



Series Z1XYW/1

SET ~ 1

प्रश्न-पत्र कोड  
Q.P. Code **31/1/1**

रोल नं. 

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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 31 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 39 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 परीक्षार्थी 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 31 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 39 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 : 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक : 80

Maximum Marks : 80



31/1/1

**106 A**

— 1 —

P.T.O.



सामान्य निर्देश :

निम्नलिखित निर्देशों को सावधानी से पढ़िए और उनका पालन कीजिए :

- (i) इस प्रश्न-पत्र में 39 प्रश्न हैं। सभी प्रश्न अनिवार्य हैं।
- (ii) यह प्रश्न-पत्र पाँच खण्डों में विभाजित है – खण्ड-क, ख, ग, घ तथा ङ।
- (iii) खण्ड-क में प्रश्न संख्या 1 से 20 तक बहुविकल्पीय प्रकार के एक-एक अंक के प्रश्न हैं।
- (iv) खण्ड-ख में प्रश्न संख्या 21 से 26 तक अति लघु-उत्तरीय प्रकार के दो-दो अंकों के प्रश्न हैं। इन प्रश्नों के उत्तर 30 से 50 शब्दों में दिए जाने चाहिए।
- (v) खण्ड-ग में प्रश्न संख्या 27 से 33 तक लघु-उत्तरीय प्रकार के तीन-तीन अंकों के प्रश्न हैं। इन प्रश्नों के उत्तर 50 से 80 शब्दों में दिए जाने चाहिए।
- (vi) खण्ड-घ में प्रश्न संख्या 34 से 36 तक दीर्घ उत्तरीय प्रकार के पाँच-पाँच अंकों के प्रश्न हैं। इन प्रश्नों के उत्तर 80 से 120 शब्दों में दिए जाने चाहिए।
- (vii) खण्ड-ङ में प्रश्न संख्या 37 से 39 तक स्रोत/प्रकरण इकाई अध्ययन आधारित चार-चार अंकों के प्रश्न (उपप्रश्नों सहित) हैं।
- (viii) प्रश्न-पत्र में समग्र विकल्प नहीं दिया गया है। यद्यपि, कुछ खण्डों में आंतरिक विकल्प दिए गए हैं।



**General Instructions :**

***Read the following instructions carefully and strictly follow them :***

- (i) *This question paper consists of 39 questions. All questions are compulsory.*
- (ii) *Question paper is divided into FIVE sections viz. Section A, B, C, D and E.*
- (iii) *In Section A - question number 1 to 20 are Multiple Choice Questions (MCQs) carrying 1 mark each.*
- (iv) *In Section B - question number 21 to 26 are Very Short Answer (VSA) type questions carrying 2 marks each. Answer to these questions should be in the range of 30 to 50 words.*
- (v) *In Section C - question number 27 to 33 are Short Answer (SA) type questions carrying 3 marks each. Answer to these questions should be in the range of 50 to 80 words.*
- (vi) *In Section D - question number 34 to 36 are Long Answer (LA) type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.*
- (vii) *In Section E - question number 37 to 39 are of 3 source-based/case-based units of assessment carrying 4 marks each with sub-parts.*
- (viii) *There is no overall choice. However, an internal choice has been provided in some Sections.*

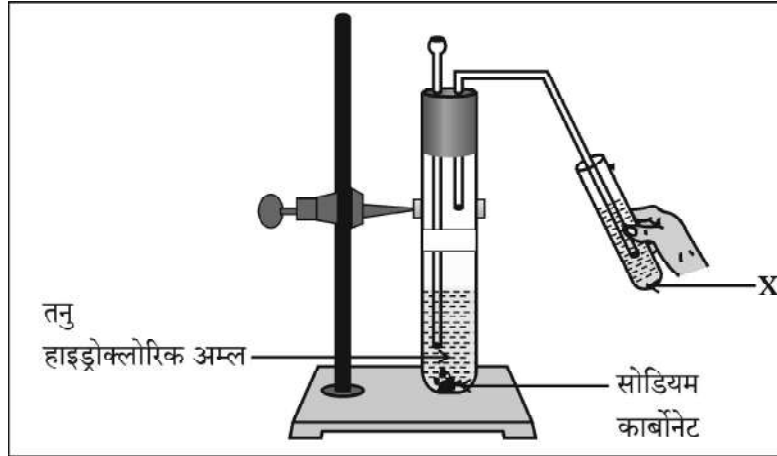


खण्ड – क

प्रश्न 1 से 20 तक के प्रश्नों में दिए गए चार विकल्पों में से सबसे उचित एक विकल्प चुनिए और लिखिए :

1. दी गयी प्रायोगिक व्यवस्था में प्रेक्षण करने पर यह पाया गया कि अभिक्रिया में उत्पन्न गैस को विलयन 'X' में प्रवाहित करने पर विलयन 'X' पहले दूधिया हो जाता है और फिर रंगहीन हो जाता है ।

1



नीचे दिया गया वह विकल्प जो उपरोक्त प्रेक्षण की पुष्टि करता है इस प्रकार है -

'X' कैल्सियम हाइड्रॉक्साइड का जलीय विलयन है तथा

- (a) अभिक्रिया में निकलने वाली कार्बन डाइऑक्साइड गैस के कारण यह दूधिया हो जाता है और कुछ समय के पश्चात कैल्सियम कार्बोनेट बनने के कारण यह रंगहीन हो जाता है ।
- (b) कैल्सियम कार्बोनेट बनने के कारण यह विलयन दूधिया हो जाता है और कार्बन डाइऑक्साइड के आधिक्य को प्रवाहित करने पर यह रंगहीन कैल्सियम हाइड्रोजन कार्बोनेट बन जाता है जो जल में घुलनशील है ।
- (c) कार्बन डाइऑक्साइड को प्रवाहित करने के कारण यह विलयन दूधिया हो जाता है तथा इसके पश्चात और अधिक गैस प्रवाहित करने पर यह सोडियम हाइड्रोजन कार्बोनेट में परिवर्तित हो जाता है जो जल में घुलनशील है ।
- (d) अभिक्रिया में निकली कार्बन डाइऑक्साइड गैस कैल्सियम हाइड्रोजन कार्बोनेट बनने के कारण चूने के पानी को दूधिया कर देती है तथा कुछ समय पश्चात कैल्सियम कार्बोनेट बनने के कारण विलयन रंगहीन हो जाता है, क्योंकि यह पानी में घुलनशील है ।

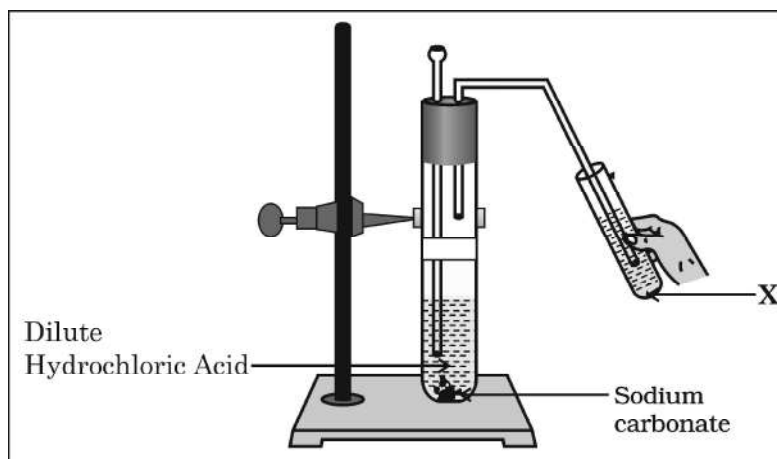


SECTION – A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20 :

1. In the experimental setup given below, it is observed that on passing the gas produced in the reaction in the solution 'X' the solution 'X' first turns milky and then colourless.

1



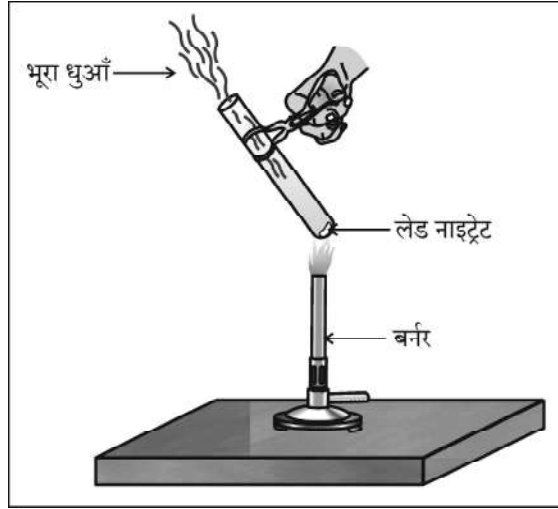
The option that justifies the above stated observation is that 'X' is aqueous calcium hydroxide and

- (a) it turns milky due to carbon dioxide gas liberated in the reaction and after sometime it becomes colourless due to formation of calcium carbonate.
- (b) it turns milky due to formation of calcium carbonate and on passing excess of carbon dioxide it becomes colourless due to formation of calcium hydrogen carbonate which is soluble in water.
- (c) it turns milky due to passing of carbon dioxide through it. It turns colourless as on further passing carbon dioxide, sodium hydrogen carbonate is formed which is soluble in water.
- (d) the carbon dioxide liberated during the reaction turns lime water milky due to formation of calcium hydrogen carbonate and after some time it turns colourless due to formation of calcium carbonate which is soluble in water.



2. दी गयी प्रायोगिक व्यवस्था में भूरे धुएँ के उत्सर्जन का कारण

1



- (a) लेड नाइट्रेट का ऊष्मीय वियोजन है जिसमें नाइट्रोजन डाइऑक्साइड का भूरा धुआँ उत्पन्न होता है ।  
(b) लेड नाइट्रेट का ऊष्मीय वियोजन है जिसमें लेड ऑक्साइड का भूरा धुआँ उत्पन्न होता है ।  
(c) लेड नाइट्रेट का उपचयन है जिसमें लेड ऑक्साइड और नाइट्रोजन डाइऑक्साइड बनते हैं ।  
(d) लेड नाइट्रेट का उपचयन है जिसमें लेड ऑक्साइड और ऑक्सीजन बनती है ।

3.  $MnO_2 + x HCl \rightarrow MnCl_2 + y H_2O + z Cl_2$

1

उपरोक्त रासायनिक समीकरण को संतुलित करने के लिए  $x$ ,  $y$  और  $z$  के मान होने चाहिए क्रमशः

- (a) 6, 2, 2 (b) 4, 1, 2  
(c) 4, 2, 1 (d) 2, 2, 1

4. नीचे दी गयी सारणी में चार विभिन्न विलयनों के pH और उनकी प्रकृति (अम्लीय/क्षारीय) के बारे में सूचना दी गयी है । इस सारणी का कौन सा विकल्प सही है ?

