Skin becomes oily. 3) Thin hair on legs and arms. **(or any other)** **(any two)**	½ ½ ½ ½ 1 ½+½	2

	SECTION—B		
8.	(a) Aldehyde	1	
	(b) $C_nH_{2n+1}CHO$ / $R-CHO$	1	
	(c) They are homologues.	½	
	 **(or any other)**	½	
	OR		
8.	(a) 	1	
	(b) **Covalent Compounds** / **Ionic Compounds** * low melting point / high melting point * low boiling point. / high boiling point. * poor conductors of electricity. / good conductors of electricity in molten state or aqueous solution. **(or any other difference)**	1+1	
	(Any Two)		3
9.	(a) "When the elements are arranged in the order of their increasing atomic masses, then every eighth element has properties similar to the first element."	1	
	(b) When the elements of a triad are arranged in the order of their increasing atomic masses, the atomic mass of the middle element is equal to the average of the atomic masses of other two elements.	½	
	Examples: • Li Na K • Ca Sr Ba • Cl Br I **(Any one example)**	½	
	(c) Limitations of :-		
	• Newlands' Law : Applicable till Calcium / assumed that only 56 elements existed / unlike elements placed in the same column (Co, Ni).	½	
	• Dobereiner's Triads : Only three triads were formed.	½	
			3

10.	(a) When an electric current is passed through a conductor, it becomes hot because the source energy is dissipated in the form of heat. This phenomenon is known as heating effect of electric current. (b) $H = I^2Rt$ or VIt or $\frac{V^2}{R}\,t$ H = Amount of heat produced R = Resistance I = Current t = Time V = Potential Difference (half marks for writing meaning of symbol) (c) Electric iron, geyser, heater **(any other)**	1 ½ ½ ½+½	3
11.	• Thread-like structures present in the nucleus carrying genetic material. • Each cell will have two copies of each chromosome, one each from the male and female parents. Every germ cell will take one chromosome from each pair. • When two germ cells combine, they restore the number of chromosomes, ensuring the stability of the species.	1 1 1	3
12.	(a) ▪ A pond is a natural ecosystem having its own cleaning system in the form of decomposers whereas an aquarium is a man-made or artificial ecosystem having no decomposers. (b) ▪ It is due to release of chlorofluorocarbons (CFCs) in the atmosphere. ▪ The harmful UV radiations would reach earth and cause damage to different life forms on the earth / cause skin cancer in human beings.	1 1 1	3
13.	(a) (i) Length of the conductor (l) (ii) Area of cross-section of the conductor (A) (b) Radius of wire, $r = 0 \cdot 01$ cm $= 0 \cdot 01 \times 10^{-2}$ m Resistance, $R = 10\ \Omega$ Resistivity, $\rho = 50 \times 10^{-8}\ \Omega$m $R = \rho\frac{l}{A} = \rho\frac{l}{\pi r^2} \Rightarrow l = \frac{R\pi r^2}{\rho}$ $l = \frac{10\Omega \times 22 \times (0{\cdot}01 \times 10^{-2})^2 \text{m}}{7 \times 50 \times 10^{-8}\Omega\text{m}}$ $= \frac{22}{35}\text{m} = 0 \cdot 629$ m $= 0.628$ m $= 0.62$ m	1 1 ½ ½	

	OR		
13.	(a) Rate at which electric energy is dissipated / consumed in an electric circuit SI unit : watt / joule per second / volt . ampere	1 ½	
	(b) $E = P \times t$	½	
	(i) 2 kW × 2h = 4kWh	½	
	(ii) 4 × 3.6 × 10^6 joules = 14.4 × 10^6 J / 1.44 × 10^7 J	½	3
	SECTION—C		
14.	(a) Direction of current in the rod is perpendicular to the direction of magnetic field.	1	
	(b) Fleming's left-hand rule : Stretch the thumb, forefinger and middle finger of your left-hand such that they are mutually perpendicular. If the first finger points to the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor.	1	
	(c) (i) Towards left or towards west / Into U shape magnet	1	
	(ii) Electric motor/ electric generator/ loudspeakers/ microphones/ electrical measuring instruments **(any two)**	½ + ½	
	OR		
	(c)  (a)	1	
	Direction of current - downward	½	
	Direction of field lines – clockwise	½	
	Alternatively, if the direction of current is marked upwards then direction of field lines will be anticlockwise.		
	(Credit full marks if direction of current and field lines are marked in the diagram)		4
15.	(a) Tall with round seeds	1	
	(b) Short with wrinkled seeds / Recessive traits are those traits which are not expressed in the presence of dominant trait.	1	
	(c) Tall with wrinkled seeds : Short with round seeds	1	

	3 : 3 1 : 1 **OR**	1	
	(c) • i) 900 ii) 100 • When two individuals showing two different contrasting characteristics are bred with each other, then in F2 progeny new combinations are seen / visible as traits are independently inherited.	½ ½ 1	4

* * *

SET-1

Series QQBRR/3

प्रश्न-पत्र कोड
Q.P. Code **31/3/1**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **15** हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **15** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains **15** printed pages.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **15** questions.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान
SCIENCE

निर्धारित समय : 2 घण्टे *अधिकतम अंक : 40*

Time allowed : 2 hours *Maximum Marks : 40*

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **15** प्रश्न हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *यह प्रश्न-पत्र **तीन** खण्डों में विभाजित किया गया है – **क, ख** एवं **ग** ।*

(iii) ***खण्ड क** – प्रश्न संख्या **1** से **7** तक लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **2** अंकों का है ।*

(iv) ***खण्ड ख** – प्रश्न संख्या **8** से **13** भी लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **3** अंकों का है ।*

(v) ***खण्ड ग** – प्रश्न संख्या **14** और **15** प्रकरण-आधारित प्रश्न हैं । प्रत्येक प्रश्न **4** अंकों का है ।*

(vi) *कुछ प्रश्नों में आंतरिक चयन प्रदान किया गया है । इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए ।*

खण्ड क

1. (क) डिस्पोजेबल कुल्हड़ों (मिट्टी के पात्र) और डिस्पोजेबल कागज़ के कपों दोनों का उपयोग प्लास्टिक के डिस्पोजेबल कपों के विकल्प के रूप में किया जा रहा है । इन दोनों में से किसे प्लास्टिक के कपों के बेहतर विकल्प के रूप में माना जा सकता है और क्यों ? *2*

अथवा

(ख) जैव आवर्धन द्वारा मानव पर सबसे अधिक प्रतिकूल प्रभाव पड़ रहा है । इसका कारण लिखिए । खाद्य पदार्थों (फलों और सब्ज़ियों) की सामान्य धुलाई से जैव आवर्धन के प्रभाव को कम क्यों नहीं किया जा सकता है ? *2*

2. निम्नलिखित की इलेक्ट्रॉन-बिंदु संरचना खींचिए : *2*

(क) साइक्लोहेक्सेन

(ख) ब्यूटेन

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises **15** questions. **All** questions are compulsory.*

(ii) *This question paper is divided into **three** sections – **A**, **B** and **C**.*

(iii) ***Section A** – Questions No. **1** to **7** are short answer type questions. Each question carries **2** marks.*

(iv) ***Section B** – Questions No. **8** to **13** are also short answer type questions. Each question carries **3** marks.*

(v) ***Section C** – Questions No. **14** and **15** are case-based questions. Each question carries **4** marks.*

(vi) *Internal choices have been provided in some questions. Only one of the alternatives has to be attempted.*

SECTION A

1. (a) Kulhads (disposable cups made of clay) and disposable paper cups both are used as an alternative for disposable plastic cups. Which one of these two can be considered as a better alternative to plastic cups and why ? *2*

OR

(b) Human beings are most adversely affected by the Biological Magnification. State the reason. Why can ordinary washing of the edibles (fruits and vegetables) not reduce the effect of biological magnification ? *2*

2. Draw the electron dot structure of the following : *2*

(a) Cyclohexane

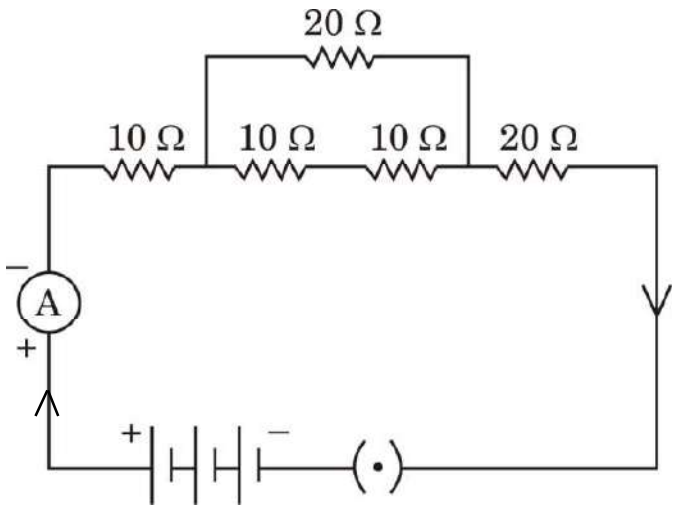
(b) Butane

3. मेन्डेलीफ द्वारा अपनी आवर्त सारणी तैयार करने के लिए अपनाए गए मापदण्ड का उल्लेख कीजिए । मेण्डेलीफ की आवर्त सारणी और आधुनिक आवर्त सारणी में तत्त्वों के समस्थानिकों की स्थिति की तुलना कीजिए । *2*

4. (क) अनुमतांक 1100 W का कोई विद्युत् तापक 220 V पर प्रचालित किया गया है । परिकलित कीजिए (i) तापक का प्रतिरोध, तथा (ii) तापक द्वारा ली गई विद्युत् धारा । *2*

अथवा

(ख) नीचे दिए गए विद्युत् परिपथ का तुल्य प्रतिरोध परिकलित कीजिए : *2*



5. मानव जनसंख्या के साइज़ को नियंत्रित करने की कोई दो गर्भनिरोधी विधियाँ सुझाइए और उनकी व्याख्या कीजिए । *2*

6. (क) मेंडल ने स्थूल रूप से दिखाई देने वाले दो विपर्यासी (विकल्पी) लक्षणों वाले मटर के पौधों के बीच संकरण कराने पर यह पाया कि F_1 संतति में प्राप्त पौधों में कोई भी बीचों-बीच (मिश्रित) लक्षणों वाला पौधा नहीं है । मेंडल के इस प्रेक्षण के कारण की व्याख्या कीजिए । *2*

अथवा

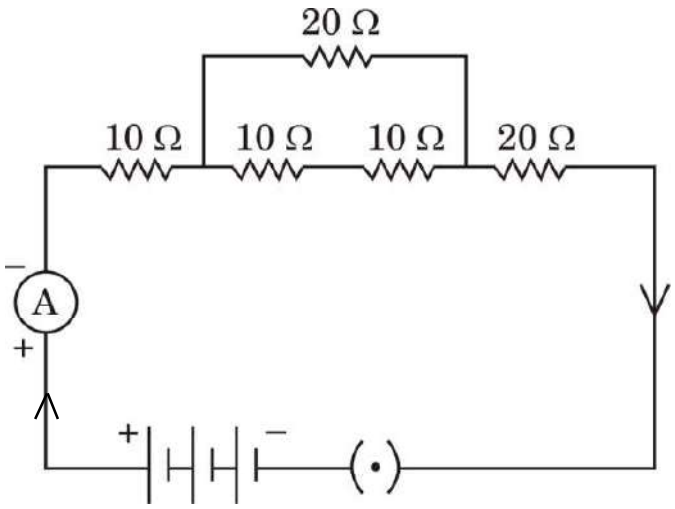
(ख) इस कथन की पुष्टि कीजिए कि "शिशु का लिंग निर्धारण इस तथ्य पर आधारित है कि वह अपने पिता से क्या वंशानुगत करता है" । *2*

3. State the criteria used by Mendeleev for creating his Periodic Table. Compare the position of isotopes of elements in the Mendeleev's Periodic Table and in the Modern Periodic Table. *2*

4. (a) An electric heater rated 1100 W operates at 220 V. Calculate (i) its resistance, and (ii) the current drawn by it. *2*

OR

(b) Calculate the equivalent resistance of the following electric circuit : *2*



5. Suggest any two contraceptive methods to control the size of human population and explain them. *2*

6. (a) Mendel crossed two pea plants with visible contrasting characteristics and found that there were no half-way characteristics in the plants of F_1 progeny. Explain the reason for this observation of Mendel. *2*

OR

(b) Justify the statement "Sex of the children will be determined by what they inherit from their father". *2*

7. मानव मादा के जनन तंत्र के उस भाग/अंग का नाम लिखिए *2*

(क) जहाँ गर्भधारण को रोकने के लिए लूप या कॉपर-T जैसी गर्भनिरोधी युक्तियों को लगाया जाता है ।

(ख) जिसे अण्डों के स्थानान्तरण को रोकने के लिए अवरुद्ध कर दिया जाता है ।

(ग) जहाँ युग्मक (अण्ड) का हरित कोशिकाओं के रूप में निर्माण होता है ।

(घ) जहाँ से भ्रूण अपनी माता के रुधिर से पोषण प्राप्त करता है ।

खण्ड ख

8. मानव-निर्मित पारितंत्र किसे कहते हैं ? एक उदाहरण दीजिए । क्या कोई मानव-निर्मित पारितंत्र स्व-पोषित पारितंत्र बन सकता है ? अपने उत्तर की कारण सहित पुष्टि कीजिए । *3*

9. (क) कारण का उल्लेख कीजिए, ऐसा क्यों है कि

(i) कार्बन के यौगिकों के गलनांक और क्वथनांक निम्न होते हैं ।

(ii) कार्बन के यौगिक विद्युत् का चालन नहीं करते हैं ।

(iii) कार्बन केवल सहसंयोजी यौगिक बना सकता है । *3*

अथवा

(ख) समजातीय श्रेणी किसे कहते हैं ? किसी समजातीय श्रेणी के दो क्रमागत सदस्यों के आण्विक द्रव्यमानों के बीच अन्तर ज्ञात कीजिए । उल्लेख कीजिए कि कार्बन के यौगिकों की किसी समजातीय श्रेणी में आण्विक द्रव्यमान में वृद्धि होने पर निम्नलिखित गुणधर्मों में किस प्रकार का विचरण होता है : *3*

(i) गलनांक और क्वथनांक

(ii) रासायनिक गुणधर्म

7. Name the part/organ of the human female reproductive system *2*

(a) where contraceptive devices such as loop or copper-T are placed to prevent pregnancy.

(b) which is blocked to prevent the transfer of eggs.

(c) where formation of green cells as ova takes place.

(d) from where the embryo gets nutrition from the mother's blood.

SECTION B

8. What are human-made ecosystems ? Give an example. Can a human-made ecosystem become a self-sustaining ecosystem ? Give reason to justify your answer. *3*

9. (a) State the reason why

(i) carbon compounds have low melting and boiling points.

(ii) carbon compounds do not conduct electricity.

(iii) carbon can form only covalent compounds. *3*

OR

(b) What is a homologous series ? Find the difference in molecular mass between the two consecutive members of a homologous series. State how in a homologous series of carbon compounds the following properties vary with increase in molecular mass : *3*

(i) Melting and boiling points

(ii) Chemical properties

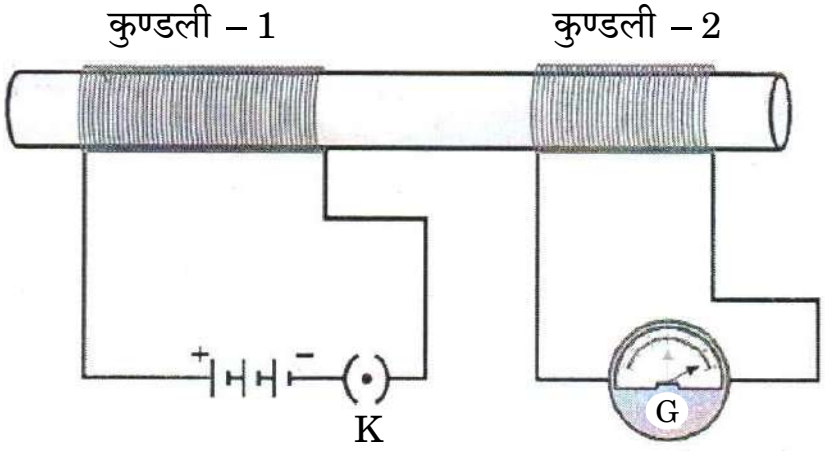
10. नीचे दी गई सारणी में कुछ तत्त्व किसी विशेष पैटर्न में व्यवस्थित किए गए हैं :

sa (do)	**re (re)**	**ga (mi)**	**ma (fa)**	**pa (so)**	**da (la)**	**ni (ti)**
H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co और Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce और La	Zr	–	–

उस आवर्त नियम को पहचानिए जिससे यह सारणी संबद्ध है । उपर्युक्त आवर्त नियम की दो प्रमुख विशेषताओं और दो विसंगतियों की सूची बनाइए । *3*

11. परिनालिका किसे कहते हैं ? किसी धारावाही परिनालिका के चारों ओर उत्पन्न चुम्बकीय क्षेत्र की चुम्बकीय क्षेत्र रेखाओं का पैटर्न खींचिए । इस पैटर्न पर उस क्षेत्र को अंकित कीजिए जहाँ चुम्बकीय क्षेत्र एकसमान है । *3*

12. (क) नीचे दिए गए आरेख में कुण्डली – 1 श्रेणीक्रम में बैटरी और प्लग कुंजी से संयोजित है जबकि कुण्डली – 2 एक गैल्वेनोमीटर से संयोजित है ।



(i) ऐसा क्यों है कि गैल्वेनोमीटर में विक्षेपण केवल उसी समय होता है जब कुंजी (K) को प्लग में लगा रहे होते हैं और उस समय नहीं होता जब परिपथ में स्थायी धारा प्रवाहित होने लगती है ?

(ii) उस समय गैल्वेनोमीटर में क्या प्रेक्षण किया जाता है, जब प्लग से कुंजी को निकाला जाता है ?

(iii) इस क्रियाकलाप के प्रेक्षण के आधार पर निकलने वाला निष्कर्ष लिखिए । *3*

अथवा

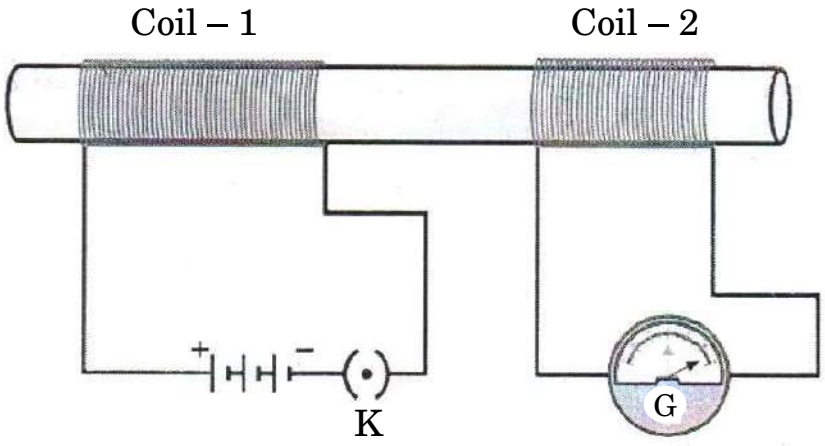
10. In the following table, some elements have been arranged in a certain pattern :

sa (do)	**re (re)**	**ga (mi)**	**ma (fa)**	**pa (so)**	**da (la)**	**ni (ti)**
H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co and Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce and La	Zr	–	–

Identify the periodic law with which the given table is associated. List two important features and two anomalies of the above periodic law. *3*

11. What is a Solenoid ? Draw the pattern of the magnetic field lines around a current carrying solenoid. Mark on the pattern the region where the magnetic field is uniform. *3*

12. (a) In the diagram given below, Coil – 1 is connected in series with a battery and a plug key while Coil – 2 is connected with a galvanometer.



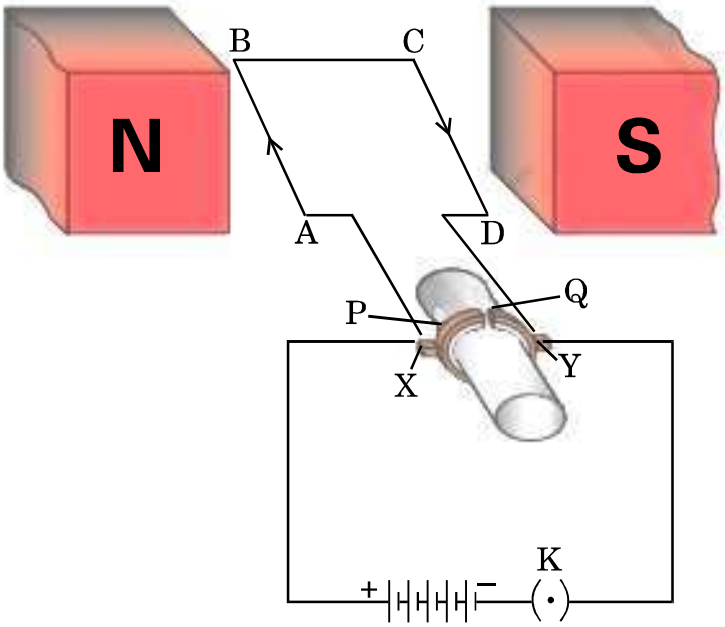
(i) Why does the galvanometer show deflection only when the key (K) is plugged in and not when a steady current starts flowing in the circuit ?

(ii) What is observed in the galvanometer, when the key is plugged out ?

(iii) State the conclusion based on the observation of this activity. *3*

OR

(ख) नीचे दिए गए आरेख में, सरल विद्युत् मोटर को दर्शाया गया है :



आरेख में दर्शाए अनुसार, कुण्डली ABCD में विद्युत् धारा का प्रवाह भुजा AB में A से B की ओर तथा भुजा CD में C से D की ओर है ।

(i) भुजा AB और भुजा CD पर लगने वाले बल की दिशाओं का उल्लेख कीजिए ।

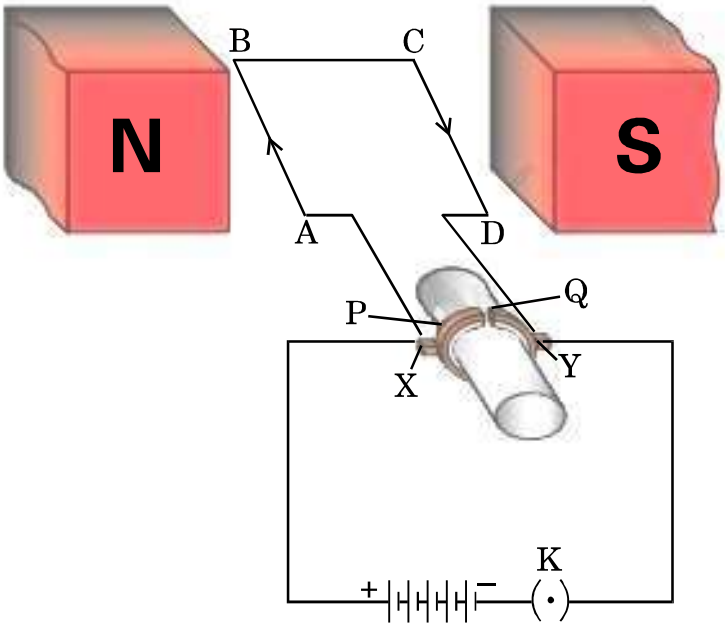
(ii) विद्युत् मोटर के उस भाग को पहचानिए और उसका नाम लिखिए जो कुण्डली ABCD में विद्युत् धारा के प्रवाह की दिशा उत्क्रमित कर देता है ।

(iii) कुण्डली ABCD में विद्युत् धारा के प्रवाह की दिशा उत्क्रमित होने के पश्चात् भुजा AB और भुजा CD पर लगने वाले बलों की दिशा लिखिए ।

(iv) किसी चुम्बकीय क्षेत्र में स्थित धारावाही चालक पर लगने वाले बल की दिशा निर्धारित करने वाले नियम का नाम लिखिए । *3*

13. मेंडल के प्रयोगों ने यह किस प्रकार दर्शाया कि लक्षण स्वतंत्र रूप से वंशानुगत होते हैं ? व्याख्या कीजिए । *3*

(b) In the figure given below, a simple electric motor is shown :



As shown in the figure, the current in the coil ABCD flows from A to B in the arm AB and C to D in the arm CD.

(i) State the directions in which the arms AB and CD will experience a force.

(ii) Identify the part of the electric motor that reverses the flow of current in the coil ABCD and write its name.

(iii) After the reversal of flow of current in the coil ABCD, state the directions in which the arms AB and CD will experience a force.

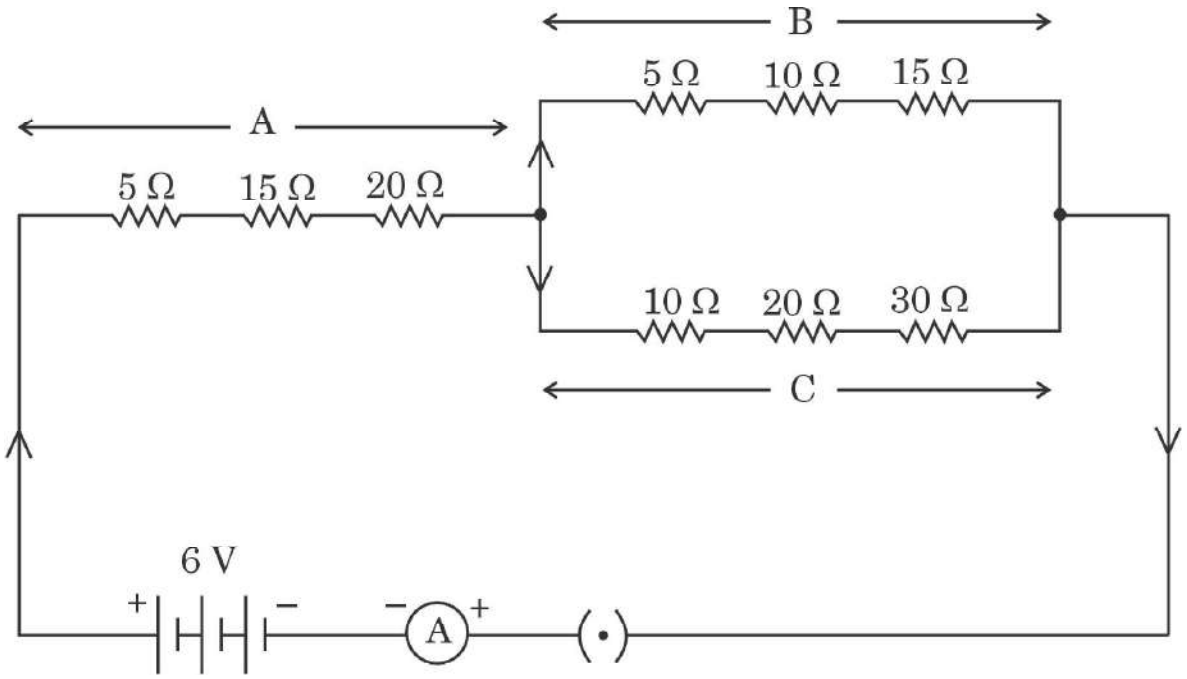
(iv) Name the rule which is applied to determine the direction of force on a current carrying conductor placed in a magnetic field. *3*

13. How do Mendel's experiments show that the traits are inherited independently ? Explain. *3*

खण्ड ग

*इस खण्ड में **2** प्रकरण-आधारित प्रश्न (**14** और **15**) हैं । प्रत्येक प्रकरण में **3** उप-भाग (क), (ख) और (ग) हैं । भाग (क) और (ख) **अनिवार्य** हैं । भाग (ग) में आंतरिक चयन प्रदान किया गया है ।*

14. नीचे दिए गए विद्युत् परिपथ का अध्ययन कीजिए जिनमें प्रतिरोधक तीन भुजाओं A, B और C में व्यवस्थित हैं :



(क) भुजा A का तुल्य प्रतिरोध ज्ञात कीजिए । *1*

(ख) भुजा B और भुजा C के पार्श्व संयोजन का तुल्य प्रतिरोध परिकलित कीजिए । *1*

(ग) (i) ऐमीटर में प्रवाहित धारा निर्धारित कीजिए । *2*

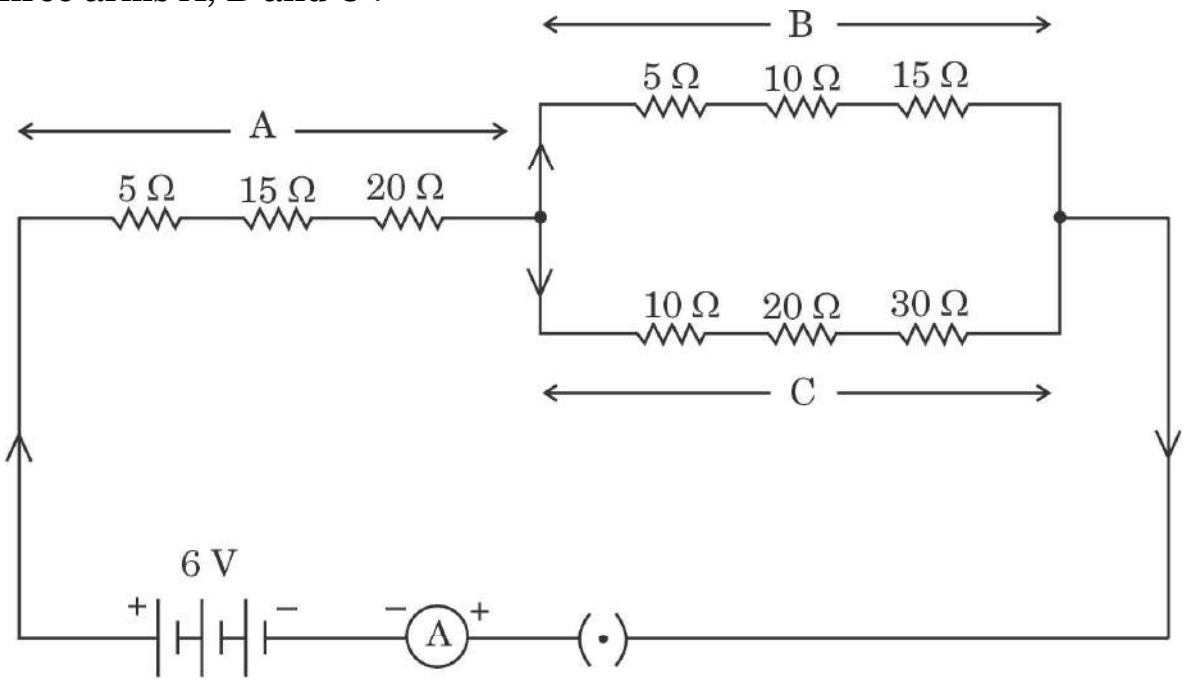
अथवा

(ii) यदि इस परिपथ से भुजा B को हटा दिया जाए, तो ऐमीटर में प्रवाहित धारा निर्धारित कीजिए । *2*

SECTION C

*This section has **2** case-based questions (**14** and **15**). Each case is followed by **3** sub-questions (a), (b) and (c). Parts (a) and (b) are **compulsory**. However, an internal choice has been provided in Part (c).*

14. Study the following electric circuit in which the resistors are arranged in three arms A, B and C :



(a) Find the equivalent resistance of arm A. *1*

(b) Calculate the equivalent resistance of the parallel combination of the arms B and C. *1*

(c) (i) Determine the current that flows through the ammeter. *2*

OR

(ii) Determine the current that flows in the ammeter when the arm B is withdrawn from the circuit. *2*

15. वह विधा जिसके द्वारा विभिन्न जीव जनन करते हैं, उनकी शारीरिक अभिकल्प (डिज़ाइन) पर निर्भर करती है । अलैंगिक जनन में, एकल व्यष्टि जनक अपनी संतति (उपज) उत्पन्न करते हैं और युग्मनज सम्मिलित नहीं होते हैं । यह विधि अनुकूल परिस्थितियों में संतति की संख्या में तीव्र वृद्धि करने का एक सामान्य साधन है । अलैंगिक जनन मुख्यतः एककोशिक जीवों, कुछ पौधों और कुछ सरल बहुकोशिक जन्तुओं में होता है ।

(क) उस जीव का नाम लिखिए जिसमें द्विखण्डन एक निर्धारित तल में होता है । इस जीव के कारण होने वाले रोग का नाम भी लिखिए । *1*

(ख) कायिक प्रवर्धन द्वारा पौधे उत्पन्न करने के किन्हीं दो लाभों की सूची बनाइए । *1*

(ग) (i) हाइड्रा में मुकुलन की प्रक्रिया की व्याख्या कीजिए । *2*

अथवा

(ii) क्या होता है जब

(I) स्पाइरोगायरा तन्तु विकसित होकर काफी लम्बा हो जाता है, और

(II) कोई बीजाणुधानी राइज़ोपस में विकसित होकर फट जाती है ? *2*

15. The modes by which various organisms reproduce depend on the body design of the organisms. In asexual reproduction, a single individual parent produces offsprings without the involvement of gametes. This method is a common means of increasing the offsprings rapidly under favourable conditions. Asexual reproduction occurs mostly in unicellular organisms, some plants and certain simple multicellular animals.