1

विकल्प	विलयन	pH पत्र का रंग	pH का सन्निकट मान	विलयन की प्रकृति
(a)	नींबू का रस	नारंगी	3	क्षारकीय
(b)	मिल्क ऑफ मैग्नीशिया	नीला	10	क्षारकीय
(c)	जठर रस	लाल	6	अम्लीय
(d)	शुद्ध जल	पीला	7	उदासीन

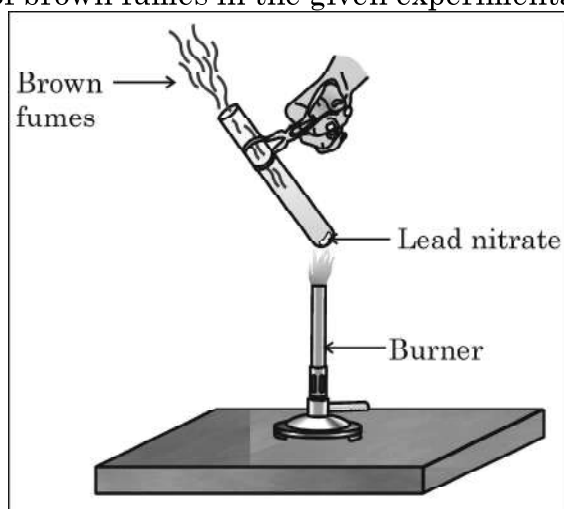
5. किसी धातु 'X' का उपयोग थर्मिट प्रक्रम में किया जाता है । जब X को वायु में जलाया जाता है तो इससे कोई उभयधर्मी ऑक्साइड 'Y' प्राप्त होता है । 'X' और 'Y' क्रमशः हैं :

1

- (a) Fe और  $Fe_2O_3$  (b) Al और  $Al_2O_3$   
(c) Fe और  $Fe_3O_4$  (d) Al और  $Al_3O_4$



2. The emission of brown fumes in the given experimental set-up is due to 1



- (a) thermal decomposition of lead nitrate which produces brown fumes of nitrogen dioxide.  
(b) thermal decomposition of lead nitrate which produces brown fumes of lead oxide.  
(c) oxidation of lead nitrate forming lead oxide and nitrogen dioxide.  
(d) oxidation of lead nitrate forming lead oxide and oxygen.
3.  $\text{MnO}_2 + x \text{HCl} \rightarrow \text{MnCl}_2 + y \text{H}_2\text{O} + z \text{Cl}_2$  1  
In order to balance the above chemical equation, the values of  $x$ ,  $y$  and  $z$  respectively are :
- (a) 6, 2, 2 (b) 4, 1, 2  
(c) 4, 2, 1 (d) 2, 2, 1

4. The table below has information regarding pH and the nature (acidic/basic) of four different solutions. Which one of the options in the table is correct ? 1

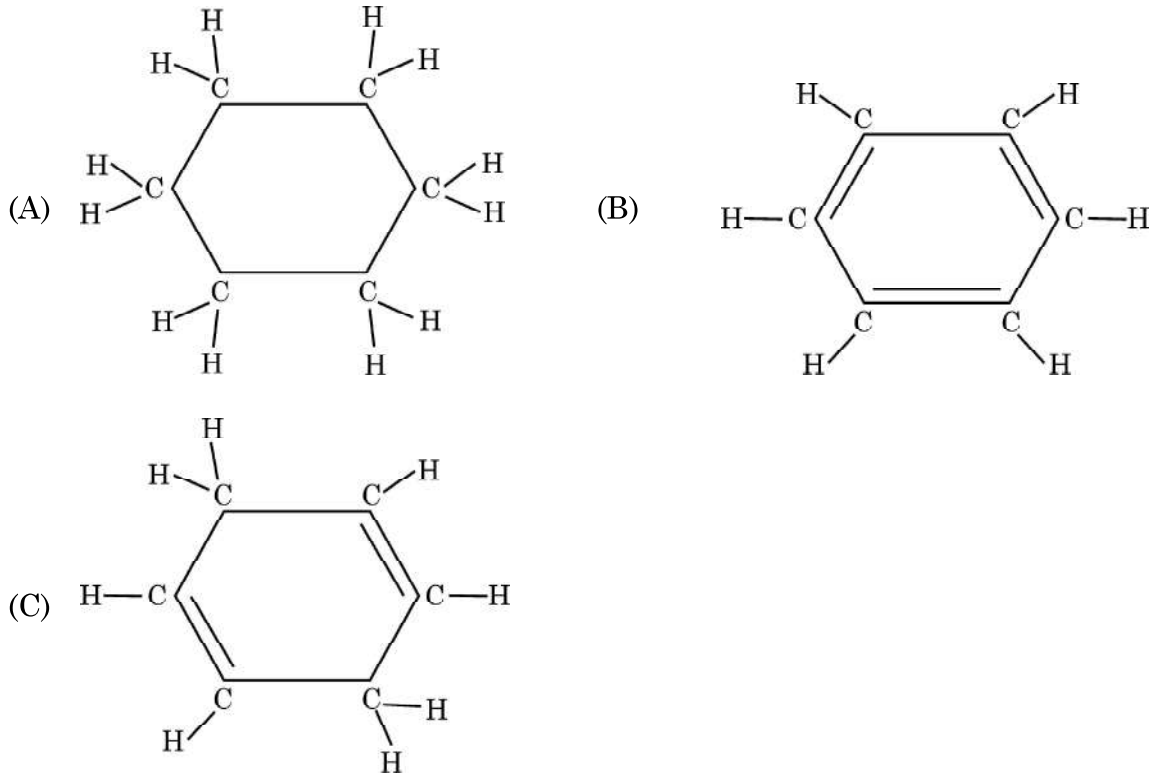
Option	Solution	Colour of pH paper	Approximate pH value	Nature of solution
(a)	Lemon juice	Orange	3	Basic
(b)	Milk of magnesia	Blue	10	Basic
(c)	Gastric juice	Red	6	Acidic
(d)	Pure water	Yellow	7	Neutral

5. A metal 'X' is used in thermite process. When X is burnt in air it gives an amphoteric oxide 'Y'. 'X' and 'Y' are respectively : 1
- (a) Fe and  $\text{Fe}_2\text{O}_3$  (b) Al and  $\text{Al}_2\text{O}_3$   
(c) Fe and  $\text{Fe}_3\text{O}_4$  (d) Al and  $\text{Al}_3\text{O}_4$



6. निम्नलिखित में से धोने का सोडा चुनिए : 1
- (a)  $\text{NaHCO}_3$  (b)  $\text{Na}_2\text{CO}_3 \cdot 5\text{H}_2\text{O}$   
(c)  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  (d)  $\text{NaOH}$

7. नीचे दी गयी तीन चक्रीय कार्बन-यौगिकों A, B और C की संरचनाओं पर विचार कीजिए और निम्नलिखित में से सही विकल्प को चुनिए : 1



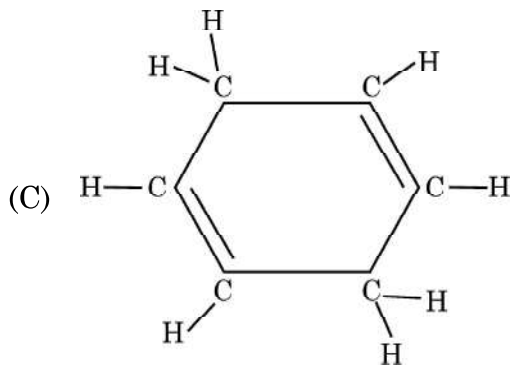
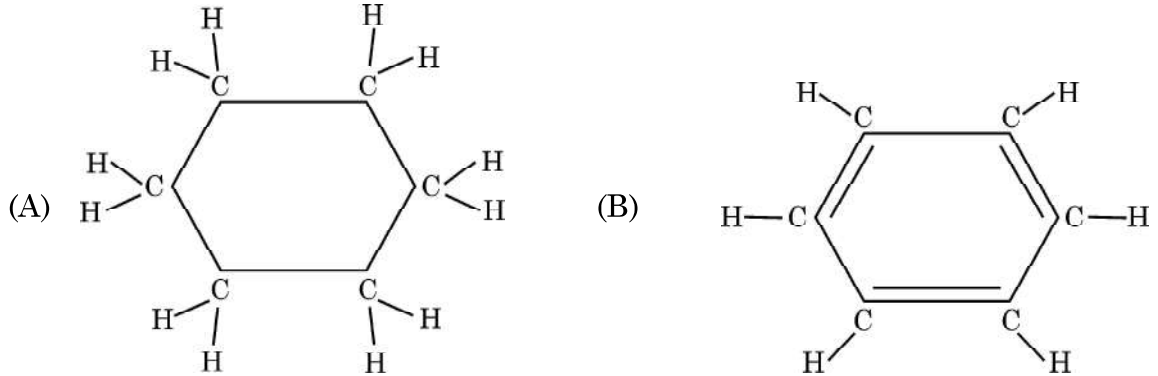
- (a) A और C हैक्सेन के समावयव हैं तथा B बेन्जीन है ।  
(b) A हैक्सेन का समावयव है, B बेन्जीन है तथा C हैक्सीन का समावयव है ।  
(c) A संतृप्त चक्रीय हाइड्रोकार्बन है तथा B और C असंतृप्त चक्रीय हाइड्रोकार्बन हैं ।  
(d) A साइक्लोहैक्सेन है तथा B और C बेन्जीन के समावयव हैं ।
8. वह जीव जो भोज्य पदार्थों का विघटन शरीर के बाहर ही कर देता है और तब उसका अवशोषण करता है, कौन सा है ? 1
- (a) पादप परजीवी, अमरबेल (b) जन्तु परजीवी, फीताकृमि  
(c) जीवाणु, राइज़ोबियम (d) कवक, राइज़ोपस





6. Select washing soda from the following : 1
- (a)  $\text{NaHCO}_3$  (b)  $\text{Na}_2\text{CO}_3 \cdot 5\text{H}_2\text{O}$   
(c)  $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  (d)  $\text{NaOH}$

7. Consider the structures of the three cyclic carbon compounds A, B and C given below and select the correct option from the following : 1



- (a) A and C are isomers of hexane and B is benzene.  
(b) A is an isomer of hexane, B is benzene and C is an isomer of hexene.  
(c) A is a saturated cyclic hydrocarbon and B and C are unsaturated cyclic hydrocarbons.  
(d) A is cyclohexane and B and C are the isomers of benzene.
8. An organism which breaks down the food material outside the body and then absorbs it is 1
- (a) a plant parasite, Cuscuta (b) an animal parasite, Tapeworm  
(c) a bacteria, Rhizobium (d) a fungi, Rhizopus



9. क्षुद्रांत्र के विषय में नीचे दिए गए कथनों पर विचार कीजिए और इनमें से उस कथन को चुनिए जो सही नहीं है : 1
- (a) जन्तुओं में क्षुद्रांत्र की लम्बाई भिन्न-भिन्न होती है क्योंकि यह उनके द्वारा खाए जाने वाले भोज्य पदार्थों के प्रकार पर निर्भर करती है ।
- (b) क्षुद्रांत्र भोज्य पदार्थों के पूर्ण पाचन का स्थल है ।
- (c) क्षुद्रांत्र लीवर (यकृत) और अग्न्याशय से स्रावण ग्रहण करती है ।
- (d) क्षुद्रांत्र के दीर्घरोम गुदा द्वारा शरीर से बाहर किए जाने से पूर्व बिना पचे भोजन से जल को अवशोषित कर लेते हैं ।
10. निम्नलिखित में से वह कथन चुनिए जो किसी जीन के लक्षण का सही वर्णन करता है : 1
- (a) किसी दी गयी स्पीशीज़ की व्यष्टि में किसी विशेष गुणसूत्र पर कोई विशिष्ट जीन स्थित होता है ।
- (b) किसी कोशिका में प्रोटीन बनाने के लिए जीन कोई सूचना स्रोत नहीं है ।
- (c) प्रत्येक गुणसूत्र पर उसकी लम्बाई के अनुदिश केवल एक जीन स्थित होता है ।
- (d) मानवों में सभी वंशागत लक्षण जीनों द्वारा नियंत्रित नहीं होते हैं ।
11. निम्नलिखित में से वह कथन चुनिए जो पौधों में अनुवर्तनी गति के लिए सही है : 1
- (a) यह स्पर्श और ताप के उद्दीपन के कारण होती है ।
- (b) यह प्राप्त होने वाले उद्दीपन की दिशा पर निर्भर नहीं करती है ।
- (c) यह केवल जड़ों में दिखाई देती है तनों में नहीं ।
- (d) यह गति वृद्धि से संबंधित होती है ।
12. निम्नलिखित में से गलत युगल (पादप और उसके कायिक भाग के मध्य) को चुनिए : 1
- (a) ब्रायोफिलम, पत्ती (b) आलू, तना
- (c) मनीप्लांट, तना (d) गुलाब, जड़



9. Consider the following statements about small intestine and select the one which is NOT correct : 1
- (a) The length of the small intestine in animals differs as it depends on the type of food they eat.
  - (b) The small intestine is the site of complete digestion of food.
  - (c) The small intestine receives secretions from liver and pancreas.
  - (d) The villi of the small intestine absorb water from the unabsorbed food before it gets removed from the body via the anus.
10. The statement that correctly describes the characteristic(s) of a gene is : 1
- (a) In individuals of a given species, a specific gene is located on a particular chromosome.
  - (b) A gene is not the information source for making proteins in the cell.
  - (c) Each chromosome has only one gene located all along its length.
  - (d) All the inherited traits in human beings are not controlled by genes.
11. Select from the following the correct statement about tropic movement in plants : 1
- (a) It is due to stimulus of touch and temperature.
  - (b) It does not depend upon the direction of stimulus received.
  - (c) It is observed only in roots and not in stems.
  - (d) It is a growth related movement.
12. Select the INCORRECT match (between the plant and its vegetative part) from the following : 1
- (a) Bryophyllum, leaf
  - (b) Potato, stem
  - (c) Money-plant, stem
  - (d) Rose, root



13. चार सर्वसम प्रतिरोधकों जिसमें प्रत्येक का प्रतिरोध  $8 \Omega$  है, को पहले श्रेणी में संयोजित किया गया है जिससे संयोजन का प्रभावी प्रतिरोध  $R_s$  है और फिर उन्हें पार्श्व में संयोजित किया है जिससे संयोजन का प्रभावी प्रतिरोध  $R_p$  है, तब अनुपात  $\frac{R_s}{R_p}$  है

1

- (a) 32 (b) 2  
(c) 0.5 (d) 16

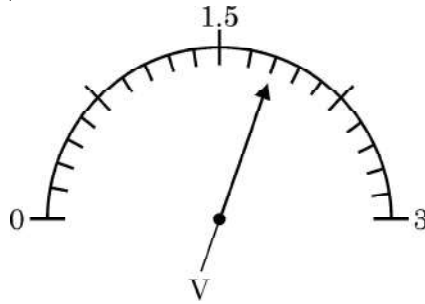
14. घरेलू विद्युत परिपथों में 15 A धारा अनुमतांक के तारों का उपयोग उन विद्युत युक्तियों के लिए होता है, जिनका

1

- (a) उच्चतर शक्ति अनुमतांक होता है जैसे गीज़र ।  
(b) निम्न शक्ति अनुमतांक होता है जैसे पंखा ।  
(c) आवरण धात्विक तथा निम्न शक्ति अनुमतांक होता है ।  
(d) आवरण अधात्विक तथा निम्न शक्ति अनुमतांक होता है ।

15. नीचे दिए गए आरेख में किसी वोल्टमीटर के पैमाने पर सूई की स्थिति दर्शायी गयी है । वोल्टमीटर का अल्पतमांक और उसका पाठ्यांक क्रमशः हैं :

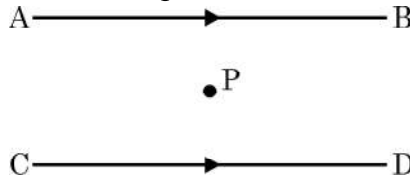
1



- (a) 0.15 V और 1.6 V (b) 0.05 V और 1.6 V  
(c) 0.15 V और 1.8 V (d) 0.05 V और 1.8 V

16. दो समान्तर तारों, जो क्षैतिजतः स्थित हैं तथा जिनमें प्रत्येक से कोई स्थायी धारा I प्रवाहित हो रही है, के बीच में स्थित किसी बिन्दु 'P' पर परिणामी चुम्बकीय क्षेत्र

1



- (a) उसी दिशा में होता है जिसमें धारा प्रवाहित हो रही है ।  
(b) ऊर्ध्वाधर ऊपर की ओर होता है ।  
(c) शून्य होता है ।  
(d) ऊर्ध्वाधर नीचे की ओर होता है ।



13. If four identical resistors, of resistance 8 ohm, are first connected in series so as to give an effective resistance  $R_s$ , and then connected in parallel so as to give an effective resistance  $R_p$ , then the ratio  $\frac{R_s}{R_p}$  is

1

- (a) 32 (b) 2  
(c) 0.5 (d) 16

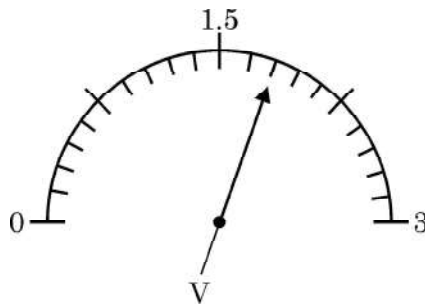
14. In domestic electric circuits the wiring with 15 A current rating is for the electric devices which have

1

- (a) higher power ratings such as geyser.  
(b) lower power ratings such as fan.  
(c) metallic bodies and low power ratings.  
(d) non-metallic bodies and low power ratings.

15. In the following diagram, the position of the needle is shown on the scale of a voltmeter. The least count of the voltmeter and the reading shown by it respectively are :

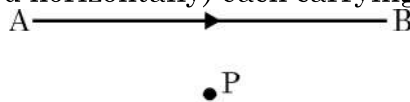
1



- (a) 0.15 V and 1.6 V (b) 0.05 V and 1.6 V  
(c) 0.15 V and 1.8 V (d) 0.05 V and 1.8 V

16. The resultant magnetic field at point 'P' situated midway between two parallel wires (placed horizontally) each carrying a steady current I is

1



- (a) in the same direction as the current in the wires.  
(b) in the vertically upward direction.  
(c) zero  
(d) in the vertically downward direction.



प्रश्न संख्या 17 से 20 अभिकथन – कारण पर आधारित प्रश्न हैं :

इन प्रश्नों में दो कथन – अभिकथन (A) और कारण (R) दिए गए हैं । इन प्रश्नों के उत्तर नीचे दिए अनुसार उचित विकल्प को चुनकर दीजिए :

- (a) (A) और (R) दोनों सही हैं तथा (R) द्वारा (A) की सही व्याख्या हो रही है ।
- (b) (A) और (R) दोनों सही हैं, परन्तु (R) द्वारा (A) की सही व्याख्या नहीं हो रही है ।
- (c) (A) सही है, परन्तु (R) गलत है ।
- (d) (A) गलत है, परन्तु (R) सही है ।

17. **अभिकथन (A)** : जब कॉपर सल्फेट के जलीय विलयन में लेड का कोई टुकड़ा डाला जाता है, तो विलयन रंगहीन हो जाता है । 1
- कारण (R)** : कॉपर की तुलना में लेड अधिक अभिक्रियाशील है, अतः यह कॉपर को उसके लवण-विलयन से विस्थापित कर देता है ।
18. **अभिकथन (A)** : जनकों से वंशागत जीन शिशु का लिंग निर्धारित करते हैं । 1
- कारण (R)** : नर शिशु में X गुणसूत्र पिता से वंशागत होते हैं ।
19. **अभिकथन (A)** : रुधिर का थक्का बनने से रुधिर की आधिक्य हानि से बचाव होता है । 1
- कारण (R)** : रुधिर का थक्का रुधिर में रुधिर-प्लैज़्मा और श्वेत रुधिर कोशिकाओं की उपस्थिति के कारण बनता है ।
20. **अभिकथन (A)** : किसी धारावाही वृत्ताकार कुण्डली के केन्द्र पर उत्पन्न चुम्बकीय क्षेत्र की तीव्रता में, कुण्डली में फेरों की संख्या में वृद्धि होने पर, वृद्धि हो जाती है । 1
- कारण (R)** : कुण्डली के प्रत्येक फेरे में विद्युत धारा के प्रवाह की दिशा समान होती है अतः व्यष्टिगत फेरों के चुम्बकीय क्षेत्र संयोजित हो जाते हैं ।



**Q. Nos. 17 to 20 are Assertion – Reason based questions.**

These consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below :

- (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
- (b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
- (c) (A) is true, but (R) is false.
- (d) (A) is false, but (R) is true.