(a) State the name of the organism in which binary fission takes place in a definite orientation. Also name the disease caused by this organism. *1*

(b) List any two advantages of producing plants through vegetative propagation. *1*

(c) (i) Explain the process of budding in Hydra. *2*

OR

(ii) What happens when

(I) a spirogyra filament matures and attains a considerable length, and

(II) a sporangia in Rhizopus bursts on maturation ? *2*

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Marking Scheme – Science SUBJECT CODE -086
(PAPER CODE –31/3/1)

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MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE–086
[PAPER CODE : 31/3/1]

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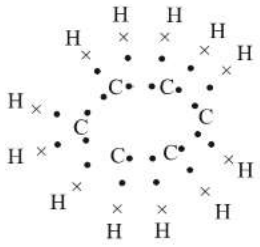
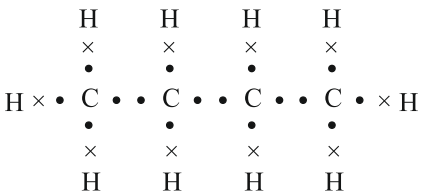
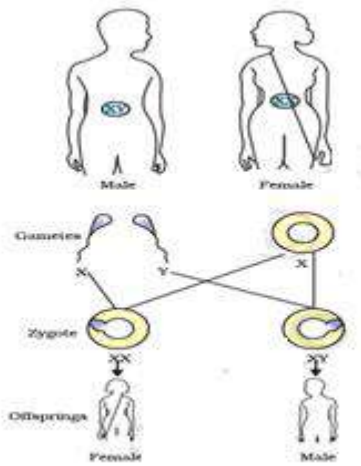
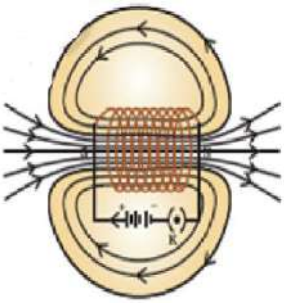
Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(a) • Disposable paper cups. • Making of Kulhads on a large scale would result in the loss of fertile top soil. /Disposable paper cups can easily decompose and do not pollute the environment. **(or any other suitable answer)** **OR**	1 1	
1.	(b) • Human beings occupy the top level in any food chain therefore maximum concentration of these chemicals get accumulated in our bodies. • Harmful chemicals or pesticides get absorbed from the soil by the plants along with water and minerals therefore ordinary washing cannot remove these harmful chemicals.	1 1	2
2.	(a)  (b) 	1 1	2

3.	• Atomic mass • Isotopes were discovered after the proposal of Mendeleev's periodic classification. / No position was given to the isotopes in Mendeleev's Periodic table. While Modern periodic table is based on the atomic number of elements so isotopes are not given any position in Modern periodic table. **Alternative answer,** No position was given to isotopes in Mendleev Periodic Table and Modern Periodic Table.	1 1	 2
4.	(a) P(Power) = V (Potential difference) × I (Current) Here P = 1100 W, V = 220 V, I = ?, R = ? $P = \frac{V^2}{R}$ (i) $R = \frac{V^2}{P}$ $= \frac{220\ \text{V} \times 220\ \text{V}}{1100\ \text{W}}$ $= 44\ \Omega$ (ii) $I = \frac{V}{R}$ $I(\text{Current}) = \frac{V}{R} = \frac{220\ \text{V}}{44\ \Omega} = 5\ \text{A}$ **(Accept any other alternative method)** **OR**	 ½ ½ ½ ½	
4.	(b) $R_S = R_3 + R_4 = 10 + 10 = 20\ \Omega$ $\frac{1}{R_P} = \frac{1}{R_2} + \frac{1}{R_S}$ $= \frac{1}{20} + \frac{1}{20} = \frac{1}{10}\ \Omega$ $R_P = 10\ \Omega$ Total equivalent resistance = $R = R_1 + R_P + R_5$ $= R = 20 + 10 + 10 = 40\ \Omega$	½ ½ ½ ½	2
5.	• Barrier method : Prevents the meeting of sperms with ova • Oral pills/Chemical method : Changes the hormonal balance in females so eggs are not released		

	• Copper T or loop : to prevent pregnancy/to prevent fusion of male & female gametes • Surgical method : To block vas deferens in males or fallopian tube in females to prevent fertilization **(Any two)**	1 +1	2
6.	(a) • No halfway characteristics were found in the F_1 generation because the F_1 progeny is a mixture of contrasting traits of the parents but only one of the character of the parents gets expressed in F_1 progeny. • The character that gets expressed is a dominant trait and that which does not get expressed in the presence of dominant trait is a recessive trait. **OR**	1 1	
6.	(b) Mother has XX chromosome. Father has XY chromosome. All children inherit X chromosome from mother. The one who inherits X chromosome from father will be a girl and one who inherits Y chromosome from the father will be a boy. /  **(full credit for diagrammatic expression)**	½ ½ 1	2
7.	(a) Uterus (b) Fallopian tube or oviduct (c) Ovary / As question has printing error, half mark is awarded to all students irrespective of attempted/non attempted (d) Placenta	½ ½ ½ ½	2

	SECTION—B		
8.	• Human made ecosystems are artificial ecosystems that are developed by human beings. Example: an aquarium, crop fields, parks **(or any other)** **(any one)** • No, they cannot become self-sustaining ecosystem. • It needs to be cleaned regularly as natural replenishment by decomposers /bacteria (cleansing agents) is not possible. **(any other answer with justification)**	1+½ ½ 1	3
9. **9.**	(a) (i) The forces of attraction between the molecules are weak. (ii) Bonding in carbon compounds does not give rise to any charged particles. (iii) Carbon only shares electrons with other atoms. It is not able to lose four electrons or gain four electrons. **OR** (b) • A series of compounds in which some functional groups substitute for hydrogen in a carbon chain / the succeeding members differ by $-CH_2$ unit (14 u) • Difference of $CH_2 = 12u + 2u = 14u$ (i) Melting and boiling points increase with increase in molecular mass. (ii) Chemical properties, determined by the functional group remain same in a homologous series.	1 1 1 1 1 ½ ½	3
10.	• Newland's Law of Octaves • Important features : 1. The elements were arranged in the order of their increasing atomic mass. 2. Every eighth element has properties similar to the first element. • Anomalies : 1. It was assumed that only 56 elements existed in nature and new elements would not be discovered in future. 2. Unlike elements were put in the same slot/note. **(Or any other)**	1 ½ ½ ½ ½	3
11.	• Solenoid: A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder.	1	

	• Pattern of field lines:  • Field is uniform only inside the solenoid. (Position of the uniform field to be marked in the figure)	1½ ½	3
12.	(a) (i) • When the key is plugged-in, current starts in coil-1, the magnetic field around the coil is changed. This produces induced current in the coil – 2 and galvanometer shows deflection • There is no change in magnetic field when a steady current starts flowing in the circuit. (ii) Galvanometer shows deflection in the opposite direction. (iii) Conclusion: Induced current is produced only when there is a change in magnetic field which occurs only when the key is plugged in or plugged out. **OR** **(b)** (i) Arm *AB*—Downward, Arm *CD*—Upward (ii) *P* and *Q*—Split ring / Commutator (iii) Arm *AB* upward, Arm *CD* downward/Direction of force will get reversed (iv) Fleming's left-hand rule	1 1 1 ½+½ ½, ½ ½ ½	3
13.	• Mendel crossed two pea plants with two different visible contrasting characteristics such as plant with round and green seeds, with plant with wrinkled, yellow seeds. In F_1 progeny all obtained plants have round and yellow seeds which are dominant characters. • F_1 progeny is self-pollinated to produce F_2 progeny and the plant produced in F_2 progeny showed new combination such as plant with round and yellow seeds or plant with wrinkled and green seeds which were not present in parent generation or F_1 progeny. The ratio obtained was 9 round yellow,3 round green, 3 wrinkled yellow, 1 wrinkled green. Thus, traits are independently inherited.	1 1 1	

	(Full marks should be given if diagrammatically represented)		3
	SECTION—C		
14.	(a) $R_S = R_1 + R_2 + R_3 = 40\Omega$	½ + ½	
	(b) $\frac{1}{Rp} = \frac{1}{R_B} + \frac{1}{R_C}$	½	
	$\frac{1}{Rp} = \frac{1}{30\Omega} + \frac{1}{60\Omega}$		
	$R_p = 20\ \Omega$	½	
	(c) (i) $R = R_s + R_p$	1	
	$= 40\ \Omega + 20\ \Omega = 60\Omega$		
	$\therefore I = \frac{V}{R} = \frac{6V}{60\Omega} = \frac{1}{10}\ A = 0.1\ A$	½ + ½	
	OR		
	(c) (ii) Resistance , $R = 40\Omega + 60\Omega = 100\Omega$	1	
	$\therefore I = \frac{V}{R} = \frac{6V}{100\Omega} = 0.06\ A$	½ + ½	
			4
15.	(a) Leishmania, Kala-azar	½ + ½	
	(b) Plants can bear fruits and flowers much earlier than produced by sexual reproduction	½	
	Plants produced are genetically similar to the parent plant	½	
	(Or any other)		
	(c) (i) Bud develops as an outgrowth due to repeated cell division at one specific site, these buds develop into tiny individuals, and when fully mature detach from the parent body and become new independent individuals.	2	
	(Marks should be awarded if a student draws a well labelled diagram)		
	OR		
	(c) (ii)		
	(I) The filament breaks into smaller pieces or fragments and each fragment grows into new individuals.	1	
	(II) It releases spores which germinate and eventually develops into new Rhizopus individuals.	1	
			4

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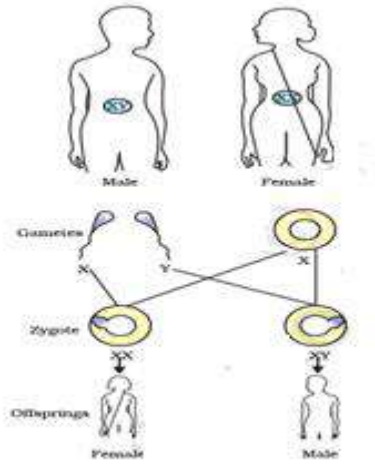
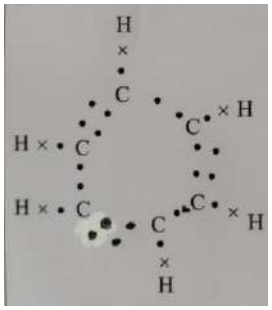
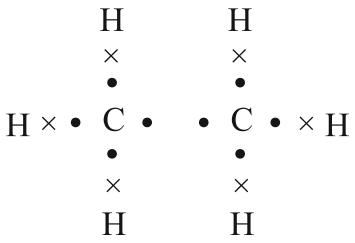
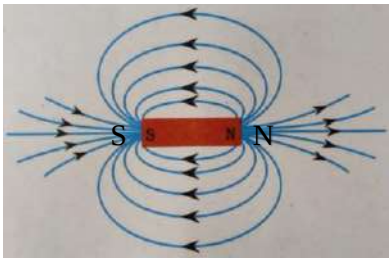
1.	(a) Urethra (b) Testis (c) Vas deferens (d) Seminal vesicle/Prostate gland	½ × 4 =2	2
2.	(a) • No halfway characteristics were found in the F_1 generation because the F_1 progeny is a mixture of contrasting traits of the parents but only one of the character of the parents gets expressed in F_1 progeny. • The character that gets expressed is a dominant trait and that which does not get expressed in the presence of dominant trait is a recessive trait.	1 1	
	OR		
2.	(b) Mother has XX chromosome. Father has XY chromosome. All children inherit X chromosome from mother. The one who inherits X chromosome from father will be a girl and one who inherits Y chromosome from the father will be a boy. /	½ ½ 1	

	 **(full credit for diagrammatic expression)**		2
3.	• Barrier method : Prevents the meeting of sperms with ova • Oral pills/Chemical method : Changes the hormonal balance in females so eggs are not released • Copper T or loop : to prevent pregnancy/to prevent fusion of male & female gametes • Surgical method : To block vas deferens in males or fallopian tube in females to prevent fertilization **(Any two)**	1+1	2
4.	• Electronic configuration of X : 2, 8, 8, 6 • Valency = 2 • Group of X= 6 • Period of X=4	½ ½ ½ ½	2
5.	(a) Electron dot structure of benzene 	1	

	(b) Electron dot structure of ethane 	1	2
6.	(a) • Disposable paper cups. • Making of Kulhads on a large scale would result in the loss of fertile top soil. /Disposable paper cups can easily decompose and do not pollute the environment. **(or any other suitable answer)** **OR**	1 1	
6.	(b) • Human beings occupy the top level in any food chain therefore maximum concentration of these chemicals get accumulated in our bodies. • Harmful chemicals or pesticides get absorbed from the soil by the plants along with water and minerals therefore ordinary washing cannot remove these harmful chemicals.	1 1	2
7.	(a) P (Power) = V (Potential difference) × I (Current) Here P = 1100 W, V = 220 V, I = ?, R = ? $P = \frac{V^2}{R}$ (i) $R = \frac{V^2}{P}$ $= \frac{220\ \text{V} \times 220\ \text{V}}{1100\ \text{W}}$ $= 44\ \Omega$ (ii) $I = \frac{V}{R}$ I (Current) $= \frac{V}{R} = \frac{220\ \text{V}}{44\ \Omega} = 5\ \text{A}$ **(Accept any other alternative method)** **OR**	½ ½ ½ ½	

	(b) $R_S = R_3 + R_4 = 10 + 10 = 20\ \Omega$ $\frac{1}{R_P} = \frac{1}{R_2} + \frac{1}{R_S}$ $= \frac{1}{20} + \frac{1}{20} = \frac{1}{10}\ \Omega$ $R_P = 10\ \Omega$ Total equivalent resistance = $R = R_1 + R_P + R_5$ $= R = 20 + 10 + 10 = 40\ \Omega$	½ ½ ½ ½	2
	SECTION—B		
8.	• Mendel crossed two pea plants with two different visible contrasting characteristics such as plant with round and green seeds, with plant with wrinkled, yellow seeds. In F_1 progeny all obtained plants have round and yellow seeds which are dominant characters. • F_1 progeny is self-pollinated to produce F_2 progeny and the plant produced in F_2 progeny showed new combination such as plant with round and yellow seeds or plant with wrinkled and green seeds which were not present in parent generation or F_1 progeny. The ratio obtained was 9 round yellow,3 round green, 3 wrinkled yellow, 1 wrinkled green. Thus, traits are independently inherited. **(Full marks should be given if diagrammatically represented)**	1 1 1	3
9.	(a) (i) • When the key is plugged-in, current starts in coil-1, the magnetic field around the coil is changed. This produces induced current in the coil – 2 and galvanometer shows deflection • There is no change in magnetic field when a steady current starts flowing in the circuit. (ii) Galvanometer shows deflection in the opposite direction. (iii) Conclusion: Induced current is produced only when there is a change in magnetic field which occurs only when the key is plugged in or plugged out. **OR**	1 1 1	
9.	(b) (i) Arm *AB*—Downward, Arm *CD*—Upward (ii) P and Q—Split ring / Commutator	½+½ ½, ½	

	(iii) Arm *AB* upward, Arm *CD* downward/Direction of force will get Reversed (iv) Fleming's left-hand rule	½ ½	3
10.	(a) • Field lines around a bar magnet.  • Position of North pole, South pole- to be marked in the diagram • Field is strongest where lines are crowded / at Poles / or indicated in the diagram. (b) If two field lines cross each other then at the point of intersection, the compass needle would point towards two directions which is not possible.	1 ½ ½ 1	3
11.	• Newland's Law of Octaves • Important features : 1. The elements were arranged in the order of their increasing atomic mass. 2. Every eighth element has properties similar to the first element. • Anomalies : 1. It was assumed that only 56 elements existed in nature and new elements would not be discovered in future. 2. Unlike elements were put in the same slot/note. **(Or any other)**	1 ½ ½ ½ ½	3
12.	(a) (i) The forces of attraction between the molecules are weak. (ii) Bonding in carbon compounds does not give rise to any charged particles. (iii) Carbon only shares electrons with other atoms. It is not able to lose four electrons or gain four electrons. **OR**	1 1 1	
12.	(b) • A series of compounds in which some functional groups substitute for hydrogen in a carbon chain / the consequent members differ by -CH_2 unit (14 u) • Difference of $CH_2 = 12u + 2u = 14u$ (i) Melting and boiling points increase with increase in molecular mass. (ii) Chemical properties, determined by the functional group remain same in a homologous series.	1 1 ½ ½	3

13.	(a) Since the 10% energy is available from lower trophic level to higher trophic level therefore the number of individuals decreases. (b) The energy captured by the autotrophs cannot revert back to the solar input / energy once received by herbivores cannot come back to autotrophs **Note: similar explanation using any two trophic levels .**	1½ 1½	3
	SECTION—C		
14.	(a) Since most organisms would not normally depend on being cut up to be able to reproduce. (b) •Plants can bear fruits and flowers much earlier than produced by sexual reproduction •Plants produced are genetically similar to the parent plant **(Or any other)** (c) (i) Bud develops as an outgrowth due to repeated cell division at one specific site, these buds develop into tiny individuals, and when fully mature detach from the parent body and become new independent individuals. **(Marks should be awarded if a student draws a well labelled diagram)** **OR** (c) (ii) (I) The filament breaks into smaller pieces or fragments and each fragment grows into new individuals. (II) It releases spores which germinate and eventually develops into new Rhizopus individuals.	1 ½ + ½ 2 1 1	4
15.	(a) $R = R_1 + R_2 + R_3$ $= 5\Omega + 10\Omega + 15\Omega$ $= 30\Omega$ (b) $\frac{1}{Rp} = \frac{1}{R_B} + \frac{1}{R_C}$ $\frac{1}{Rp} = \frac{1}{30\Omega} + \frac{1}{60\Omega}$ $R_p = 20\ \Omega$ (c) (i) $R = R_s + R_p$ $= 40\ \Omega + 20\ \Omega = 60\Omega$ $\therefore I = \frac{V}{R} = \frac{6V}{60\Omega} = \frac{1}{10}\ A = 0.1\ A$	1 ½ ½ 1 ½ + ½	

	OR (c) (ii) $Resistance\ , R = 40\Omega\ + 60\Omega = 100\Omega$ $\therefore I = \frac{V}{R} = \frac{6V}{100\Omega} = 0.06\ A$	1 ½ + ½	4

* **

Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
(PAPER CODE –31/3/3)

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.

12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totalling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totalling on the title page.
    - Wrong totalling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.
    - Wrong transfer of marks from the answer book to online award list.
    - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

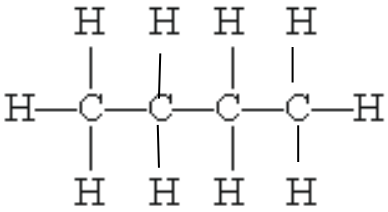
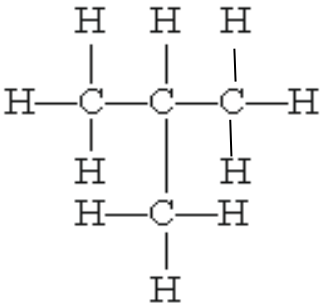
MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE–086
[PAPER CODE : 31/3/3]

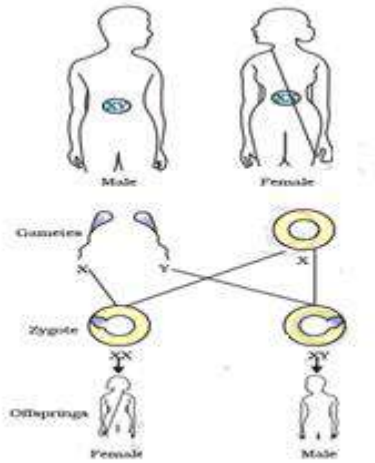
Instructions:-

- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

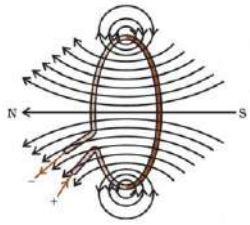
Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	*(a)* P(Power) = V (Potential difference) × I (Current) Here P = 1100 W, V = 220 V, I = ?, R = ? $P = \frac{V^2}{R}$ (i) $R = \frac{V^2}{P}$ $= \frac{220\ \text{V} \times 220\ \text{V}}{1100\ \text{W}}$ $= 44\ \Omega$ (ii) $I = \frac{V}{R}$ $I(\text{Current}) = \frac{V}{R} = \frac{220\ \text{V}}{44\ \Omega} = 5\ \text{A}$ **(Accept any other alternative method)** **OR** (b) $R_S = R_3 + R_4 = 10 + 10 = 20\ \Omega$ $\frac{1}{R_P} = \frac{1}{R_2} + \frac{1}{R_S}$ $= \frac{1}{20} + \frac{1}{20} = \frac{1}{10}\ \Omega$ $R_P = 10\ \Omega$ Total equivalent resistance = $R = R_1 + R_P + R_5$ $= R = 20 + 10 + 10 = 40\ \Omega$	½ ½ ½ ½ ½ ½ ½	2

2.	(i) Down the group the effective nuclear charge experienced by valence electron is decreasing because the outer most electron are further away from the nucleus. Therefore, these can be lost easily. (ii) Effective nuclear charge acting on the valence shell electrons increases across a period. The tendency to lose electron will decrease.	1 1	2
3.	Structural isomers of butane  / $CH_3—CH_2—CH_2—CH_3$  / $CH_3—CH(CH_3)—CH_3$	1 1	2
4.	(a) • Disposable paper cups. • Making of Kulhads on a large scale would result in the loss of fertile top soil. /Disposable paper cups can easily decompose and do not pollute the environment. **(or any other suitable answer)** **OR** (b) • Human beings occupy the top level in any food chain therefore maximum concentration of these chemicals get accumulated in our bodies. • Harmful chemicals or pesticides get absorbed from the soil by the plants along with water and minerals therefore ordinary washing cannot remove these harmful chemicals.	1 1 1 1	2
5.	(a) i) Part—D Anther /Stamen ii) Part—A Stigma (b) Ovule converts into Seed; Ovary converts into Fruit	½ ½ ½ + ½	2
6.	• Barrier method : Prevents the meeting of sperms with ova		

	• Oral pills/Chemical method : Changes the hormonal balance in females so eggs are not released • Copper T or loop : to prevent pregnancy/to prevent fusion of male & female gametes • Surgical method : To block vas deferens in males or fallopian tube in females to prevent fertilization **(Any two)**	1+1	2
7.	(a) • No halfway characteristics were found in the F_1 generation because the F_1 progeny is a mixture of contrasting traits of the parents but only one of the character of the parents gets expressed in F_1 progeny. • The character that gets expressed is a dominant trait and that which does not get expressed in the presence of dominant trait is a recessive trait. **OR** (b) Mother has XX chromosome. Father has XY chromosome. All children inherit X chromosome from mother. The one who inherits X chromosome from father will be a girl and one who inherits Y chromosome from the father will be a boy. /  **(Full credit for diagrammatic expression)**	1 1 ½ ½ 1	2
	SECTION-B		
8.	Newland's Law of Octaves Important features: 1. The elements were arranged in the order of their increasing atomic mass. 2. Every eighth element has properties similar to the first element.	1 ½	

	Anomalies: 1. It was assumed that only 56 elements existed in nature and new elements would not be discovered in future. 2. Unlike elements were put in the same slot/note. **(Or any other)**	½ ½ ½	3
9.	• Mendel crossed two pea plants with two different visible contrasting characteristics such as plant with round and green seeds, with plant with wrinkled, yellow seeds. In F_1 progeny all obtained plants have round and yellow seeds which are dominant characters. • F_1 progeny is self-pollinated to produce F_2 progeny and the plant produced in F_2 progeny showed new combination such as plant with round and yellow seeds or plant with wrinkled and green seeds which were not present in parent generation or F_1 progeny. The ratio obtained was 9 round yellow,3 round green, 3 wrinkled yellow, 1 wrinkled green. Thus, traits are independently inherited. **(Full marks should be given if diagrammatically represented)**	1 1 1	3
10.	(a) • The microorganisms, that break down the dead remains and waste products of organisms into simpler substances. • Break down the complex organic wastes into simpler substances and return the nutrients to the soil so that these can be used again by the plants. (b) Decomposers are not able to break down the plastics into its constituents therefore plastics cannot be decomposed. / Plastics are non-bio degradable.	1 1 1	3
11. **11.**	(a) (i) The forces of attraction between the molecules are weak. (ii) Bonding in carbon compounds does not give rise to any charged particles. (iii) Carbon only shares electrons with other atoms. It is not able to lose four electrons or gain four electrons. **OR** (b) • A series of compounds in which some functional groups substitute for hydrogen in a carbon chain / the consequent members differ by -CH_2 unit (14 u) • Difference of $CH_2 = 12u + 2u = 14u$ (i) Melting and boiling points increase with increase in molecular mass.	1 1 1 1 1 ½	

	(ii)Chemical properties, determined by the functional group remain same in a homologous series.	½	3
12.	(a) Pattern of magnetic field 	1	
	1 mark for correct representation of direction of magnetic field lines and current.	1	
	(b) Right-hand thumb rule : Hold a current carrying straight conductor in your righthand such that the thumb points towards the direction of current, then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field.	1	3
13.	(a) (i) • When the key is plugged-in, current starts in coil-1, the magnetic field around the coil is changed. This produces induced current in the coil – 2 and galvanometer shows deflection • There is no change in magnetic field when a steady current starts flowing in the circuit.	1	
	(ii) Galvanometer shows deflection in the opposite direction.	1	
	(iii) Conclusion: Induced current is produced only when there is a change in magnetic field which occurs only when the key is plugged in or plugged out.	1	
13.	**OR**		
	(b)		
	(i) Arm *AB*—Downward, Arm *CD*—Upward	½+½	
	(ii) *P* and *Q*—Split ring / Commutator	½, ½	
	(iii) Arm *AB* upward, Arm *CD* downward/Direction of force will get reversed	½	
	(iv) Fleming's left-hand rule	½	3
	SECTION—C		
14.	(a) $R = R_1 + R_2 + R_3$ $= 10\Omega + 20\Omega + 30\Omega$ $= 60\Omega$	1	
	(b) $\frac{1}{Rp} = \frac{1}{R_B} + \frac{1}{R_C}$	½	

	$\frac{1}{Rp} = \frac{1}{30\Omega} + \frac{1}{60\Omega}$ $R_p = 20\ \Omega$ (c) (i) $R = R_s + R_p$ $= 40\ \Omega + 20\ \Omega = 60\Omega$ $\therefore I = \frac{V}{R} = \frac{6V}{60\Omega} = \frac{1}{10}\ A = 0.1\ A$ **OR** (c) (ii) $Resistance, R = 40\Omega + 60\Omega = 100\Omega$ $\therefore I = \frac{V}{R} = \frac{6V}{100\Omega} = 0.06\ A$	½ 1 ½ +½ 1 ½ +½	4
15.	(a) Leishmania, Kala-azar (b) Buds produced in the notches of leaf margins of 'Bryophyllum' develop into new plants, whereas Banana leaves do not have buds in their leaves. (c) (i) Bud develops as an outgrowth due to repeated cell division at one specific site, these buds develop into tiny individuals, and when fully mature detach from the parent body and become new independent individuals. **(Marks should be awarded if a student draws a well labelled diagram)** **OR** (c) (ii) (I) The filament breaks into smaller pieces or fragments and each fragment grows into new individuals. (II) It releases spores which germinate and eventually develops into new Rhizopus individuals.	1 1 2 1 1	4

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Series : QQDRR/4

SET-1

प्रश्न–पत्र कोड
Q.P. Code **31/4/1**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न–पत्र कोड को उत्तर–पुस्तिका के मुख–पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न–पत्र में मुद्रित पृष्ठ **16** हैं ।
- प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए प्रश्न–पत्र कोड को छात्र उत्तर–पुस्तिका के मुख–पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न–पत्र में **15** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर–पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न–पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न–पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न–पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर–पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।

- Please check that this question paper contains **16** printed pages.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **15** questions.
- **Please write down the Serial Number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the candidates will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान
SCIENCE

*निर्धारित समय : **2** घण्टे* | *अधिकतम अंक : **40***

*Time allowed : **2** hours* | *Maximum Marks : **40***

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **15** प्रश्न हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *यह प्रश्न-पत्र **तीन** खण्डों में विभाजित है – खण्ड-**क**, **ख** एवं **ग** ।*

(iii) *खण्ड– **क** : प्रश्न संख्या **1** से **7** लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **2** अंक का है ।*

(iv) *खण्ड– **ख** : प्रश्न संख्या **8** से **13** भी लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **3** अंक का है ।*

(v) *खण्ड– **ग** : प्रश्न संख्या **14** और **15** प्रकरण आधारित प्रश्न हैं । प्रत्येक प्रश्न **4** अंक का है ।*

(vi) *कुछ प्रश्नों में आंतरिक चयन प्रदान किया गया है । इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए ।*

*

खण्ड – क

1. कारण सहित स्पष्ट कीजिए ऐसा क्यों है कि यद्यपि आधुनिक आवर्त सारणी में किसी आवर्त में बाईं ओर से दाईं ओर जाने पर तथा किसी समूह में ऊपर से नीचे जाने पर दोनों ही स्थितियों में नाभिकीय आवेश में वृद्धि होती है, परन्तु परमाणु के साइज़ में इन दोनों स्थितियों में समान रूप से परिवर्तन नहीं होता है । **2**

2. आरेख में दर्शाए अनुसार एल्युमिनियम की किसी छड़ 'AB' को किसी नाल चुम्बक के दोनों ध्रुवों के बीच इस प्रकार निलम्बित किया गया है कि छड़ का अक्ष क्षैतिजत: तथा चुम्बकीय क्षेत्र की दिशा ऊर्ध्वाधर उपरिमुखी हो । छड़ को श्रेणी में एक बैटरी और एक कुंजी से संयोजित किया गया है । **2**

General Instructions :

Read the following instructions carefully and strictly follow them :

*(i) This question paper contains **15** questions. **All** questions are compulsory.*

*(ii) This question paper is divided into **three** Sections viz. Section **A, B** and **C.***

*(iii) Section **A** - Question numbers **1** to **7** are short answer type questions. Each question carries **two** marks.*

*(iv) Section **B** - Question numbers **8** to **13** are also short answer type questions. Each question carries **three** marks.*

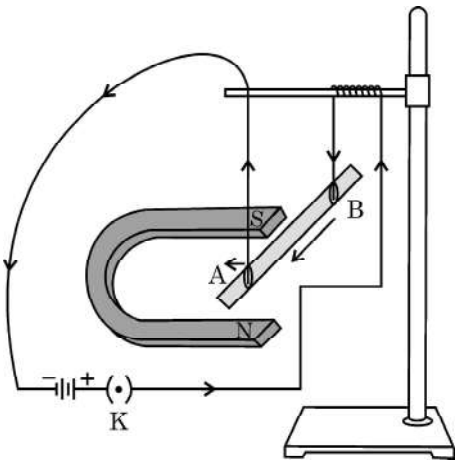
*(v) Section **C** – Question No. **14** and **15** are case based questions. Each question carries **four** marks.*

(vi) Internal choices have been provided in some questions. Only one of the alternatives has to be attempted.

SECTION – A

1. Explain giving reason why although the nuclear charge in atoms increases in moving from left to right in a period as well as in moving from top to bottom in a group in the Modern periodic table, but the size of the atoms does not vary similarly in both situations. **2**

2. As shown in the diagram an aluminium rod 'AB' is suspended horizontally between the two poles of a strong horse shoe magent in such a way that the axis of rod is horizontal and the direction of the magnetic field is vertically upward. The rod is connected in series with a battery and a key. **2**



कारण देकर उल्लेख कीजिए कि :

(a) जब एल्युमिनियम की छड़ में उसके B सिरे से A सिरे की ओर विद्युत धारा प्रवाहित करते हैं, तो क्या देखते हैं ?

(b) उस स्थिति में क्या परिवर्तन देखते हैं जब छड़ 'AB' के अक्ष को चुम्बकीय क्षेत्र की दिशा में संरेखित करके छड़ में उसी दिशा में विद्युत धारा प्रवाहित करते हैं ?

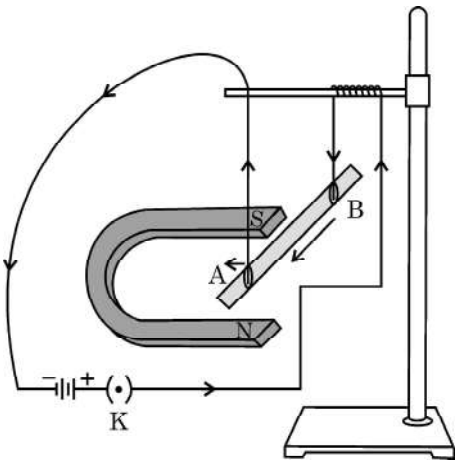
अथवा

"चुम्बकीय क्षेत्र एक भौतिक राशि है जिसमें परिमाण और दिशा दोनों होते हैं ।" किसी छड़ चुम्बक की चुम्बकीय क्षेत्र रेखाओं की सहायता से इस कथन को किस प्रकार सिद्ध किया जा सकता है ?

3. पौधे की ऊँचाई (लम्बापन / बौनापन) के उदाहरण का उपयोग करके यह दर्शाइए कि जीव में जीन लक्षणों को नियंत्रित करते हैं । **2**

अथवा

किसी लाल रंग के पुष्पों और सफेद रंग के पुष्पों के संकरण में जब F1 संतति के लाल रंग के पुष्पों वाले पौधों का स्वपरागण कराया गया तो F2 संतति में प्राप्त पौधों में 75% पौधे लाल पुष्पों वाले तथा 25% पौधे सफेद पुष्पों वाले थे । उपरोक्त प्रकरण में लक्षणों की वंशानुगति की केवल प्रवाह आरेख खींचकर तथा प्राप्त होने वाले पौधों के अनुपात सहित व्याख्या कीजिए ।



State giving reason :

(a) What is observed when a current is passed through the aluminum rod from end B to end A ?

(b) What change is observed in a situation in which the axis of the rod 'AB' is moved and aligned parallel to the magnetic field and current is passed in the rod in the same direction ?

OR

"Magnetic field is a physical quantity that has both direction and magnitude." How can this statement be proved with the help of magnetic field lines of a bar magnet ?

3. Using height (tallness / dwarfness) of a plant as an example, show that genes control the characteristics or traits in an organism. **2**

OR

In a cross between red coloured and white coloured flowers, when plants with red coloured flowers of F1 generation were self pollinated, plants of F2 generation were obtained in which 75% of plants were with red flowers and 25% plants were with white flowers.

Explain the inheritance of traits in the above cross with the help of a flow chart only along with the ratio of plants obtained.