17. **Assertion (A) :** The colour of aqueous solution of copper sulphate turns colourless when a piece of lead is added to it. 1

**Reason (R) :** Lead is more reactive than copper, and hence displaces copper from its salt solution.

18. **Assertion (A) :** Genes inherited from the parents decide the sex of a child. 1

**Reason (R) :** X chromosome in a male child is inherited from his father.

19. **Assertion (A) :** Blood clotting prevents excessive loss of blood. 1

**Reason (R) :** Blood clotting is due to blood plasma and white blood cells present in the blood.

20. **Assertion (A) :** The strength of the magnetic field produced at the centre of a current carrying circular coil increases on increasing the number of turns in it. 1

**Reason (R) :** The current in each circular turn has the same direction and the magnetic field due to each turn then just adds up.



खण्ड – ख

प्रश्न संख्या 21 से 26 अति लघु उत्तर प्रश्न हैं :

21. (a) (i) जिप्सम से बने किसी यौगिक 'X' में उचित मात्रा में पानी मिलाए जाने पर कठोर हो जाने का गुण है । 2

'X' को पहचान कर इसका रासायनिक सूत्र लिखिए ।

- (ii) बैकिंग सोडा और बैकिंग पाउडर के रासायनिक संघटनों में अन्तर लिखिए ।

अथवा

- (b) नीचे होने वाली अभिक्रियाओं के संतुलित रासायनिक समीकरण लिखिए : 2

(i) जब कॉपर सल्फेट के नीले क्रिस्टलों को गर्म किया जाता है, तथा

(ii) भोजन पकाते समय जब सोडियम हाइड्रोजन कार्बोनेट को गर्म किया जाता है ।

22. (a) मानव शरीर में रुधिर शर्करा स्तर के नियमन में इन्सुलिन की भूमिका लिखिए । इसके कारण होने वाले रोग का उल्लेख कीजिए । 2

(b) रुधिर में मुक्त होने वाली इन्सुलिन का समय और मात्रा का नियंत्रण किस प्रकार होता है ?

23. (a) निम्नलिखित द्वारा वहन किए जाने वाले रुधिर का प्रकार (ऑक्सीजनित/अनॉक्सीजनित) का नाम और उसका पथ (किस भाग से किस भाग की ओर) दीजिए 2

(i) महाशिरा

(ii) फुफ्फुसीय धमनी

अथवा

- (b) व्यवस्थित प्रवाह आरेख की सहायता से ऊर्जा प्रदान करने के लिए किसी कोशिका में 2

(i) ऑक्सीजन की उपस्थिति में

(ii) ऑक्सीजन के अभाव में

ग्लूकोज़ का विघटन दर्शाइए ।





**SECTION – B**

**Q. No. 21 to 26 are very short answer questions.**

21. (a) (i) A compound 'X' which is prepared from gypsum has the property of hardening when mixed with proper quantity of water. 2  
Identify 'X' and write its chemical formula.
- (ii) State the difference in chemical composition between baking soda and baking powder.

**OR**

- (b) Write balanced chemical equation for the reaction that occurs when : 2  
(i) blue coloured copper sulphate crystals are heated and  
(ii) Sodium hydrogen carbonate is heated during cooking.
22. (a) Write the role of insulin in regulating blood sugar levels in human body. Mention the disease caused due to it. 2  
(b) How is the timing and the amount of release of insulin in the blood regulated ?
23. (a) Name the type of blood (oxygenated / deoxygenated) transported by each of the following mentioning the path (i.e. from one organ (which place) to another (which place)). 2  
(i) Vena cava  
(ii) Pulmonary artery

**OR**

- (b) With the help of a schematic flow chart, show the breakdown of glucose in a cell to provide energy – 2  
(i) in the presence of oxygen  
(ii) in lack of oxygen

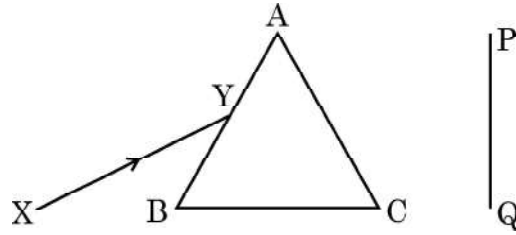


24. मानव उत्सर्जन तंत्र के उस भाग का नाम लिखिए जिसमें वृक्काणु पाए जाते हैं। वृक्काणुओं की संरचना और उनका कार्य लिखिए।

2

25. (a) श्वेत प्रकाश का कोई पतला प्रकाश पुंज XY किसी काँच के प्रिज्म ABC से आरेख में दर्शाए अनुसार गुजर रहा है :

2



इसे अपनी उत्तर पुस्तिका पर खींचिए और पर्दे PQ पर दिखाई देने वाले निर्गत प्रकाश पुंज के पथ को दर्शाए।

प्रेक्षण की जाने वाली परिघटना का नाम लिखिए और इसके कारण का उल्लेख कीजिए।

अथवा

(b) यह प्रेक्षण किया गया है कि आयु में वृद्धि होने पर नेत्रों की निकट की तथा दूर की वस्तुओं को स्पष्ट देख सकने की क्षमता घट जाती है।

2

(i) उपरोक्त कथन के लिए कारण दीजिए।

(ii) इस प्रकार की स्थिति में नेत्रों में होने वाले संभावित दोष का नाम लिखिए।

(iii) इस प्रकार की दोषयुक्त नेत्र की दृष्टि के पुनः स्थापन के लिए उपयोग किए जाने वाले लेंस के प्रकार को दर्शाने के लिए नामांकित किरण आरेख खींचिए।

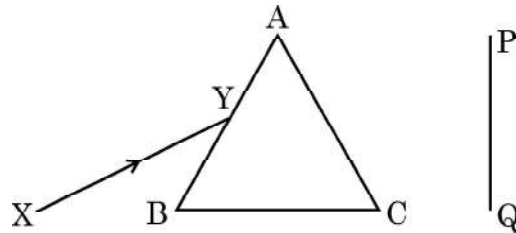
26. किसी आहार शृंखला में हानिकर रसायन किस प्रकार प्रत्येक पोषी स्तर पर उत्तरोत्तर संगृहीत होते जाते हैं ?

2



24. Name the part of the human excretory system where nephrons are found.  
Write the structure and function of nephrons. 2

25. (a) A narrow beam XY of white light is passing through a glass prism ABC as shown in the diagram : 2



Trace it on your answer sheet and show the path of the emergent beam as observed on the screen PQ.

Name the phenomenon observed and state its cause.

**OR**

- (b) It is observed that the power of an eye to see nearby objects as well as far off objects diminishes with age. 2
- (i) Give reason for the above statement.
- (ii) Name the defect that is likely to arise in the eyes in such a condition.
- (iii) Draw a labelled ray diagram to show the type of corrective lens used for restoring the vision of such an eye.

26. How do harmful chemicals get accumulated progressively at each trophic level in a food chain ? 2



खण्ड – ग

प्रश्न संख्या 27 से 33 लघु उत्तर प्रश्न हैं।

27. (a) नीचे दी गयी अभिक्रियाओं में अपचायी एजेंट पहचानिए : 3
- (i)  $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$
- (ii)  $\text{H}_2\text{O} + \text{F}_2 \rightarrow \text{HF} + \text{HOF}$
- (iii)  $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
- (iv)  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- (b) उपचयन-अपचयन (रेडॉक्स) अभिक्रिया की परिभाषा ऑक्सीजन की वृद्धि अथवा हास के पदों में दीजिए।

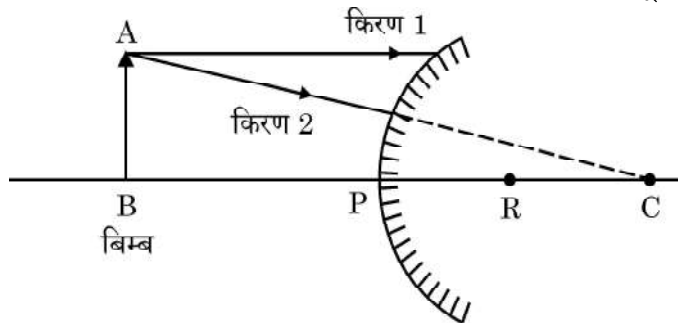
28. (a) मानव शरीर में निम्नलिखित प्रकरणों में होने वाले प्रत्येक pH परिवर्तन को प्रभावहीन करने के लिए किए जाने वाली प्रत्युपाय (सुधारात्मक) क्रिया सुझाइए : 3
- (i) अपच के समय आमाशय में अधिक अम्ल का निर्माण
- (ii) मधुमक्खी / नेटल के डंक लगने पर
- (b) ताजे दूध का pH मान 6 होता है। दही बनने पर यह pH मान बढ़ता है या घटता ? क्यों ?