4. मानव के मादा जनन तंत्र में (a) प्लैसेन्टा (b) फैलोपियन ट्यूब (c) गर्भाशय और (d) अंडाशय के कार्य का उल्लेख कीजिए । **2**

5. "हमारी जीवन शैली में सुधार से उत्पादित अपशिष्ट पदार्थों (कचरे) की मात्रा अत्यधिक हो गयी है ।" इस कथन की पुष्टि के लिए दो कारण दीजिए । **2**

अथवा

"पैकेज़िंग के तरीकों में बदलाव से अजैव निम्नीकरणीय वस्तुओं के कचरे में पर्याप्त वृद्धि हुई है ।" दैनिक जीवन से दो उदाहरण देकर इस कथन की पुष्टि कीजिए ।

6. (a) अमीबा में द्विखण्डन और लेस्मानिया में द्विखण्डन के बीच विभेदन कीजिए । **2**

(b) मलेरिया परजीवी में जनन किस प्रकार होता है ?

7. नीचे दिए गए आण्विक सूत्रों वाले कार्बन के यौगिकों पर विचार कीजिए : **2**

(i) C_3H_6 , (ii) C_3H_8 , (iii) C_4H_6 , (iv) C_6H_6 , (v) C_6H_{12}

(a) C_3H_6 में द्वि सहसंयोजी आबन्धों की संख्या लिखिए ।

(b) जिस समजातीय श्रेणी का C_4H_6 सदस्य है उस श्रेणी के पहले सदस्य का सूत्र लिखिए ।

(c) उपरोक्त यौगिकों में से किसकी संरचना में कार्बन के अणु वलय के रूप में व्यवस्थित होते हैं ?

(d) उपरोक्त यौगिकों में से उसे पहचानिए जो एल्केन श्रेणी का सदस्य है ।

4. Mention the functions of (a) Placenta (b) Fallopian tubes (c) Uterus and (d) Ovary in the human female reproductive system. **2**

5. "The improvement in our lifestyle has led to the generation of large amount of waste material." List two reasons to justify this statement. **2**

OR

"The change in packaging has resulted in waste becoming non-biodegradable."

Giving two examples from daily life, justify this statement.

6. (a) Differentiate between binary fission in Amoeba and binary fission in Leishmania. **2**

(b) How does reproduction take place in malarial parasite ?

7. Consider the carbon compounds having following molecular formula : **2**

(i) C_3H_6 (ii) C_3H_8 (iii) C_4H_6 (iv) C_6H_6 (v) C_6H_{12}

(a) State the number of double covalent bonds present in C_3H_6.

(b) Write the formula of first member of the homologous series to which the carbon compound C_4H_6 belongs.

(c) Which one of the above compounds forms ring structure of carbon atoms ?

(d) Identify, which of the above compounds, is a member of alkane series.

खण्ड – ख

8. उन तत्त्वों का नाम लिखिए जिनके यौगिक मेन्डेलीफ की आवर्त सारणी के वर्गीकरण के आधार थे । मेन्डेलीफ ने इन तत्त्वों को क्यों चुना ? इन तत्त्वों के यौगिकों के सूत्रों ने मेन्डेलीफ की उसकी सारणी में तत्त्व की स्थिति निर्धारित करने में किस प्रकार सहायता की ? **3**

9. पोषी स्तर क्या हैं ? सभी आहार शृंखलाओं में स्वपोषियों को सदैव पहले पोषी स्तर का क्यों माना जाता है ? प्रकृति में पोषी स्तरों की संख्या सीमित क्यों होती है ? **3**

10. पुष्पी पादपों (पुष्प वाले पौधों) में परागण द्वारा परागकण वर्तिकाग्र तक स्थानान्तरित हो जाते हैं, परन्तु मादा युग्मक अण्डाशय में स्थित होते हैं । नामांकित आरेख (केवल संबंधित भागों का ही नामांकन) की सहायता से व्याख्या कीजिए कि नर युग्मक किस प्रकार अण्डाशय तक पहुँचता है । **3**

11. "कार्बन के दो विभिन्न रूपों – डायमण्ड (हीरे) और ग्रेफाइट की संरचनाएँ भिन्न हैं और उनके भौतिक गुणधर्म भी भिन्न हैं यद्यपि इनके रासायनिक गुणधर्म समान हैं ।" ऐसा क्यों है, व्याख्या कीजिए । **3**

अथवा

कारणों का उल्लेख कीजिए कि कार्बन क्यों

(i) C^{4+} धनायन बनाने के लिए अपने चार इलेक्ट्रॉन क्यों नहीं खोता है और

(ii) C^{4-} ऋणायन बनाने के लिए चार इलेक्ट्रॉन क्यों ग्रहण नहीं करता है ?

कार्बन इस समस्या को यौगिकों को बनाने में किस प्रकार सुलझा लेता है ?

SECTION – B

8. Name the elements whose compounds formed the basis of classification in Mendeleev's periodic table. Why did Mendeleev choose these elements ? **3**

How the formulae of these compounds had helped Mendeleev in deciding the position of an element in his periodic table ?

9. What are trophic levels ? Why are autotrophs considered to be at the first trophic level of all food chains ? State the reason for limited number of trophic levels in nature. **3**

10. In flowering plants, the pollen grains are transferred to stigma by pollination but the female germ cells are present in the ovary. Explain with the help of a labelled diagram (only concerned parts), how the male germ cell reaches the ovary. **3**

11. "Two different forms of carbon – diamond and graphite have different structures and very different physical properties even though their chemical properties are same." Explain why. **3**

OR

State the reasons, why carbon cannot

(i) Lose four electrons to form C^{4+} cation, and

(ii) Gain four electrons to form C^{4-} anion.

How does carbon overcome this problem to form compounds ?

12. (a) कोई छात्र एक ही समय विद्युत ताप, विद्युत बल्ब और विद्युत पंखे का उपयोग करना चाहता है । उसे उन युक्तियों को विद्युत-मेन्स से किस प्रकार संयोजित करना चाहिए ? तीन कारणों सहित अपने उत्तर की पुष्टि कीजिए । **3**

(b) विद्युत फ्यूज़ क्या होता है ? इसे परिपथ में किस प्रकार संयोजित किया जाता है ?

13. अनुमंतांक 1100 W के विद्युत मोटर को 220 V के विद्युत मेन्स से संयोजित किया गया है । ज्ञात कीजिए : **3**

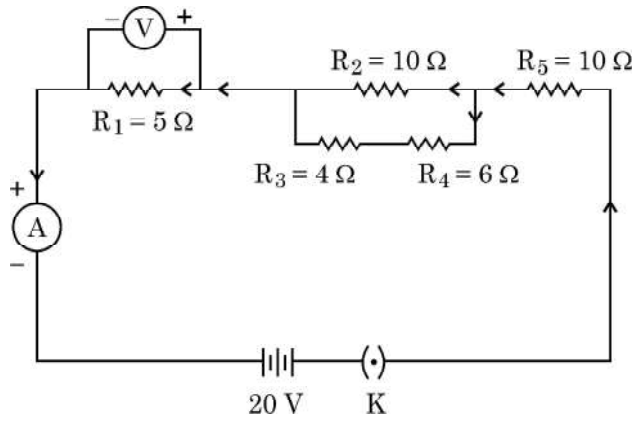
(i) मेन्स से ली गयी विद्युत धारा

(ii) यदि इसे 6 दिनों तक प्रतिदिन 5 घन्टे उपयोग किया जाता है, तो उपयुक्त विद्युत ऊर्जा

(iii) यदि एक यूनिट का मूल्य ₹ 5 है, तो उपयुक्त ऊर्जा का कुल मूल्य

अथवा

नीचे दिए गए परिपथ का अध्ययन कीजिए और ज्ञात कीजिए :



(i) परिपथ का प्रभावी प्रतिरोध

(ii) बैटरी से ली गयी विद्युत धारा

(iii) 5 Ω प्रतिरोधक के सिरों पर विभवान्तर

12. (a) A student wants to use an electric heater, an electric bulb and an electric fan simultaneously. **3**

How should these gadgets be connected with the mains ? Justify your answer giving three reasons.

(b) What is an electric fuse ? How is it connected in a circuit ?

13. An electric motor rated 1100 W is connected to 220 V mains. Find : **3**

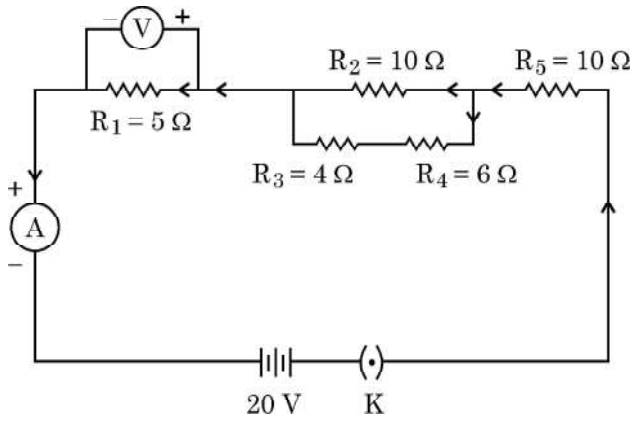
(i) The current drawn from the mains,

(ii) Electric energy consumed if the motor is used for 5 hours daily for 6 days.

(iii) Total cost of energy consumed if the rate of one unit is ₹ 5.

OR

Study the following circuit and find :



(i) Effective resistance of the circuit

(ii) Current drawn from the battery

(iii) Potential difference across the 5 Ω resistor

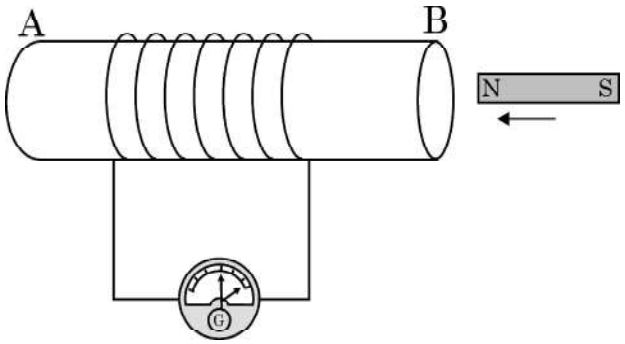
खण्ड – ग

इस खण्ड में **02** प्रकरण आधारित प्रश्न **(14** और **15)** हैं ।

प्रत्येक प्रकरण के पश्चात् **03** उप–प्रश्न (a, b और c) दिए गए हैं ।

भाग (a) और (b) अनिवार्य हैं । परन्तु भाग (c) में आंतरिक चयन प्रदान किया गया है ।

14. AB अनेक फेरों वाली ताँबे के तार की कुण्डली है । आरेख में दर्शाए अनुसार इस कुण्डली के सिरे एक गैल्वैनोमीटर से संयोजित हैं । जब किसी प्रबल छड़ चुम्बक के उत्तर ध्रुव को कुण्डली के सिरे B की ओर लाया जाता है, तो गैल्वैनोमीटर में विक्षेपण का प्रेक्षण किया जाता है । **4**



(a) इस क्रियाकलाप में गैल्वैनोमीटर का उपयोग करने का कारण लिखिए तथा उल्लेख कीजिए कि चुम्बक को कुण्डली की ओर लाने पर सूई में क्षणिक विक्षेपण क्यों आता है ।

(b) गैल्वैनोमीटर में उस स्थिति में क्या प्रेक्षण किया जाएगा, जब छड़ चुम्बक और कुण्डली दोनों ही एक समान चाल से समान दिशा में गति करेंगे ? अपने उत्तर की पुष्टि कीजिए ।

(c) इस क्रियाकलाप द्वारा निकाला जा सकने वाला निष्कर्ष लिखिए ।

क्या गैल्वैनोमीटर के क्षणिक विक्षेपण में कोई अन्तर आयेगा यदि कुण्डली में फेरों की संख्या में वृद्धि कर दी जाए तथा और अधिक प्रबलता के चुम्बक को कुण्डली की ओर लाया जाए ?

अथवा

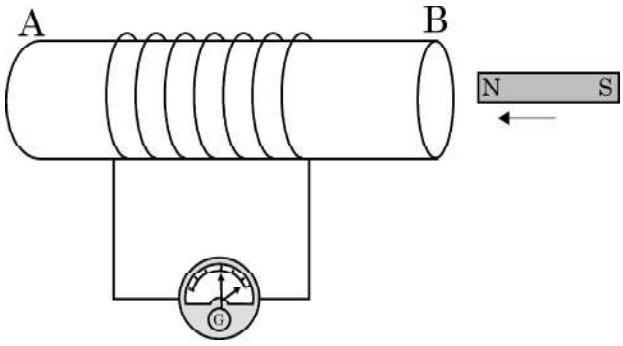
SECTION – C

This section has 02 case based questions (14 and 15).

Each case is followed by **03** sub-questions (a, b and c).

Part (a) and (b) are compulsory. However an internal choice has been provided in Part (c).

14. AB is a coil of copper wire having a large number of turns. The ends of the coil are connected with a galvanometer as shown. When the north pole of a strong bar magnet is moved towards the end B of the coil, a deflection is observed in the galvanometer. **4**



(a) State the reason for using galvanometer in the activity and why does its needle deflects momentarily when magnet is moved towards the coil.

(b) What would be observed in the galvanometer in a situation when the coil and the bar magnet both move with the same speed in the same direction ? Justify your answer.

(c) State the conclusion that can be drawn from this activity.

Will there be any change in the momentary deflection in the galvanometer if number of turns in the coil is increased and a more stronger magnet is moved towards the coil ?

OR

विद्युत चुम्बकीय प्रेरण किसे कहते हैं ? उस स्थिति में गैल्वेनोमीटर में क्या प्रेक्षण किया जाता है जब किसी प्रबल छड़ चुम्बक को अत्यधिक फेरों वाली कुण्डली के एक सिरे के निकट विराम की स्थिति में रखा जाता है ? अपने उत्तर की पुष्टि कीजिए ।

15. विभिन्न स्पीशीज़ में किसी एकल जीव का लिंग निर्धारण भिन्न-भिन्न कारकों द्वारा होता है । कुछ जन्तु पूर्ण रूप से पर्यावरण पर निर्भर करते हैं, जबकि कुछ अन्य जन्तु अपना लिंग, अपने जीवन काल में बदल सकते हैं । इससे यह इंगित होता है कि कुछ स्पीशीज़ का लिंग निर्धारण आनुवंशिक नहीं है । लेकिन मानव में लिंग निर्धारण आनुवंशिक आधार पर होता है । **4**

(a) लिंग गुणसूत्र 'X' और 'Y' किस प्रकार साइज़ में एक दूसरे से भिन्न होते हैं ? मानवों में लिंग गुणसूत्र के उस जोड़े का नाम लिखिए जो परिपूर्ण जोड़ा नहीं होता ।

(b) मानवों में उपस्थित लिंग गुणसूत्रों के जोड़े/जोड़ों की संख्या लिखिए । जनकों (नर/मादा) में से किसमें गुणसूत्रों का परिपूर्ण जोड़ा होता है ?

(c) दो उदाहरण देते हुए इस कथन की पुष्टि कीजिए कि "लिंग निर्धारण सदैव ही आनुवंशिक आधार पर नहीं होता है ।"

अथवा

यह दर्शाने के लिए प्रवाह आरेख खींचिए कि मानवों में लिंग निर्धारण आनुवंशिक आधार पर होता है ।

What is electromagnetic induction ? What is observed in the galvanometer when a strong bar magnet is held stationary near one end of a coil of large number of turns ? Justify your answer.

15. Sex of an individual is determined by different factors in various species. Some animals rely entirely on the environmental cues, while in some other animals the individuals can change their sex during their life time indicating that sex of some species is not genetically determined. However, in human beings, the sex of an individual is largely determined genetically. **4**

(a) In what way are the sex chromosomes 'X' and 'Y' different in size ? Name the mismatched pair of sex chromosome in humans.

(b) Write the number of pair/pairs of sex chromosomes present in human beings. In which one of the parent (male / female) perfect pair / pairs of sex chromosomes are present ?

(c) Citing two examples, justify the statement "Sex of an individual is not always determined genetically".

OR

Draw a flow chart to show that sex is determined genetically in human beings.