29. (a) (i) कोशिकीय श्वसन में ATP की भूमिका का उल्लेख कीजिए। 3
- (ii) पादपों में गैसों के पर्याप्त आदान-प्रदान को कौन सुनिश्चित करता है ?
- (iii) उन स्थितियों का उल्लेख कीजिए जिन पर पादपों में गैसों के विसरण की दिशा निर्भर करती है।

अथवा

- (b) (i) पादपों और जन्तुओं में आन्तरिक ऊर्जा किस रूप में संचित होती है ?
- (ii) मरुस्थली पादपों में यदि दिन के समय उनके रंध्र बन्द रहते हैं तो प्रकाश-संश्लेषण किस प्रकार होता है ? 3

30. (a) प्रतिबिम्ब बनना दर्शाने के लिए नीचे दिए गए प्रकाश किरण आरेख को पूरा कीजिए : 3



- (b) इस प्रकरण में बने प्रतिबिम्ब की प्रकृति, स्थिति और साइज़ का उल्लेख कीजिए।
- (c) कार्तीय चिह्न प्रणाली का उपयोग करके इस प्रकरण में प्रतिबिम्ब-दूरी के चिह्न का उल्लेख कीजिए।



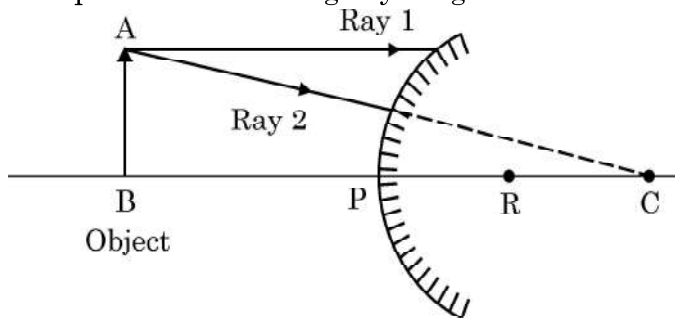
SECTION – C

Q. No. 27 to 33 are short answer questions.

27. (a) Identify the reducing agent in the following reactions : 3
- (i)  $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$
  - (ii)  $\text{H}_2\text{O} + \text{F}_2 \rightarrow \text{HF} + \text{HOF}$
  - (iii)  $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
  - (iv)  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- (b) Define a redox reaction in terms of gain or loss of oxygen.
28. (a) Suggest one remedial measure each to counteract the change in pH in human beings in following cases : 3
- (i) Production of too much acid in stomach during indigestion
  - (ii) Stung by a honey bee / nettle leaves
- (b) Fresh milk has a pH of 6. When it changes into curd will its pH increase or decrease ? Why ?
29. (a) (i) State the role of ATP in cellular respiration. 3
- (ii) What ensures sufficient exchange of gases in plants ?
  - (iii) State the conditions on which the direction of diffusion of gases in plant depend upon.

OR

- (b) (i) What is the internal energy reserve in plants and animals ?
- (ii) How desert plants perform photosynthesis if their stomata remain closed during the day ? 3
30. (a) Complete the following ray diagram to show the formation of image : 3



- (b) Mention the nature, position and size of the image formed in this case.
- (c) State the sign of the image distance in this case using the Cartesian sign convention.



31. निम्नलिखित के लिए कारण दीजिए :

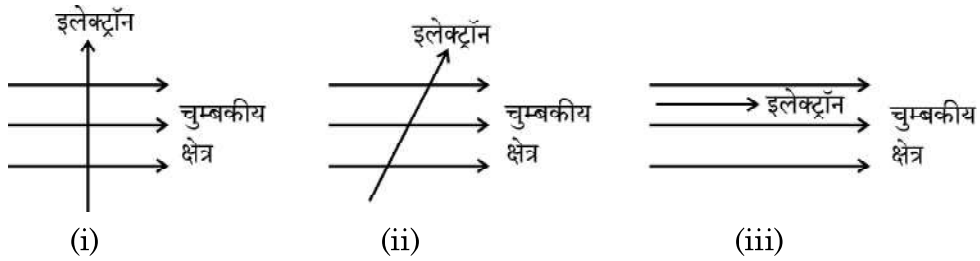
3

- हवाई अड्डों तथा ऊँचे भवनों के शीर्ष पर लगे खतरे के सिगनल लाल रंग के होते हैं ।
- अत्यधिक ऊँचाई पर उड़ रहे यात्रियों को आकाश काला प्रतीत होता है ।
- कोलॉइडी विलयनों से गुजरने वाले प्रकाश पुंज का मार्ग दृश्य होता है ।

32. (a) (i) चुम्बकीय क्षेत्र में स्थित किसी धारावाही चालक पर लगने वाले बल की दिशा ज्ञात करने वाले नियम को लिखिए ।

3

- नीचे तीन आरेख दिए गए हैं जिनमें चुम्बकीय क्षेत्र में किसी इलेक्ट्रॉन को प्रवेश करते दिखाया गया है । इनमें से वह प्रकरण पहचानिए जिसमें इलेक्ट्रॉन पर लगने वाला बल क्रमशः (1) अधिकतम और (2) निम्नतम होगा । अपने उत्तरों के लिए कारण दीजिए ।



अथवा

(b) (i) नीचे दिए गए प्रकरणों में चुम्बकीय क्षेत्र रेखाओं का पैटर्न खींचिए :

3

- धारावाही परिनालिका
- छड़ चुम्बक

(ii) इन दोनों चुम्बकीय क्षेत्रों के बीच दो विभेदनकारी लक्षणों की सूची बनाइए ।

33. (a) (i) किसी घरेलू बगीचे (किचन गार्डन) को कृत्रिम पारितंत्र क्यों कहा जाता है जबकि वन (जंगल) को प्राकृतिक पारितंत्र माना जाता है ?

3

(ii) घर पर किसी कृत्रिम (मानव निर्मित) पारितंत्र की अभिकल्पना करते समय उन किन्हीं दो बातों का कारण सहित उल्लेख कीजिए जो उसे स्वनिर्वाह पारितंत्र में परिवर्तित कर सकते हैं ।

अथवा

(b) (i) निम्नलिखित को सम्मिलित करते हुए चार पोषी स्तरों की आहार शृंखला बनाइए :

3

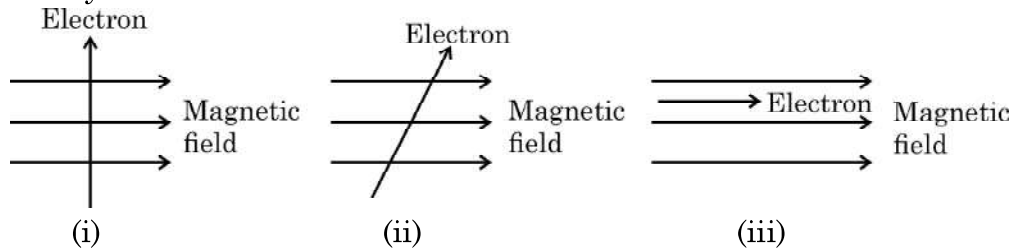
बाज्र, सर्प, पौधे, चूहे

(ii) उत्पादकों द्वारा दूसरे पोषी स्तर के जीवों के लिए 20,000 J ऊर्जा स्थानान्तरित की गयी है । ऊर्जा की उस मात्रा का परिकलन कीजिए जिसे तीसरे पोषी स्तर के जीवों द्वारा चौथे पोषी स्तर के जीवों के लिए स्थानान्तरित किया जाएगा ।



31. Give reasons for the following : 3
- (a) Danger signals installed at airports and at the top of tall buildings are of red colour.
  - (b) The sky appears dark to the passengers flying at very high altitudes.
  - (c) The path of a beam of light passing through a colloidal solution is visible.

32. (a) (i) State the rule used to find the force acting on a current carrying conductor placed in a magnetic field. 3
- (ii) Given below are three diagrams showing entry of an electron in a magnetic field. Identify the case in which the force will be (1) maximum and (2) minimum respectively. Give reason for your answer.



**OR**

- (b) (i) Draw the pattern of magnetic field lines of 3
- (1) a current carrying solenoid
  - (2) a bar magnet
- (ii) List two distinguishing features between the two fields.
33. (a) (i) Why does a kitchen garden called an artificial ecosystem while a forest is considered to be a natural ecosystem ? 3
- (ii) While designing an artificial ecosystem at home, write any two things to be kept in mind to convert it into a self-sustaining system. Give reason to justify your answer.

**OR**

- (b) (i) Construct a food chain of four trophic levels comprising the following : 3
- Hawk, snake, plants, rat.
- (ii) 20,000 J of energy was transferred by the producers to the organism of second trophic level. Calculate the amount of energy that will be transferred by organisms of the third trophic level to the organisms of the fourth trophic level.



खण्ड – घ

प्रश्न संख्या 34 से 36 दीर्घ उत्तर प्रश्न हैं।

34. (a) कोई संतृप्त कार्बन यौगिक 'A' एल्कोहॉलों की समजातीय श्रेणी का यौगिक है। यौगिक 'A' को सांद्र सल्फ्यूरिक अम्ल के साथ 443 K पर गर्म किया जाता है तो आण्विक द्रव्यमान 28 u का असंतृप्त यौगिक 'B' बनता है। यौगिक 'B' निकेल की उपस्थिति में हाइड्रोजन के एक मोल के संकलन द्वारा संतृप्त हाइड्रोकार्बन 'C' में परिवर्तित हो जाता है।

5

- (i) A, B और C की पहचान कीजिए।
- (ii) A से B में परिवर्तन को दर्शाने के लिए रासायनिक समीकरण लिखिए।
- (iii) क्या होता है जब यौगिक C का दहन किया जाता है ?
- (iv) हाइड्रोजनीकरण अभिक्रिया का एक औद्योगिक अनुप्रयोग लिखिए।
- (v) यौगिक A की सोडियम से अभिक्रिया द्वारा बनने वाले उत्पाद का नाम लिखिए।

अथवा

- (b) (i) आरेख की सहायता से तैलीय धूल पर साबुन लगाने पर मिसेल बनना दर्शाइए।
- (ii) दो परखनलियाँ X और Y लेकर प्रत्येक में 10 mL कठोर जल भरिए। परखनली 'X' में साबुन के घोल की कुछ बूँदें मिलाइए तथा परखनली 'Y' में अपमार्जक (डिटरजेन्ट) के घोल की कुछ बूँदें मिलाइए। दोनों परखनलियों को बराबर समय तक हिलाइए।
- (1) किस परखनली में अधिक झाग बनेंगे और क्यों ?
  - (2) किस परखनली में दही जैसा ठोस पदार्थ बनता है और क्यों ?

5





SECTION – D

**Q. No. 34 to 36 are long answer questions.**

34. (a) A saturated organic compound 'A' belongs to the homologous series of alcohols. 5

On heating 'A' with concentrated sulphuric acid at 443 K, it forms an unsaturated compound 'B' with molecular mass 28 u.

The compound 'B' on addition of one mole of hydrogen in the presence of Nickel, changes to a saturated hydrocarbon 'C'.

- (i) Identify A, B and C.
- (ii) Write the chemical equations showing the conversion of A into B.
- (iii) What happens when compound C undergoes combustion ?
- (iv) State one industrial application of hydrogenation reaction.
- (v) Name the products formed when compound A reacts with sodium.

**OR**

- (b) (i) With the help of diagram, show the formation of micelles, when soap is applied on oily dirt. 5

- (ii) Take two test tubes X and Y with 10 mL of hard water in each.

In test tube 'X', add few drops of soap solution and in test tube 'Y' add a few drops of detergent solution. Shake both the test tubes for the same period.