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Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
[Paper Code : 31/4/1]

General Instructions :

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-

- Leaving answer or part thereof unassessed in an answer book.
- Giving more marks for an answer than assigned to it.
- Wrong totalling of marks awarded on a reply.
- Wrong transfer of marks from the inside pages of the answer book to the title page.
- Wrong question wise totalling on the title page.
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- Marks in words and figures not tallying.
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- Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
- Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

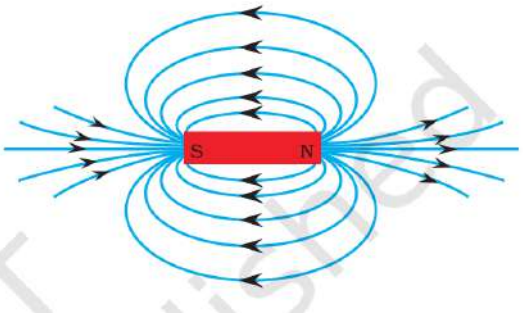
17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

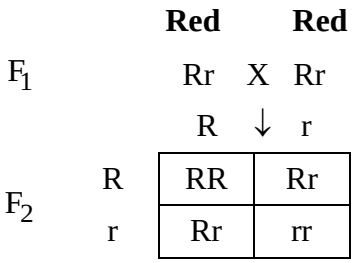
MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE–086
[PAPER CODE : 31/4/1]

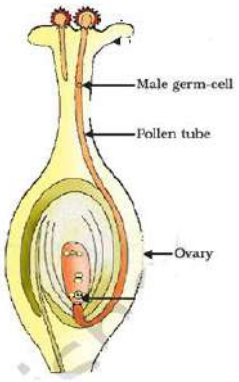
Instructions:-

- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	On moving from left to right in a period, the increase in nuclear charge tends to pull electrons closer to the nucleus and reduces the size of the atom, whereas in in a group moving from top to bottom new shells are being added which increases the distance between the outermost electrons and the nucleus, hence increases the size of the atom.	1, 1	2
2.	(a) • Rod AB would get displaced • Reason: When a current carrying conductor is placed in an external magnetic field perpendicularly, it experiences a force. (b) As current and magnetic field are parallel, there will be no force experienced by the conductor hence no displacement in rod.	½ ½ 1	2
2.	**OR** • Field lines emerge from the north pole and merge at south pole/the direction in which a north pole of the compass needle moves inside it. • The relative strength of the magnetic field is shown by the degree of closeness of the field lines. Crowded are the field lines, stronger is the field. OR diagrammatic expression.  	1 1	
3.	• The plants have genes which have the ability to produce enzyme for growth. If enzymes are efficient more growth hormone are produced thus plant grow in length..	1	

3.	• If the gene for that enzyme has an alteration that makes the enzyme less efficient, the amount of hormone produced will be less and a plant will be short. **OR**  75%—Red (RR and Rr) flowers 25%—White flowers (rr) **OR** Ratio—3 : 1 Red : White	1 ½ ½ ½ ½ ½ ½	2
4.	(a) Placenta—Helps in the transportation of glucose and oxygen from the mother to the embryo/ removal of waste (b) Egg is carried from the ovary to uterus/ site of fertilisation (c) Helps in the development of embryo/ implantation (d) Production of female gamete or ovum/secretion of female sex hormone	½ ½ ½ ½	2
5.	• Improvement in lifestyle has led to large consumption of resources • Demand for things with disposable nature increases the non-biodegradable wastes like plastics, metal cans etc. **(or any other)** **OR**	1 1	
5.	• The demand for increasing the shelf life of products and transporting goods over large distances is increasing, so the plastics / polyethene packing is preferred. • Less use of biodegradable products such as paper bag, cloth bag etc. (**or any other)**	1 1	2
6.	(a) • In *Amoeba,* the splitting of the two cells during division can take place in any plane.	½	

	• In *Leishmania*, binary fission occurs in definite orientation in relation to its whip like structure. (b) Malarial parasite/*Plasmodium* divides into many daughter cells simultaneously by multiple fission.	½ 1	2
7.	(a) One double bond (b) C_2H_2 (c) C_6H_6 (d) C_3H_8	½ ½ ½ ½	2
	SECTION—B		
8.	• Hydrogen and Oxygen • He selected hydrogen and oxygen as they are very reactive and formed compound with most of the elements. • The formulae of hydrides and oxides formed by an element were treated as one of the basic properties of an element for its classification.	1 1 1	3
9.	• Every step or level of the food chain forms a trophic level. • Autotrophs are the green plants, which are the only organisms which can fix up the solar energy and make it available for heterotrophs or the consumers. • Very little amount of energy is available to the last trophic level as energy is lost at every level to the environment.	1 1 1	3
10.	After the pollen lands on a suitable stigma, it has to reach the female germ cells which is located in the ovary. For this a tube grows out of the pollen grain and travels through the style to reach the ovary.  Germination of pollen on stigma Labelling: pollen tube/ ovary/ male germ cell **(any two labelling)**	1 1 ½ , ½	3

11.	• In diamond, each carbon atom is bonded to four other carbon atoms forming a rigid three dimensional structure. This makes diamond the hardest substance known. • In graphite, each carbon atom is bonded to three other carbon atoms in same plane giving a hexagonal array being placed in layers one above the other this makes graphite a smooth and slippery substance. • Both diamond and graphite are composed of carbon, therefore their chemical properties are same. / Both are allotropic form of Carbon.	1 1 1	
	OR		
11.	(i) If carbon atom loses four electrons forming C^{4+} cation, it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding two electrons. (ii) If carbon atom gains four electrons forming C^{4-} anion, it would be difficult for a nucleus with six protons to hold on ten electrons, that is four extra electrons. • Carbon atom overcomes this problem by sharing its valence electrons with other atoms of carbon or with atoms of other elements.	1 1 1	3
12.	(a) • These appliances/gadgets should be connected in parallel. Justification: • These gadgets need current of widely different values to operate properly. • independent switching can be done for different appliances. • If any component fails, other gadgets may function. • All gadgets get the required voltage for their operation. • Effective resistance decreases hence heat loss minimizes. **(any three)**	½ ½ x 3	
	(b) • It is a device which protects the circuit/appliance by stopping the flow of any unduly high current / safety device in electrical circuit. • It is connected in series with the device.	½ ½	3
13.	Power (P) = 1100 W, V = 220 V (i) Current drawn $= I = \frac{P}{V}$ $= \frac{1100\ \text{W}}{220\ \text{V}} = 5\ \text{A}$ (ii) $E = P \times t$	½ ½ ½	

	= 1100 W × 5 h × 6 = 33000 Wh	½	
	(iii) Cost of one commercial unit = ₹ 5		
	Energy consumed = 33 kWh = 33 unit = 118.8×10^6 J	½	
	Cost of 33 unit = 33 × 5 = ₹ 165	½	
	OR		
13.	(i) Effective resistance of the circuit $R_s = R_3 + R_4 = 4\Omega + 6\Omega = 10\Omega$ $\frac{1}{R_p} = \frac{1}{R_s} + \frac{1}{R_2} = \frac{1}{10\Omega} + \frac{1}{10\Omega} = \frac{2}{10\Omega} = \frac{1}{5\Omega}$ $R_p = 5\Omega$	½	
	Total resistance of the circuit = $R_1 + R_p + R_5 = 5 + 5 + 10 = 20\Omega$	½	
	(ii) Current drawn from the battery $V = 20V, R = 20\Omega$ $I = \frac{V}{R} = \frac{20V}{20\Omega}$	½	
	$I = 1$ A	½	
	(iii) Reading in voltmeter connected across 5Ω Resistance $V = I R$		
	I = 1 A	½	
	R = 5Ω		
	V = 1 A × 5Ω = 5 V	½	3
	SECTION—C		
14.	(a) • Galvanometer is used to detect the presence of current along with its direction.	½	
	• Needle deflects momentarily due to momentary change in magnetic field associated with the coil due to which current induces.	½	

	(b) There would be no deflection in the galvanometer because there is no induced current flowing in galvanometer as there is no relative motion between the magnet and the coil and no change in magnetic field associated with coil. (c) • The relative motion of a magnet and coil produces an induced potential difference which sets up an induced current in the circuit and it lasts so long the relative motion is there. • Momentary deflection will be there with increased magnitude. **OR** • It is a process by which a changing magnetic field in a conductor induces current in another conductor. • No deflection in galvanometer As there is no relative motion between the coil and magnet which leads to no change in magnetic field associated with coil hence no induced current generates.	1 1 1 1 ½ , ½	4
15.	(a) • X chromosome is of normal size and Y chromosome is short / Y chromosome is shorter than X chromosome. • XY pair of chromosomes (b) • One pair of sex chromosomes • mother/female has perfect pair of chromosomes (c) • In reptiles, the temperature at which fertilized eggs are kept determines whether the animals developing in the eggs would be a male or a female. • In snails, they can change their sex during their lifetime. **OR** Parents *XY* (Male) *XX* (Female) Gametes *X* *Y* *X* Zygote *XX* *XY* Offsprings Female Male	½ ½ ½ ½ 1 1 ½ × 4	4

* * *

Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
[Paper Code : 31/4/2]

General Instructions: -

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MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE – 086
[PAPER CODE : 31/4/2]

Instructions:-

- **The marking scheme carries only suggested value points for the answers.**
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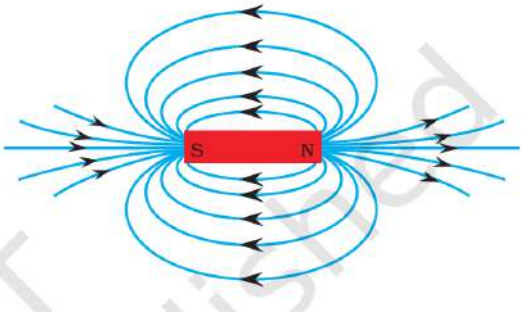
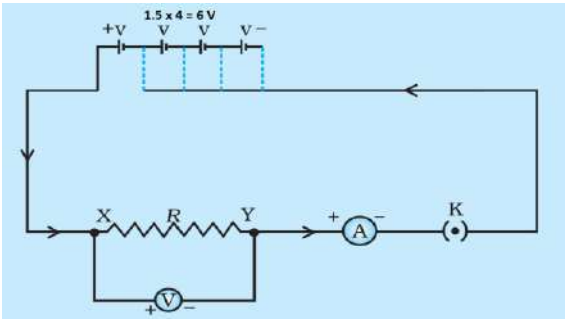
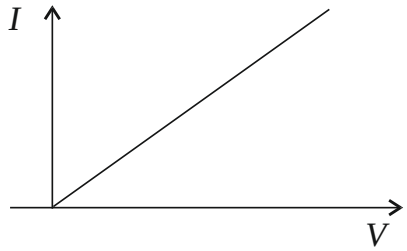
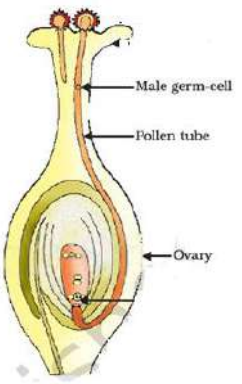
Maximum Marks : 40

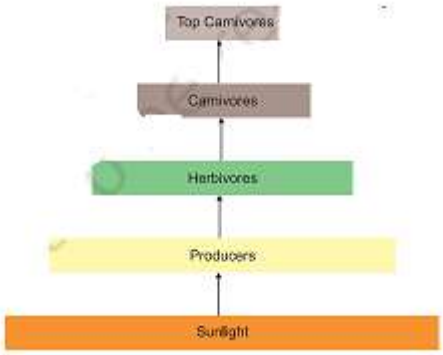
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(a) Placenta—Helps in the transportation of glucose and oxygen from the mother to the embryo/ removal of waste (b) Egg is carried from the ovary to uterus/ site of fertilisation (c) Helps in the development of embryo/ implantation (d) Production of female gamete or ovum/secretion of female sex hormone	½ ½ ½ ½	2
2.	• The plants have genes that have information to produce enzyme for growth, a lot of hormone is produced, a plant will be tall. • If the gene for that enzyme has an alteration that makes the enzyme less efficient, the amount of hormone produced will be less and a plant will be short. **OR**	1 1	
2.	**Red Red** F_1 Rr X Rr R ↓ r F_2 R: RR | Rr r: Rr | rr 75%—Red (RR and Rr) flowers 25%—White flowers (rr) **OR** Ratio—3 : 1 Red : White	½ ½ ½ ½ ½ ½	2

3.	(a) CH_3OH (b) C_3H_4 (c) HCOOH (d) CnH_{2n}	½ ½ ½ ½	2
4.	• Improvement in lifestyle has led to large consumption of resources • Demand for things with disposable nature increases the non-biodegradable wastes like plastics, metal cans etc. **(or any other)** **OR**	1 1	
4.	• The demand for increasing the shelf life of products and transporting goods over large distances is increasing, so the plastics / polyethene packing is preferred. • Less use of biodegradable products such as paper bag, cloth bag etc. (**or any other)**	1 1	2
5.	• The process in which an individual is cut or broken up into many pieces and many of these pieces grow into separate individual. • In Planaria regeneration is carried out by specialised cells, these cells proliferate, develop and differentiate into various cell types and tissues. **(explanation with diagram will be awarded full marks.)**	1 1	2
6.	(a) • Rod AB would get displaced • Reason: When a current carrying conductor is placed in an external magnetic field perpendicularly, it experiences a force. (b) As current and magnetic field are parallel, there will be no force experienced by the conductor hence no displacement in rod.	½ ½ 1	
6.	**OR** • Field lines emerge from the north pole and merge at south pole/the direction in which a north pole of the compass needle moves inside it. • The relative strength of the magnetic field is shown by the degree of closeness of the field lines. Crowded are the field lines, stronger is the field. Or diagrammatic expression.	1 1	

			2
7.	Properties of elements are a periodic function of their atomic number '18' vertical columns called groups '7' horizontal rows are known as periods	1 ½ ½	2
	SECTION—B		
8.	Power (P) = 1100 W, V = 220 V (i) Current drawn $= I = \frac{P}{V}$ $= \frac{1100\ \text{W}}{220\ \text{V}} = 5\ \text{A}$ (ii) $E = P \times t$ $= 1100\ \text{W} \times 5\ \text{h} \times 6 = 33000\ \text{Wh}$ (iii) Cost of one commercial unit = ₹ 5 Energy consumed = 33 kWh = 33 unit = 118.8×10^6 J Cost of 33 unit = 33 × 5 = ₹ 165	½ ½ ½ ½ ½ ½	
	OR		
8.	(i) Effective resistance of the circuit $R_s = R_3 + R_4 = 4\Omega + 6\Omega = 10\Omega$ $\frac{1}{R_p} = \frac{1}{R_s} + \frac{1}{R_2} = \frac{1}{10\Omega} + \frac{1}{10\Omega} = \frac{2}{10\Omega} = \frac{1}{5\Omega}$ $R_p = 5\Omega$ Total resistance of the circuit = $R_1 + R_p + R_5 = 5 + 5 + 10 = 20\Omega$	½ ½	

	(ii) Current drawn from the battery $V = 20V, R = 20\Omega$ $I = \frac{V}{R} = \frac{20V}{20\Omega}$ $I = 1$ A (iii) Reading in voltmeter connected across 5Ω Resistance $V = I\,R$ I = 1 A R = 5Ω V = 1 A × 5Ω = 5 V	½ ½ ½ ½	3
9.	Electric circuit  Diagram making Any two labelling Potential difference (V) directly proportional to the current (I).  	1 ½ , ½ ½ ½	3
10.	• In diamond, each carbon atom is bonded to four other carbon atoms forming a rigid three dimensional structure. This makes diamond the hardest substance known.	1	

10.	• In graphite, each carbon atom is bonded to three other carbon atoms in same plane giving a hexagonal array being placed in layers one above the other this makes graphite a smooth and slippery substance. • Both diamond and graphite are composed of carbon, therefore their chemical properties are same. / Both are allotropic form of Carbon. **OR** (i) If carbon atom loses four electrons forming C^{4+} cation, it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding two electrons. (ii) If carbon atom gains four electrons forming C^{4-} anion, it would be difficult for a nucleus with six protons to hold on ten electrons, that is four extra electrons. • Carbon atom overcomes this problem by sharing its valence electrons with other atoms of carbon or with atoms of other elements.	1 1 1 1 1	3
11.	After the pollen lands on a suitable stigma, it has to reach the female germ cells which is located in the ovary. For this a tube grows out of the pollen grain and travels through the style to reach the ovary.  Germination of pollen on stigma Labelling: pollen tube/ ovary/ male germ cell **(any two labelling)**	1 1 ½ , ½	3
12.	• Hydrogen and Oxygen • He selected hydrogen and oxygen as they are very reactive and formed compound with most of the elements. • The formulae of hydrides and oxides formed by an element were treated as one of the basic properties of an element for its classification.	1 1 1	3

13.	Diagram  (Can be shown with the help of food chain starting from sun) *Inferences:* ● Flow of energy is unidirectional ● Sun is the ultimate source of energy. ● Energy available at each trophic level gets diminished progressively due to loss of energy at each level. ● Every food chain starts with producers. **(Or any other inference) (any two)**	1 1,1	3
	SECTION—C		
14.	(a) • Galvanometer is used to detect the presence of current along with its direction. • Needle deflects momentarily due to momentary change in magnetic field associated with the coil due to which current induces. (b) When coil moves towards the magnet, the magnetic field passing through coil changes and a current is induced in the coil due to which deflection is observed in galvanometer. (c) • The relative motion of a magnet and coil produces an induced potential difference which sets up an induced current in the circuit and it lasts so long the relative motion is there. • Momentary deflection will be there with increased magnitude. **OR** • It is a process by which a changing magnetic field in a conductor induces current in another conductor.	½ ½ 1 1 1 1	

	• No deflection in galvanometer As there is no relative motion between the coil and magnet which leads to no change in magnetic field associated with coil hence no induced current generates.	½ , ½	4
15.	(a) • X chromosome is of normal size and Y chromosome is short / Y chromosome is shorter than X chromosome. • XY pair of chromosomes (b) 44 chromosomes or 22 pairs of chromosomes, male / father (c) • In reptiles, the temperature at which fertilized eggs are kept determines whether the animals developing in the eggs would be a male or a female. • In snails, they can change their sex during their lifetime. **OR** Parents *XY* (Male) *XX* (Female) Gametes *X* *Y* *X* Zygote *XX* *XY* Offsprings Female Male	½ ½ ½ ½ 1 1 ½ × 4	4

* * *

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Marking Scheme – Science SUBJECT CODE -086
[Paper Code : 31/4/3]

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totalling of marks awarded on a reply.