- (1) In which test tube the formation of foam will be more ?  
Why ?
- (2) In which test tube is a curdy solid formed ? Why ?



35. (a) किसी उभयलिंगी पुष्प के उन भागों का नाम लिखिए जो जनन में प्रत्यक्ष रूप से सम्मिलित नहीं होते हैं । 5
- (b) स्व-परागण और पर-परागण के बीच विभेदन कीजिए । परागण के किन्हीं दो महत्त्वों की सूची बनाइए ।
- (c) किसी पुष्प में निषेचन के पश्चात बीजाण्ड और अण्डाशय का क्या होता है ?
36. (a) किसी विद्युत इस्तरी में अधिकतम तापन दर के लिए 880 W की दर से ऊर्जा उपभुक्त होती है तथा 330 W की दर से उस समय उपभुक्त होती है जब तापन की दर निम्नतम है । यदि विद्युत स्रोत की वोल्टता 220 V है, तो दोनों प्रकरणों में विद्युत धारा तथा प्रतिरोध परिकलित कीजिए । 5
- (b) विद्युत धारा का तापन प्रभाव किसे कहते हैं ?
- (c) जब किसी प्रतिरोधक से कोई धारा कुछ समय के लिए प्रवाहित होती है, तो उत्पन्न ऊष्मा के लिए व्यंजक ज्ञात कीजिए ।

#### खण्ड – ड

प्रश्न संख्या 37 से 39 प्रकरण आधारित/सामग्री आधारित प्रश्न हैं, जिनमें 2 से 3 लघु उप-भाग हैं । इनमें से एक उप-भाग में आन्तरिक चयन प्रदान किया गया है ।

37. लगभग सभी धातुएँ ऑक्सीजन से संयोग करके धातु के ऑक्साइड बनाती हैं । धातुओं के ऑक्साइडों की प्रकृति सामान्यतः क्षारकीय होती है, परन्तु कुछ धातुओं के ऑक्साइड क्षारकीय के साथ-साथ अम्लीय व्यवहार भी दर्शाते हैं । विभिन्न धातुओं की ऑक्सीजन के साथ अभिक्रियाशीलता भिन्न होती है । कुछ धातुएँ ऑक्सीजन के साथ बहुत तेजी से अभिक्रिया करती हैं जबकि कुछ कोई अभिक्रिया नहीं करती हैं ।
- (a) क्या होता है जब कॉपर को वायु में गर्म किया जाता है ? (अभिक्रिया का रासायनिक समीकरण दीजिए ।) 1
- (b) कुछ धातुओं के ऑक्साइडों को उभयधर्मी की श्रेणी में क्यों रखा जाता है ? एक उदाहरण दीजिए । 1
- (c) नीचे दिए गए समीकरणों को पूरा कीजिए : 2
- (i)  $\text{Na}_2\text{O}_{(s)} + \text{H}_2\text{O}_{(l)} \rightarrow$
- (ii)  $\text{Al}_2\text{O}_3 + 2 \text{NaOH} \rightarrow$

अथवा



35. (a) Name the parts of a bisexual flower that are not directly involved in reproduction. 5
- (b) Differentiate between self pollination and cross pollination. List any two significance of pollination.
- (c) What is the fate of ovules and ovary after fertilization in a flower ?
36. (a) An electric iron consumes energy at a rate of 880 W when heating is at the maximum rate and 330 W when the heating is at the minimum. If the source voltage is 220 V, calculate the current and resistance in each case. 5
- (b) What is heating effect of electric current ?
- (c) Find an expression for the amount of heat produced when a current passes through a resistor for some time.

### SECTION – E

**Q. No. 37 to 39 are case based/data based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.**

37. Almost all metals combine with oxygen to form metal oxides. Metal oxides are generally basic in nature. But some metal oxides show both basic as well as acidic behaviour. Different metals show different reactivities towards oxygen. Some react vigorously while some do not react at all.
- (a) What happens when copper is heated in air ? (Give the equation of the reaction involved). 1
- (b) Why are some metal oxides categorized as amphoteric ? Give one example. 1
- (c) Complete the following equations : 2
- (i)  $\text{Na}_2\text{O}_{(s)} + \text{H}_2\text{O}_{(l)} \rightarrow$
- (ii)  $\text{Al}_2\text{O}_3 + 2 \text{NaOH} \rightarrow$

OR



(c) सल्फर का ऑक्सीजन में दहन करने पर कोई रंगहीन गैस उत्पन्न होती है ।

2

(i) अभिक्रिया का रासायनिक समीकरण लिखिए ।

(ii) बनने वाली गैस का नाम लिखिए ।

(iii) इस गैस की प्रकृति लिखिए ।

(iv) इस गैस की शुष्क लिटमस पत्र पर क्या क्रिया होगी ?

38. लक्षणों की वंशागति की खोज करने के लिए मेण्डल ने मटर के ऐसे पौधों के बीच संकरण कराया जिनमें एक अथवा दो विपर्यासी लक्षणों के युगल थे । जब उन्होंने गोल और पीले बीजों वाले मटर के पौधों का झुर्रीदार और हरे बीजों वाले मटर के पौधों के साथ संकरण कराया तो प्रेक्षण करने पर उन्होंने यह पाया कि  $F_1$  संतति के पौधों में झुर्रीदार व हरे बीजों वाले पौधे नहीं थे । जब  $F_1$  संतति के पौधों का स्व-परागण कराया गया तो  $F_2$  संतति के पौधों में बीजों की आकृति और रंग के विभिन्न संयोजन भी प्राप्त हुए ।

(a) उपरोक्त विपर्यासी लक्षणों के अतिरिक्त मेंडल द्वारा अपने प्रयोगों में उपयोग किए मटर पौधे के किन्हीं अन्य दो विपर्यासी लक्षणों को लिखिए ।

1

(b) प्रभावी और अप्रभावी लक्षणों के बीच विभेदन कीजिए ।

1

(c) उपरोक्त प्रकरण में  $F_2$  संतति के बीजों में पाए गए विभिन्न संयोजनों का अनुपात लिखिए । इस परिणाम की विवेचना कीजिए ।

2

अथवा

(c) नीचे शुद्ध बैंगनी पुष्पों वाले मटर के पौधों (V) और शुद्ध श्वेत पुष्पों वाले मटर के पौधों (v) के बीच संकरण दिया गया है । प्रवाह आरेख द्वारा  $F_1$  और  $F_2$  में प्राप्त संततियों के प्रकार की व्याख्या कीजिए :

2

शुद्ध बैंगनी पुष्पों वाले पौधे × शुद्ध श्वेत पुष्पों वाले पौधे  
(VV) (vv)



- (c) On burning Sulphur in oxygen a colourless gas is produced. 2
- (i) Write chemical equation for the reaction.
  - (ii) Name the gas formed.
  - (iii) State the nature of the gas.
  - (iv) What will be the action of this on a dry litmus paper ?

38. In order to trace the inheritance of traits Mendel crossed pea plants having one contrasting character or a pair of contrasting characters. When he crossed pea plants having round and yellow seeds with pea plants having wrinkled and green seeds, he observed that no plants with wrinkled and green seeds were obtained in the  $F_1$  generation. When the  $F_1$  generation pea plants were cross-bred by self-pollination, the  $F_2$  generation had seeds with different combinations of shape and colour also.

- (a) Write any two pairs of contrasting characteristics of pea plant used by Mendel other than those mentioned above. 1
- (b) Differentiate between dominant and recessive traits. 1
- (c) State the ratio of the combinations observed in the seeds of  $F_2$  generation (in the above case). What do you interpret from this result ? 2

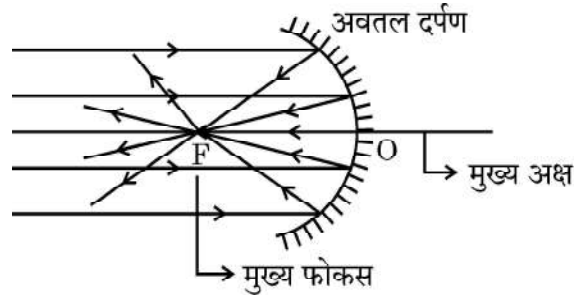
**OR**

- (c) Given below is a cross between a pure violet flowered pea plant (V) and a pure white flowered pea plant (v). Diagrammatically explain what type of progeny is obtained in  $F_1$  generation and  $F_2$  generation :

Pure violet flowered plant  $\times$  Pure white flowered plant. 2  
(V V) (v v)



39. किसी अवतल दर्पण को अपने हाथ में पकड़िए तथा इसके परावर्तक पृष्ठ को सूर्य की ओर कीजिए । दर्पण द्वारा परावर्तित प्रकाश को दर्पण के पास रखे सफेद कार्डबोर्ड पर डालिए । कार्डबोर्ड को धीरे-धीरे आगे-पीछे कीजिए जब तक कि आपको कार्डबोर्ड पर प्रकाश का एक चमकदार तीक्ष्ण बिन्दु प्राप्त न हो जाए । यह तीक्ष्ण बिन्दु सूर्य का कार्डबोर्ड पर बना प्रतिबिम्ब है, जिसे अवतल दर्पण का 'मुख्य फोकस' भी कहते हैं ।



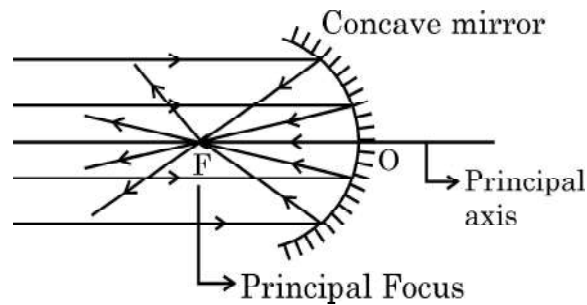
- (a) अवतल दर्पण के दो अनुप्रयोगों की सूची बनाइए । 1
- (b) यदि दर्पण और मुख्य फोकस के बीच की दूरी 15 cm है, तो दर्पण की वक्रता त्रिज्या ज्ञात कीजिए । 1
- (c) किसी अवतल दर्पण के ध्रुव और फोकस के बीच स्थित किसी बिम्ब के दर्पण द्वारा बने प्रतिबिम्ब के प्रकार को दर्शाने के लिए किरण आरेख खींचिए । 2

अथवा

- (c) 10 cm साइज़ का कोई बिम्ब किसी अवतल दर्पण के सामने 100 cm दूरी पर स्थित है । यदि बिम्ब का प्रतिबिम्ब उसी स्थान पर बनता है जहाँ बिम्ब स्थित है, तो 2
- (i) दर्पण की फोकस दूरी ज्ञात कीजिए, तथा
- (ii) कार्तीय चिह्न परिपाटी के अनुसार बनने वाले प्रतिबिम्ब का आवर्धन ज्ञात कीजिए ।



39. Hold a concave mirror in your hand and direct its reflecting surface towards the sun. Direct the light reflected by the mirror on to a white card-board held close to the mirror. Move the card-board back and forth gradually until you find a bright, sharp spot of light on the board. This spot of light is the image of the sun on the sheet of paper; which is also termed as “Principal Focus” of the concave mirror.