- Wrong transfer of marks from the inside pages of the answer book to the title page.
- Wrong question wise totalling on the title page.
- Wrong totalling of marks of the two columns on the title page.
- Wrong grand total.
- Marks in words and figures not tallying.
- Wrong transfer of marks from the answer book to online award list.
- Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
- Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

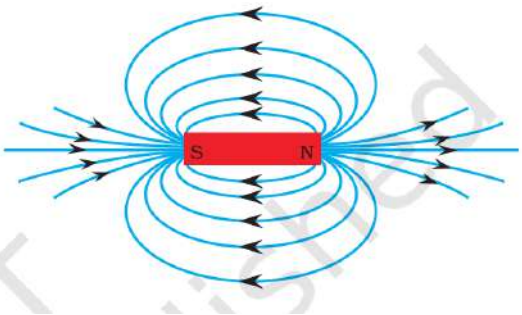
17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE–086
[PAPER CODE : 31/4/3]

Instructions:-
- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

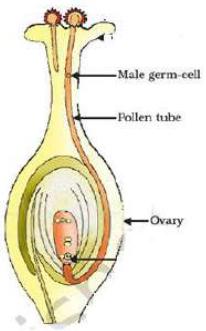
Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	In binary fission, the parent organism divides/splits into two cells/two equal halves during divisions. e.g., *Amoeba/Leishmania/Paramecium* **(any one example)** In multiple fission, the parent organism divides into many daughter cells simultaneously. e.g., *Plasmodium* **(any one example)**	½ ½ ½ ½	2
2.	• Improvement in lifestyle has led to large consumption of resources • Demand for things with disposable nature increases the non-biodegradable wastes like plastics, metal cans etc. **(or any other)** **OR**	1 1	
2.	• The demand for increasing the shelf life of products and transporting goods over large distances is increasing, so the plastics / polyethene packing is preferred. • Less use of biodegradable products such as paper bag, cloth bag etc. (**or any other)**	1 1	2
3.	(a) • Rod AB would get displaced • Reason: When a current carrying conductor is placed in an external magnetic field perpendicularly, it experiences a force. (b) As current and magnetic field are parallel, there will be no force experienced by the conductor hence no displacement in rod.	½ ½ 1	

3.	**OR** • Field lines emerge from the north pole and merge at south pole/the direction in which a north pole of the compass needle moves inside it. • The relative strength of the magnetic field is shown by the degree of closeness of the field lines. Crowded are the field lines, stronger is the field. Or diagrammatic expression.  	1 1	2
4.	Criteria (i) Group- valence electrons (ii) Period- number of shells • Group -16 • Period -3rd	½ ½ ½ ½	2
5.	(a) One double bond (b) C_2H_2 (c) C_6H_6 (d) C_3H_8	½ ½ ½ ½	2
6.	(a) CH_3CHO (b) C_nH_{2n-2} (c) C_2H_2 (d) CH_3OH	½ ½ ½ ½	2
7.	• The plants have genes that have information to produce enzyme for growth, a lot of hormone is produced, a plant will be tall. • If the gene for that enzyme has an alteration that makes the enzyme less efficient, the amount of hormone produced will be less and a plant will be short.	1 1	

7.	**OR** **Red** **Red** F_1 Rr X Rr R ↓ r F_2 R | RR | Rr r | Rr | rr 75%—Red (RR and Rr) flowers 25%—White flowers (rr) **OR** Ratio—3 : 1 Red : White	½ ½ ½ ½ ½ ½	2
	SECTION—B		
8.	(a) $\rho = R\frac{A}{l}$ SI unit of ρ = ohm $\times \frac{m^2}{m}$ = ohm × metre/ Ω m (b) $\rho = R\frac{A}{l}$ $= \frac{0 \cdot 04\Omega \times 1 \cdot 4 \times 10^{-6} m^2}{2m}$ $= 2 \cdot 8 \times 10^{-8} \Omega\,\text{m}$	½ ½ ½ 1 ½	3
9.	Power (P) = 1100 W, V = 220 V (i) Current drawn $= I = \frac{P}{V}$ $= \frac{1100\ \text{W}}{220\ \text{V}} = 5\ \text{A}$ (ii) $E = P \times t$ = 1100 W × 5 h × 6 = 33000 Wh (iii) Cost of one commercial unit = ₹ 5	½ ½ ½ ½	

	Energy consumed = 33 kWh = 33 unit = 118.8×10^6 J Cost of 33 unit = 33×5 = ₹ 165	½ ½	
	OR		
9.	(i) Effective resistance of the circuit $R_s = R_3 + R_4 = 4\Omega + 6\Omega = 10\Omega$ $\frac{1}{R_p} = \frac{1}{R_s} + \frac{1}{R_2} = \frac{1}{10\Omega} + \frac{1}{10\Omega} = \frac{2}{10\Omega} = \frac{1}{5\Omega}$ $R_p = 5\Omega$ Total resistance of the circuit = $R_1 + R_p + R_5 = 5 + 5 + 10 = 20\Omega$ (ii) Current drawn from the battery $V = 20V, R = 20\Omega$ $I = \frac{V}{R} = \frac{20V}{20\Omega}$ $I = 1$ A (iii) Reading in voltmeter connected across 5Ω Resistance $V = I\,R$ I = 1 A R = 5Ω V = 1 A × 5Ω = 5 V	½ ½ ½ ½ ½	3
10.	• Hydrogen and Oxygen • He selected hydrogen and oxygen as they are very reactive and formed compound with most of the elements. • The formulae of hydrides and oxides formed by an element were treated as one of the basic properties of an element for its classification.	1 1 1	3
11.	• Chlorofluoro carbons (CFCs) • Aerosols / Refrigerants / fire extinguishers i) Chorofluoro carbon chemicals damage ozone layer / depletion of ozone layer	1 1	

	ii) UV radiations reaching earth's surface can cause damage to organisms / skin cancer in humans.	½ + ½	3
12.	After the pollen lands on a suitable stigma, it has to reach the female germ cells which is located in the ovary. For this a tube grows out of the pollen grain and travels through the style to reach the ovary.  Germination of pollen on stigma Labelling: pollen tube/ ovary/ male germ cell **(any two labelling)**	1 1 ½ , ½	3
13.	• In diamond, each carbon atom is bonded to four other carbon atoms forming a rigid three dimensional structure. This makes diamond the hardest substance known. • In graphite, each carbon atom is bonded to three other carbon atoms in same plane giving a hexagonal array being placed in layers one above the other this makes graphite a smooth and slippery substance. • Both diamond and graphite are composed of carbon, therefore their chemical properties are same. / Both are allotropic form of Carbon.	1 1 1	
	OR		
13.	(i) If carbon atom loses four electrons forming C^{4+} cation, it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus holding two electrons. (ii) If carbon atom gains four electrons forming C^{4-} anion, it would be difficult for a nucleus with six protons to hold on ten electrons, that is four extra electrons. • Carbon atom overcomes this problem by sharing its valence electrons with other atoms of carbon or with atoms of other elements.	1 1 1	3
	SECTION—C		
14.	(a) • A galvanometer is an instrument that can detect the presence of a current in a circuit. • Induced current that flows in the coil and the galvanometer.	½ + ½	

	(b) There would be no deflection in the galvanometer because there is no induced current flowing in galvanometer as there is no relative motion between the magnet and the coil and no change in magnetic field associated with coil. (c) • The relative motion of a magnet and coil produces an induced potential difference which sets up an induced current in the circuit and it lasts so long the relative motion is there. • Momentary deflection will be there with increased magnitude. **OR** (c) • It is a process by which a changing magnetic field in a conductor induces current in another conductor. • No deflection in galvanometer As there is no relative motion between the coil and magnet which leads to no change in magnetic field associated with coil hence no induced current generates.	1 1 1 1 ½ , ½	4
15.	(a) 50% male and 50% female/ 1:1 male and female / equal probability of male and female (b) • One pair of sex chromosomes • mother/female has perfect pair of chromosomes (c) • In reptiles, the temperature at which fertilized eggs are kept determines whether the animals developing in the eggs would be a male or a female. • In snails, they can change their sex during their lifetime. **OR** (c) Parents *XY* (Male) *XX* (Female) Gametes *X* *Y* *X* Zygote *XX* *XY* Offsprings Female Male	1 ½ ½ 1 1 ½ × 4	4

* * *

SET-5

Series AQ@QA

प्रश्न-पत्र कोड
Q.P. Code **31/B/5**

रोल नं.
Roll No.

परीक्षार्थी प्रश्न-पत्र कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Q.P. Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ **11** हैं ।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए प्रश्न-पत्र कोड को परीक्षार्थी उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें ।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में **15** प्रश्न हैं ।
- **कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, उत्तर-पुस्तिका में प्रश्न का क्रमांक अवश्य लिखें ।**
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है । प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा । 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे ।
- Please check that this question paper contains **11** printed pages.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **15** questions.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

विज्ञान
(केवल दृष्टिबाधित परीक्षार्थियों के लिए)

SCIENCE
(FOR VISUALLY IMPAIRED CANDIDATES ONLY)

निर्धारित समय : 2 घण्टे | *अधिकतम अंक : 40*

Time allowed : 2 hours | *Maximum Marks : 40*

सामान्य निर्देश :

निम्नलिखित निर्देशों को बहुत सावधानी से पढ़िए और उनका सख़्ती से पालन कीजिए :

(i) *इस प्रश्न-पत्र में कुल **15** प्रश्न हैं । **सभी** प्रश्न अनिवार्य हैं ।*

(ii) *यह प्रश्न-पत्र **तीन** खण्डों में विभाजित किया गया है – **क, ख** एवं **ग** ।*

(iii) ***खण्ड क –** प्रश्न संख्या **1** से **7** तक लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **2** अंकों का है ।*

(iv) ***खण्ड ख –** प्रश्न संख्या **8** से **13** भी लघु-उत्तरीय प्रकार के प्रश्न हैं । प्रत्येक प्रश्न **3** अंकों का है ।*

(v) ***खण्ड ग –** प्रश्न संख्या **14** और **15** प्रकरण-आधारित प्रश्न हैं । प्रत्येक प्रश्न **4** अंकों का है ।*

(vi) *कुछ प्रश्नों में आंतरिक चयन प्रदान किया गया है । इस प्रकार के प्रश्नों में केवल एक ही विकल्प का उत्तर दीजिए ।*

खण्ड क

1. (क) सहसंयोजी यौगिक क्या हैं ? सहसंयोजी यौगिकों के दो गुणधर्मों की सूची बनाइए । *2*

अथवा

(ख) "कार्बन आयनिक आबन्ध नहीं बना सकता है ।" इस कथन की पुष्टि कीजिए । *2*

2. मान लीजिए डॉबेराइनर का कोई त्रिक तीन तत्त्वों A, B और C का बना है । उन दो गुणों की सूची बनाइए जो आप इन तीनों तत्त्वों में पाएँगे । *2*

3. (क) स्त्रीकेसर किसे कहते हैं ? इसके किन्हीं दो भागों के प्रमुख कार्यों का उल्लेख कीजिए । *2*

अथवा

(ख) पुंकेसर किसे कहते हैं ? क्या होता है जब कोई परागकण किसी उचित वर्तिकाग्र पर पहुँचता है ? *2*

4. 'ब्रायोफिलम' पौधे में कायिक प्रवर्धन होने की प्रक्रिया की संक्षेप में व्याख्या कीजिए । *2*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper comprises **15** questions. **All** questions are compulsory.*

(ii) *This question paper is divided into **three** sections – **A**, **B** and **C**.*

(iii) ***Section A** – Questions No. **1** to **7** are short-answer type questions. Each question carries **2** marks.*

(iv) ***Section B** – Questions No. **8** to **13** are also short-answer type questions. Each question carries **3** marks.*

(v) ***Section C** – Questions No. **14** and **15** are case-based questions. Each question carries **4** marks.*

(vi) *Internal choices have been provided in some questions. Only one of the alternatives has to be attempted.*

SECTION A

1. (a) What are Covalent Compounds ? List two properties of covalent compounds. *2*

OR

(b) "Carbon cannot form ionic bonds." Justify this statement. *2*

2. Suppose three elements A, B and C form a Döbereiner's triad. List two properties which you would find in these three elements. *2*

3. (a) What is Pistil (Carpel) ? State the main function of any two of its parts. *2*

OR

(b) What is Stamen ? State what happens when a pollen lands on a suitable stigma. *2*

4. Explain briefly how vegetative propagation takes place in a 'Bryophyllum' plant. *2*

5. दो खेतों X और Y में मटर के पौधे उगाए गए । खेत X में सफेद फूलों वाले मटर के पौधे उगे, जबकि खेत Y में नीले फूलों वाले मटर के पौधे उगे । दोनों खेतों की उत्तरवर्ती संततियों (पीढ़ियों) में यह प्रेक्षण किया गया कि खेत X की संतति के पौधे केवल अपने पैतृकों के लक्षण ही दर्शाते हैं, जबकि खेत Y की संतति के अधिकांश पौधे लक्षणों में विभिन्नता दर्शाते हैं । इन प्रेक्षणों के संभावित कारणों का उल्लेख कीजिए । *2*

6. (क) चुम्बकीय क्षेत्र किसे कहते हैं ? किसी स्थान पर चुम्बकीय क्षेत्र की दिशा किस प्रकार निर्धारित की जाती है ? *2*

अथवा

(ख) किसी धारावाही सीधे चालक के द्वारा उत्पन्न चुम्बकीय क्षेत्र रेखाओं का पैटर्न कैसा होता है ? इस प्रकरण में चुम्बकीय क्षेत्र की दिशा निर्धारित करने वाला नियम लिखिए । *2*

7. (क) अपमार्जक (अपघटक) क्या हैं ? किसी पारितंत्र में अपमार्जकों की दो महत्त्वपूर्ण भूमिकाओं की सूची बनाइए । *2*

अथवा

(ख) प्रत्येक का एक-एक उदाहरण देकर जैवनिम्नीकरणीय और अजैवनिम्नीकरणीय पदार्थों के बीच विभेदन कीजिए । *2*

खण्ड ख

8. (क) (i) समजातीय श्रेणी किसे कहते हैं ? प्रकार्यात्मक समूह – OH के यौगिकों की समजातीय श्रेणी का सामान्य सूत्र लिखिए तथा इस श्रेणी के तीसरे सदस्य का आण्विक सूत्र दीजिए ।

(ii) एथेन की संरचना खींचिए और इसके अणु में उपस्थित एकल आबन्धों की संख्या लिखिए । *3*

अथवा

(ख) (i) संरचनात्मक समावयव क्या होते हैं ? ब्यूटेन (C_4H_{10}) के दो समावयवों की संरचनाएँ खींचिए ।

(ii) (i) साइक्लोहेक्सेन, और (ii) बेन्ज़ीन के आण्विक सूत्र लिखिए । *3*

5. Pea plants were grown in two fields, X and Y. While field X produced pea plants with white flowers, field Y produced pea plants with blue flowers. In subsequent generations, it was observed that in the field X, the offsprings exhibited only the parental characters whereas in the field Y, majority of the offsprings exhibited variation in characters. State the possible reasons for these observations. *2*

6. (a) What is a magnetic field ? How is the direction of a magnetic field at a place determined ? *2*

OR

(b) What is the pattern of the magnetic field lines produced by a current carrying straight conductor ? State the rule that determines the direction of the magnetic field in this case. *2*

7. (a) What are Decomposers ? List two important roles of decomposers in an ecosystem. *2*

OR

(b) Distinguish between Biodegradable and Non-biodegradable substances giving one example for each. *2*

SECTION B

8. (a) (i) What is a Homologous Series ? Write the general formula of the homologous series for the compounds having functional group – OH and give the molecular formula for the third member of this series.

(ii) Draw the structure of ethane and write the number of single bonds present in its molecule. *3*

OR

(b) (i) What are Structural Isomers ? Draw the structures of two isomers of butane (C_4H_{10}).

(ii) Write the molecular formula of (i) cyclohexane, and (ii) benzene. *3*

9. (क) आधुनिक आवर्त नियम लिखिए ।

(ख) आधुनिक आवर्त सारणी में कुल कितने ऊर्ध्वाधर स्तम्भ हैं ? इन्हें क्या कहते हैं ?

(ग) किसी आवर्त में बाईं ओर से दाईं ओर जाने पर तत्त्वों का धात्विक लक्षण किस प्रकार परिवर्तित होता है ? *3*

10. (क) मानव नर और मानव मादा में लिंग गुणसूत्रों सहित उपस्थित कुल गुणसूत्रों की संख्या लिखिए । व्याख्या कीजिए कि लैंगिक जनन करने वाले जीवों की संतति में गुणसूत्रों की संख्या किस प्रकार जनकों में गुणसूत्रों की संख्या के समान बनी रहती है । *3*

अथवा

(ख) मानव मादा जनन तंत्र के निम्नलिखित अंगों के कार्य लिखिए : *3*

(i) अण्डाशय

(ii) फैलोपियन नली

(iii) गर्भाशय

11. (क) (i) परिनालिका किसे कहते हैं ? किसी धारावाही परिनालिका के सिरों के निकट चुम्बकीय क्षेत्र रेखाओं का अपसरण क्या इंगित करता है ?