- (a) List two applications of concave mirror. 1
- (b) If the distance between the mirror and the principal focus is 15 cm, find the radius of curvature of the mirror. 1
- (c) Draw a ray diagram to show the type of image formed when an object is placed between pole and focus of a concave mirror. 2

**OR**

- (c) An object 10 cm in size is placed at 100 cm in front of a concave mirror. If its image is formed at the same point where the object is located, find : 2
- (i) focal length of the mirror, and
- (ii) magnification of the image formed with sign as per Cartesian sign convention.

\_\_\_\_\_





**Strictly Confidential: (For Internal and Restricted use only)**  
**Secondary School Examination, 2023**  
**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.
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 various rules of the Board and 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 due 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, due marks should be awarded.**
4. The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5. 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. If there is any variation, the same should be zero after deliberation and discussion. 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.
6. Evaluators will mark(  $\surd$  ) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (  $\surd$  ) while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7. 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.
8. 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.
9. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **“Extra Question”**.
10. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

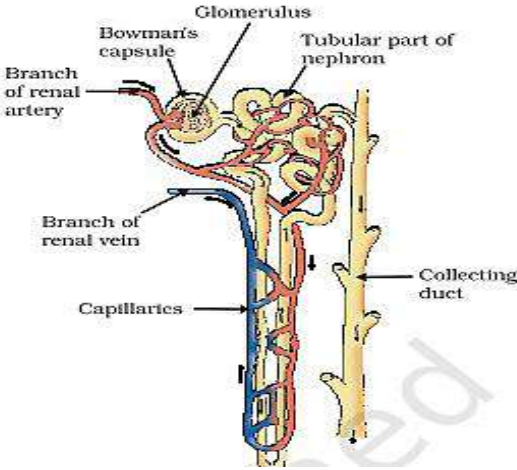
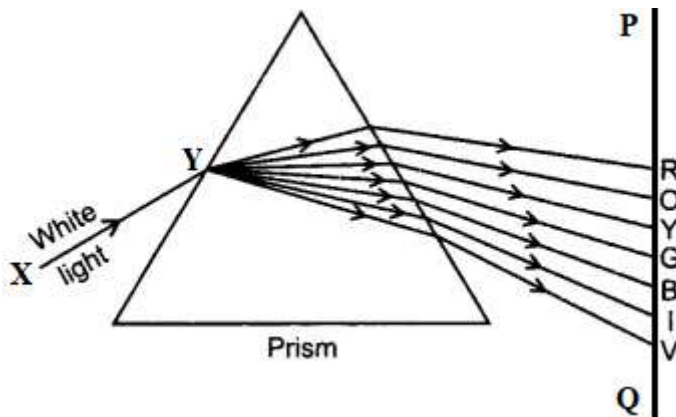
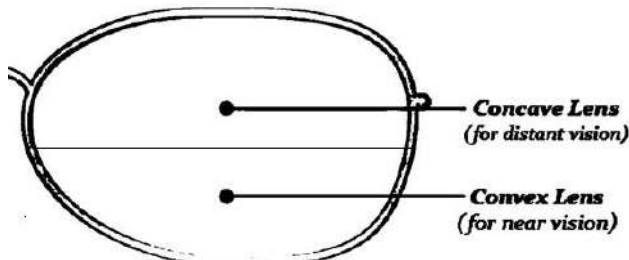
11. A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12. Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 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.
13. 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 totaling on the title page.
  - Wrong totaling of marks of the two columns on the title page.
  - Wrong grand total.
  - Marks in words and figures not tallying / not same.
  - 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.
14. 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.
15. 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.
16. The Examiners should acquaint themselves with the guidelines given in the “**Guidelines for spot Evaluation**” before starting the actual evaluation. Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
17. 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.
18. The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

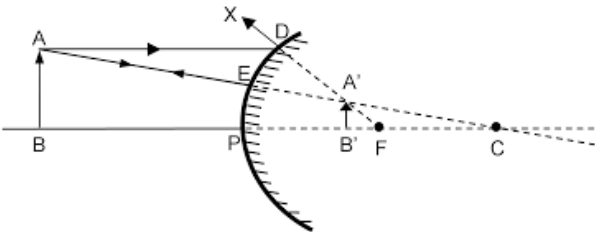
**MARKING SCHEME**  
Secondary School Examination, 2023  
**SCIENCE (Subject Code–086)**  
[ Paper Code:31/1/1]

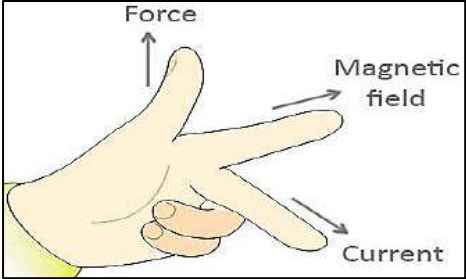
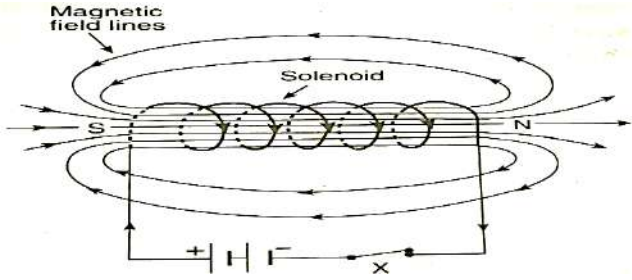
**Maximum Marks: 80**

<b>Q. No.</b>	<b>EXPECTED ANSWER / VALUE POINTS</b>	<b>Marks</b>	<b>Total Marks</b>
	<b>SECTION—A</b>		
1.	(b)	1	1
2.	(a)	1	1
3.	(c)	1	1
4.	(b)	1	1
5.	(b)	1	1
6.	(c)	1	1
7.	(c)	1	1
8.	(d)	1	1
9.	(d)	1	1
10.	(a)	1	1
11.	(d)	1	1
12.	(d)	1	1
13.	(d)	1	1
14.	(a)	1	1
15.	(c)	1	1
16.	(c)	1	1
<b>17.</b>	(a)	1	1
<b>18.</b>	(c)	1	1
<b>19.</b>	(c)	1	1

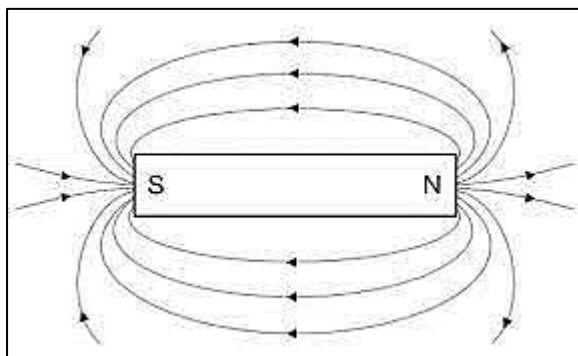
20.	(a)	1	1
<b>SECTION B</b>			
21.	<p>(a) (i) X: Plaster of Paris/Calcium sulphate hemihydrate.</p> <p>• <math>\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}</math></p> <p>(ii) • Baking Soda – <math>\text{NaHCO}_3</math> /Sodium hydrogen carbonate/ Sodium bicarbonate</p> <p>• Baking Powder – A mixture of <math>\text{NaHCO}_3</math> /Baking soda + Tartaric acid/any mild edible acid</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) <math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \xrightarrow{\text{heat}} \text{CuSO}_4 + 5\text{H}_2\text{O}</math></p> <p>(ii) <math>2\text{NaHCO}_3 \xrightarrow{\text{heat}} \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2</math></p>	<p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>1</p> <p>1</p>	2
22.	<p>(a) • Lowers blood sugar levels</p> <p>• Diabetes</p> <p>(b) The rise in sugar level in blood produces more insulin. As the blood sugar level falls, secretion is reduced.</p>	<p>½</p> <p>½</p> <p>1</p>	2
23.	<p>(a) (i) Vena cava – deoxygenated blood from body to heart.</p> <p>(ii) Pulmonary artery – deoxygenated blood from heart to lungs.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <p>(i)</p> <p style="text-align: center;"> <math>\text{Glucose (in cytoplasm)} \rightarrow \text{Pyruvate} \xrightarrow[\text{(in mitochondria)}]{\text{Presence of oxygen}} \text{CO}_2 + \text{Water} + \text{Energy}</math> </p> <p>(ii)</p> <p style="text-align: center;"> <math>\text{Glucose (in cytoplasm)} \rightarrow \text{Pyruvate} \xrightarrow[\text{(In human muscles cells)}]{\text{Lack of oxygen}} \text{Lactic acid} + \text{Energy}</math> </p>	<p>½, ½</p> <p>½, ½</p> <p>1</p> <p>1</p>	2
24.	<p>• Kidneys</p> <p>Structure: A cluster of thin-walled capillaries (glomerulus) associated with cup-shaped end of a tube called Bowman's capsule. This further extends into a tubular part which ends in collective ducts. /</p>	<p>½</p> <p>1</p>	

	 <ul style="list-style-type: none"> <li>• Function: Filtration of nitrogenous waste from blood to form urine. / Reabsorption of useful materials from the filtrate. / Osmoregulation</li> </ul> <p style="text-align: right;"><b>(Any one function)</b></p>	1/2	2
25	<p>(a)</p>  <ul style="list-style-type: none"> <li>• Dispersion of white light</li> <li>• Cause: Different colours of light bend through different angles w.r.t. the incident ray. / Different colours have different wavelengths.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) It is due to gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens.</p> <p>(ii) Presbyopia/ Presbyopia + Myopia</p> <p>(iii) Bifocal /Concave + Convex lens/ Diagram</p> 	1  1/2 1/2  1/2, 1/2  1/2 1/2	2