(ii) किसी धारावाही परिनालिका का उपयोग करके विद्युत्-चुम्बक किस प्रकार बनाया जाता है ? *3*

अथवा

(ख) (i) फ्लेमिंग का वामहस्त नियम लिखिए ।

(ii) किसी विद्युत् मोटर का कार्यकारी सिद्धान्त लिखिए ।

(iii) किसी विद्युत् मोटर के (i) ब्रुशों, और (ii) विभक्त वलय का कार्य लिखिए । *3*

12. निम्नलिखित का कारण दीजिए : *3*

(क) विद्युत् लैम्पों के तन्तुओं के निर्माण में प्रायः एकमात्र टंग्स्टेन का ही उपयोग किया जाता है ।

(ख) विद्युत् तापन युक्तियों के तापन अवयवों के निर्माण में शुद्ध धातुओं के स्थान पर मिश्रातुओं का उपयोग किया जाता है ।

(ग) घरेलू विद्युत् परिपथों में श्रेणीक्रम संयोजन का उपयोग नहीं किया जाता है ।

9. (a) State the Modern Periodic Law.

(b) How many vertical columns are there in the Modern Periodic Table ? What are they called ?

(c) How does the metallic character of elements vary on moving from left to right in a period ? *3*

10. (a) Write the total number of chromosomes along with the sex chromosomes that are present in a human male and a human female. Explain how, in sexually reproducing organisms, the number of chromosomes in the progeny remains the same as that of the parent. *3*

OR

(b) Write the functions of the following parts of the human female reproductive system : *3*

(i) Ovary

(ii) Fallopian tube

(iii) Uterus

11. (a) (i) What is a Solenoid ? What does the divergence of magnetic field lines near the ends of a current carrying solenoid indicate ?

(ii) How is an electromagnet made using a current carrying solenoid ? *3*

OR

(b) (i) State Fleming's left hand rule.

(ii) Write the principle of working of an electric motor.

(iii) Write the function of (i) brushes, and (ii) split ring in an electric motor. *3*

12. Give reason for the following : *3*

(a) Tungsten is used exclusively for the filaments of electric lamps.

(b) Heating elements of electric heating devices are made of alloys rather than a pure metal.

(c) Series arrangement is not used for domestic electric circuits.

13. पोषी स्तर की परिभाषा लिखिए । नीचे दिए गए जीवों की आहार शृंखला बनाइए :

सर्प, पौधे, बाज़, चूहे

यदि प्रथम पोषी स्तर पर 1000 जूल ऊर्जा दूसरे पोषी स्तर के जीवों को स्थानान्तरित करने के लिए उपलब्ध है, तो चौथे पोषी स्तर के जीवों को कितनी ऊर्जा उपलब्ध होगी ? *3*

खण्ड ग

*इस खण्ड में **2** प्रकरण-आधारित प्रश्न (**14** और **15**) हैं । प्रत्येक प्रकरण में **3** उप-भाग (a), (b) और (c) हैं । भाग (a) और (b) **अनिवार्य** हैं । भाग (c) में आंतरिक चयन प्रदान किया गया है ।*

14. मेंडल ने मटर के पौधों के साथ प्रजनन प्रयोग किए । उन्होंने लम्बे मटर के पौधों (TT) और बौने मटर के पौधों (tt) के संकरण द्वारा प्राप्त F_1 पीढ़ी के पौधों में केवल लम्बे मटर के पौधे ही प्राप्त किए ।

(क) ऊँचाई के अतिरिक्त मटर के पौधों में स्थूल रूप से दिखाई देने वाले किन्हीं अन्य दो विपर्यासी (विकल्पी) लक्षणों की सूची बनाइए जिनका उपयोग मेंडल ने अपने प्रयोगों में किया था ।

(ख) प्रथम संतति/पीढ़ी (F_1) के पौधों में केवल लम्बे मटर के पौधे ही प्राप्त होने के कारण का उल्लेख कीजिए ।

(ग) (i) जब F_1 पीढ़ी के मटर के पौधों का स्वपरागण कराया गया, तो F_2 पीढ़ी में कुल 1600 पौधे प्राप्त हुए । F_2 पीढ़ी के इन पौधों में से (I) कितने पौधे लम्बे, और (II) कितने पौधे बौने थे ? F_2 पीढ़ी में उत्पन्न पौधों के जीन (लक्षण) संयोजन दीजिए ।

अथवा

(ii) यदि कोई छात्र इसी प्रकार के प्रयोग को किसी अन्य आवृतबीजियों के साथ करे और उसे इसी प्रकार के परिणाम प्राप्त हों, तो अपने इस प्रयोग के आधार पर क्या वह कोई निष्कर्ष निकाल सकता है ? यदि हाँ, तो वह निष्कर्ष लिखिए । यदि नहीं, तो अपने उत्तर की पुष्टि कीजिए । *4*

13. Define Trophic Level. Prepare a food chain comprising the following organisms :

Snakes, Plants, Hawks, Rats

If 1000 joules of energy is available at the first trophic level for transfer to the organisms of the second trophic level, then how much energy will be made available to the organisms at the fourth trophic level ? *3*

SECTION C

*This section has **2** case-based questions (**14** and **15**). Each case is followed by **3** sub-questions (a), (b) and (c). Parts (a) and (b) are **compulsory**. However, an internal choice has been provided in Part (c).*

14. Mendel conducted breeding experiments with garden peas. He crossed tall pea plants (TT) with short pea plants (tt) and obtained only tall pea plants in F_1 generation.

(a) List any two visible contrasting characters taken by Mendel in pea plants apart from height, in his other experiments.

(b) State the reason why only tall pea plants were obtained in the F_1 generation.

(c) (i) When F_1 generation pea plants were self-pollinated a total of 1600 plants were produced. How many of these plants of F_2 generation would be (I) tall plants, and (II) short plants ? Give the gene (trait) combination of plants produced in F_2 generation.

OR

(ii) If a student performs the same experiment with other angiosperms and gets the similar results, then on the basis of his experiment, can he arrive at a conclusion ? If yes, write the conclusion. If not, give justification for your answer. *4*

15. एक छात्र ने किसी विद्युत् परिपथ की रूपरेखा बनायी है । इस परिपथ में एक 6 V की बैटरी, एक कुंजी, एक ऐमीटर और एक 30 Ω के प्रतिरोधक को श्रेणीक्रम में दो प्रतिरोधकों, जिनमें प्रत्येक प्रतिरोधक का प्रतिरोध 60 Ω है, के पार्श्व संयोजन से जोड़ा गया है तथा एक वोल्टमीटर को 30 Ω के प्रतिरोधक के सिरों से संयोजित किया गया है ।

(क) दो प्रतिरोधकों के पार्श्व संयोजन, जिसमें प्रत्येक का प्रतिरोध 60 Ω है, का तुल्य प्रतिरोध ज्ञात कीजिए ।

(ख) परिपथ का कुल प्रतिरोध निर्धारित कीजिए ।

(ग) (i) कुंजी को बन्द करने पर ऐमीटर से प्रवाहित होने वाली विद्युत् धारा का मान परिकलित कीजिए ।

अथवा

(ii) क्या 30 Ω के प्रतिरोधक के सिरों पर विभवान्तर तथा दो प्रतिरोधकों के पार्श्व संयोजन (जिसमें प्रत्येक का प्रतिरोध 60 Ω है) के सिरों पर विभवान्तर समान होगा ? अपने उत्तर की पुष्टि कीजिए । *4*

15. A student has designed an electric circuit containing a 6 V battery, a key, an ammeter, and a resistor of 30 Ω in series with a parallel combination of two resistors of 60 Ω each and a voltmeter across the 30 Ω resistor.

(a) Find the equivalent resistance of the parallel combination of two 60 Ω resistors.

(b) Determine the total resistance of the circuit.

(c) (i) Calculate the current that will flow through the ammeter when the key is closed.

OR

(ii) Will the potential difference across the 30 Ω resistor be the same as that across the parallel combination of two 60 Ω resistors ? Justify your answer. *4*

Strictly Confidential: (For Internal and Restricted use only)
Class : X Secondary School Term II Examination, 2022
Marking Scheme – Science SUBJECT CODE -086
[Paper Code : 31/B/5]

General Instructions :

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks **40** has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per

day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.

12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totalling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totalling on the title page.
    - Wrong totalling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.
    - Wrong transfer of marks from the answer book to online award list.
    - Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
    - Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totalling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.

17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

MARKING SCHEME
SECONDARY SCHOOL EXAMINATION TERM–II, 2022
SUBJECT : SCIENCE CODE – 086
[PAPER CODE : 31/B/5]

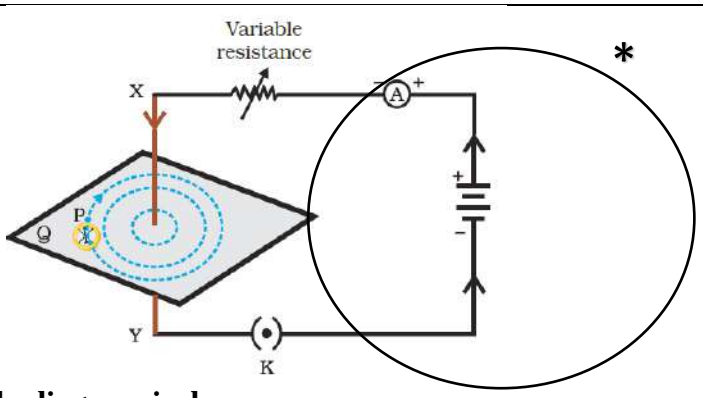
Instructions:-

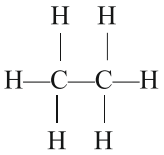
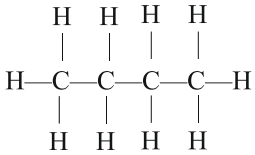
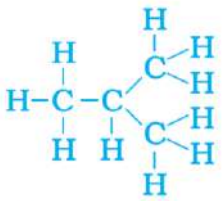
- **The marking scheme carries only suggested value points for the answers.**
- **These are only guidelines and do not constitute the complete answer.**
- **The students can have their own expression and if the expression is correct, the marks are awarded accordingly.**

Maximum Marks : 40

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(a) • Covalent compounds are formed by sharing of electrons between two atoms • Low melting and boiling points • Bad conductor of electricity or any other property **(Any two)**	1 ½ × 2	2
1.	**OR** (b) • Carbon cannot lose 4 electrons to form C^{4+} ion, because this would require a large amount of energy to remove 4 electrons. • Carbon cannot gain 4 electrons to form C^{4-} ion because this ion is highly unstable. **Alternative answer** :- It is difficult for carbon atom to gain 4 electrons (C^{4-} anion) or lose 4 electrons (C^{4+} cation) as it becomes unstable in terms of energy.	1 1	2
2.	• A, B and C have similar properties • The atomic masses of A,B and C are in ascending order • Atomic mass of B $\cong \frac{\text{Atomic mass of A+Atomic mass of C}}{2}$ **(Any two)**	1 1	2

3.	(a) • Female reproductive part of a flower • (i) Stigma—Pollen grain lands and germinates on it (ii) Style—Pollen tube grows/travels through it (iii) Ovary—Sperm nucleus and egg nucleus fuse to form zygote / contains the female germ cell **(any two parts)** **(Deduct half mark if functions not given but parts are written.)** **OR** (b) • Male reproductive part of a flower After the pollen lands on stigma. • A tube grows out of the pollen grain • travels through the style to reach the female germs cells in the ovary for fertilisation	1 ½×2 1 ½ ½	2
4.	• The leaf of Bryophyllum possesses (Adventitious) buds on its margin. • These buds when fall on the soil develop into plantlets/young plants which grow into developed plants.	1 1	2
5.	• In field *X*, the reason for the parental traits in subsequent generations of the offsprings is <u>self-pollination</u>. • In field *Y*, variation in traits is observed due to <u>cross-pollination</u> in which recombination of genes takes place.	1 1	2
6.	(a) • Region around a magnet in which its force can be detected. • The direction of magnetic field at a point is determined by placing a small compass needle. The direction in which its N-pole rests is the direction of magnetic field at that point. **OR** (b) • The magnetic field lines are circles concentric to the straight conductor.	1 1 1	

	 **Give full credit if only diagram is drawn.** *circuit part is optional. • Right-hand thumb rule: Statement : Imagine that you are holding a current carrying straight conductor in your right hand such that thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of field lines of the magnetic field. **Half marks should be deducted if only the name of the law is given and statement not written**.	1	2
7.	(a) • Organisms which breakdown the dead/decaying complex organic matter into simpler inorganic matter. • (i) Conversion of dead plants and animals into simple inorganic substance that go into soil and used as plant nutrients / recycling of matter. (ii) Clean the environment **OR** (b) • Biodegradable : Materials which can be degraded by microorganisms, e.g., garbage/ sewage/ dead plants/dead animal. • Non-biodegradable : Material which cannot be degraded to simpler substances by the action of microorganism, e.g., plastic/ glass/ insecticides.	1 ½ ½ ½ + ½ ½ + ½	2
7.			
	SECTION - B		
8.	(a) (i) • A series of carbon compounds with same functional group in which the successive member is differed by – CH_2-- group. / They differ by atomic mass of 14u. • $C_nH_{2n+1}OH$ / R-OH	1 ½	

8.	• C_3H_7OH / $CH_3CH_2CH_2OH$ (ii) •  • Seven **OR** (b) (i) • Carbon compounds which have same/identical molecular formula but different structures. • *(i)*   (ii) (i) C_6H_{12} (ii) C_6H_6	½ ½ ½ 1 ½ + ½ ½ ½	3
9.	(a) The properties of the elements are periodic function of their atomic number. (b) • 18 • Group (c) Decreases from left to right in a period.	1 ½ ½ 1	3
10. **10.**	(a) • 46/ 23 pair/ 22+1 pair • Gametes contain half number of chromosomes • when male and female gametes fuse during fertilization the original number is restored. **OR** (b) (i) Ovary—To produce ovum / secretion of female sex hormone	1 1 1 1	

	(ii) Fallopian tube —Site of fertilization / It is a passage for movement of egg and sperm (iii) Uterus—Site of development of embryo or foetus / Implantation of embryo	1 1	3
11.	(a) (i) • A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder. • Divergence of magnetic field lines at the ends indicates that the intensity of magnetic field decreases as we move farther and farther away from the ends. (ii) A piece of magnetic material such as soft iron is placed inside a solenoid. When current is switched on, a strong magnetic field produced inside the solenoid magnetises the magnetic material.	1 1 1	
11.	**OR**		
	(b) (i) Stretch the thumb, forefinger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. (ii) It works on the magnetic effect of electric current and converts electric energy into mechanical energy. / Current carrying conductor placed in an external magnetic field, experiences a force. (iii) (i) Function of brushes— To transfer charge or current between the armature coil and the external circuit. / To provide connectivity between armature coil and external circuit. (ii) Function of split rings— To reverse the direction of current after each half rotation of the coil.	1 1 ½ ½	3
12.	(a) Tungsten has a high melting point. So it does not melt when electric current flows through it. (b) Alloys used for heating element have generally high melting point / high resistivity / Do not oxidise even at high temperature. (c) If one appliance is switched off (or damaged) all other appliances stop working. / Different appliances require different current which is not available in series arrangement. **(or any other)**	1 1 1	3
13.	• Various steps in a food chain at which the transfer of energy takes place. • Plants→Rats→Snakes→Hawks • 1 J (Calculation not required)	1 1 1	3

	SECTION—C		
14.	(a) Round seeds and wrinkled seeds, violet flowers and white flowers **(or any other)**	½ + ½	
	(b) Tallness (T) is a dominant trait.	1	
	(c) (i) • Tall plants - 1200 • Short plants - 400	½ + ½	
	• TT : Tt : tt 1 : 2 : 1	1	
	OR		
	(c) (ii) • Yes	1	
	• The trait that is expressed in the F_1 generation is the dominant character although both the dominant and recessive traits are present in the F_1 generation.	1	4
15.	(a) $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$	½	
	$\frac{1}{R_p} = \frac{1}{60\,\Omega} + \frac{1}{60\,\Omega} = \frac{2}{60\Omega}$		
	$R_p = 30\,\Omega$	½	
	(b) $R_S = R_P + R_3$	½	
	$R_s = 30\,\Omega + 30\,\Omega = 60\,\Omega$	½	
	(c) (i) $I = \frac{V}{R}$	½	
	$= \frac{6V}{60\ \Omega} = 0{\cdot}1A$ **Deduct ½ mark for no / wrong unit.**	1½	
	OR		
	(c) (ii) Yes	½	

	Justification should include following three points. • Both combinations in series so same current flow. • Resistance of the parallel combination of two 60 Ω resistors is also 30 Ω • $V = I \times R$ Current is same and the resistance of the parallel combination of two 60 Ω resistors is also 30 Ω **(or any other correct explanation)**	½ ½ ½	4

* * *