26.	<p>The chemicals sprayed on crops are washed down into the soil. From the soil these are absorbed by plants along with water and minerals, plants are eaten by animals. This way they enter in a food chain.</p> <p>As these chemicals are not degradable, these get accumulated progressively at each successive trophic level. This phenomena is called bio magnification.</p>	2	2
<b>SECTION C</b>			
27.	<p>(a) (i) NH<sub>3</sub> (ii) H<sub>2</sub>O (iii) CO (iv) H<sub>2</sub></p> <p><b>(Award full mark if part (ii)of (a) is attempted)</b></p> <p>(b) A reaction in which the gain or loss of oxygen takes place simultaneously is called a redox reaction.</p>	½ x 4	3
28.	<p>(a) (i) Use of antacids (ii) Baking soda/mild base/dock plant.</p> <p>(b) pH will decrease, as curd is more acidic than milk.</p>	1 1 ½+½	3
29.	<p>(a) (i) Energy currency for cellular processes / ATP breaks down to give a fixed amount of energy which can drive the endothermic reactions taking place in the cell. (ii) Stomata and surface of leaves, stems and roots. (iii) Environmental conditions Requirements of the plant.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) Plants -Starch Animals- Glycogen (ii) Desert plants take up carbon dioxide at night and prepare an intermediate compound which is acted upon by the energy absorbed by the chlorophyll during the day.</p>	1  1 ½ ½  1 1 1	3
30.	<p>(a)</p>  <p>A' B' is the image formed. <b>Credit full mark if attempted.</b></p> <p>(b) Nature: Virtual and erect Position: Behind the mirror (between P and F)</p>	1  ½ ½	

	<p>Size: Diminished</p> <p>(c) Positive</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	<p>3</p>
<p>31.</p>	<p>(a) Red Coloured light is least scattered by fog or smoke and can be easily seen from a distance. / Red colour has high wavelength thus scattering is less.</p> <p>(b) There is no scattering of light due to lack of atmosphere.</p> <p>(c) Particles of colloid are big enough to scatter the beam of light.</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
<p>32.</p>	<p>(a) (i) Flemings left-hand rule: Stretch the forefinger, the central finger and the thumb of your left hand in mutually perpendicular directions. If the forefinger shows the direction of the magnetic field and the central finger that of the current, then the thumb will point towards the direction of motion of the conductor or direction of force /</p>  <p>(ii) (1) Force on electron is maximum in Fig (i) because the direction of motion of electron/current is at right angle/perpendicular to that of magnetic field.</p> <p>(2) Force on electron is minimum in Fig (iii) because the electron is moving along / parallel to the direction of magnetic field</p> <p><b>OR</b></p> <p>(b) (i) (1)</p>  <p>Magnetic field lines of a current carrying solenoid</p>	<p>1</p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p>1</p>	

(2)



Magnetic field lines of a bar magnet

(ii)

Magnetic field of a solenoid	Magnetic field of a bar magnet
1. The strength of the magnetic field can be changed by changing the current.	1. The strength of the magnetic field for a bar magnet cannot be changed.
2. The direction of magnetic field can be reversed by reversing the direction of current.	2. The direction of magnetic field for a bar magnet cannot be changed.
3. It is a temporary magnetic field.	3. It is a permanent magnetic field.

(Any two)

33.

- (a) (i) Kitchen Garden → A man made ecosystem / non-sustainable  
Forest → Ecosystem maintained by nature / self-sustainable
- (ii) In a jar containing water we can provide oxygen through a pump and add a few aquatic plants and animals to make it a self-sustaining system.
- Justification –
- Oxygen is replenished continuously.
  - Aquatic plants serve as food.
- (or any other example)*
- OR**
- (b) (i) Plants → Rats → Snakes → Hawks
- (ii) Energy available at second trophic level = 20,000 J  
Energy transferred from second to third trophic level = 2000 J  
Energy transferred from third to fourth trophic level = 200 J

**SECTION D**

34.

- (a) (i) A:  $\text{CH}_3\text{CH}_2\text{OH}$  / Ethanol / Ethyl alcohol  
B:  $\text{CH}_2 = \text{CH}_2$  / Ethene  
C:  $\text{CH}_3 - \text{CH}_3$  / Ethane

1

1/2, 1/2

3

1

1

1

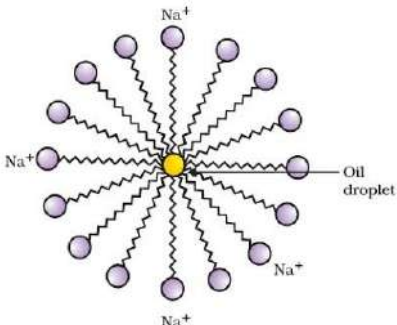
1

1

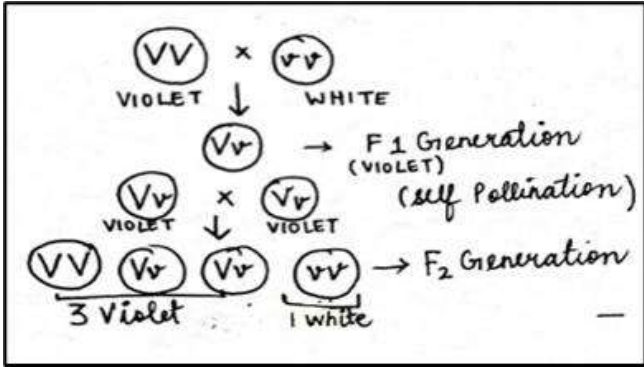
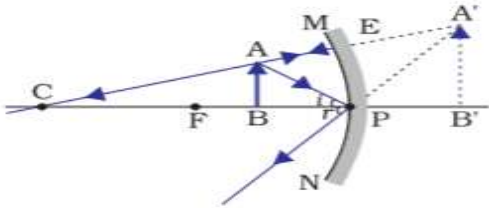
1

3



	<p>(ii)</p> <div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <math display="block">\underset{\text{A}}{\text{CH}_3\text{CH}_2\text{OH}} \xrightarrow[443\text{ K}]{\text{conc. H}_2\text{SO}_4} \underset{\text{B}}{\text{CH}_2=\text{CH}_2} + \text{H}_2\text{O}</math> </div> <p>(iii) Carbon dioxide and water are produced and a large amount of heat is released /  <math>\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow 2\text{CO}_2 + 3\text{H}_2\text{O} + \text{Heat}</math>  (Award full marks even if equation is not balanced.)</p> <p>(iv) Conversion of vegetable oil into fats.</p> <p>(v) Sodium ethoxide and hydrogen</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i)</p> <div style="text-align: center;">  </div> <p>(ii) (1) • Test tube 'Y'.  • Detergents are effective in hard water.</p> <p>(2) • Test tube 'X'  • Reaction between soap and calcium and magnesium salts of hard water form insoluble scum / due to formation of scum / insoluble ppt.</p>	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1</p> <p style="text-align: center;">2</p> <p style="text-align: center;">1/2, 1</p> <p style="text-align: center;">1/2, 1</p>	<p style="text-align: center;">5</p>
<p><b>35.</b></p>	<p>(a) Sepals/calyx and petals/ corolla</p> <p>(b) Self-pollination: Transfer of pollen grain from anther to stigma in the same flower or another flower of the same plant.  Cross pollination: Transfer of pollen grain from anther to stigma of one flower to another of two different plants.</p> <ul style="list-style-type: none"> <li>• Significance.</li> <li>1. Necessary for seed formation.</li> <li>2. Stimulates development of fruits.</li> <li>3. Cross pollination brings about genetic variation</li> <li>4. Leads to fertilization</li> </ul> <p style="text-align: right;"><i>(any two)</i></p> <p>(c) Ovule – seed , Ovary – Fruit.</p>	<p style="text-align: center;">1/2, 1/2</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2, 1/2</p>	<p style="text-align: center;">5</p>

36.	<p>(a) When heating is at maximum rate. Power, <math>P = 880 \text{ W}</math> Voltage, <math>V = 220 \text{ V}</math> Current, <math>I = \frac{P}{V} = \frac{880}{220} = 4 \text{ A}</math> Resistance, <math>R = \frac{V}{I} = \frac{220}{4} = 55 \Omega</math></p> <p>When heating is at minimum rate Power, <math>P = 330 \text{ W}</math> Voltage, <math>V = 220 \text{ V}</math> Current, <math>I = \frac{P}{V} = \frac{330}{220} = \frac{3}{2} = 1.5 \text{ A}</math> Resistance, <math>R = \frac{V}{I} = \frac{220}{1.5} = 146.6 \Omega</math></p> <p>(b) When electric current is passed through a resistor, electrical energy is dissipated and appears as heat energy.</p> <p>(c) <math>H = I^2 R t / H = V I t</math></p>	<p>1/2, 1/2</p> <p>1/2, 1/2</p> <p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p>	5
<b>SECTION E</b>			
37.	<p>(a) <math>2\text{Cu} + \text{O}_2 \longrightarrow 2\text{CuO}</math></p> <p>(b) • Because they react with both acids and bases to produce salt and water. • <math>\text{Al}_2\text{O}_3 / \text{ZnO}</math> (any one)</p> <p>(c) (i) <math>\text{Na}_2\text{O}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow 2\text{NaOH}(\text{aq})</math> (ii) <math>\text{Al}_2\text{O}_3 + 2\text{NaOH} \longrightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(c) (i) <math>\text{S} + \text{O}_2 \longrightarrow \text{SO}_2</math> (ii) Sulphur dioxide (iii) Acidic (iv) No change</p>	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	4
38.	<p>(a) Tall – Dwarf (Height of plant) White – Purple (Colour of flower) (or any other)</p> <p>(b) Dominant Trait – are expressed even if one copy of dominant trait exists. Recessive Trait – Whose expression is suppressed by a dominant gene/ Expressed when two copies of recessive traits are present.</p> <p>(c) 9 : 3 : 3 : 1</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1</p>	

	<p>Interpretation: Traits are independently inherited.</p> <p style="text-align: center;"><b>OR</b></p> <p>(c)</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;">  </div> <p style="text-align: center;"><i>(or with punnet square diagram)</i></p>	<p>1</p>   <p><math>\frac{1}{2} \times 4</math></p>	<p>4</p>
<p>39</p>	<p>(a) Torches, search light, vehicles head lights, shaving mirrors, dentist's mirror, Solar furnaces. <span style="float: right;"><i>(any two)</i></span></p> <p>(b) <math>f = 15\text{cm}</math>  <math>R = 2f</math>  <math>R = 2 \times 15\text{ cm} = 30\text{ cm}</math></p> <p>(c)</p> <div style="text-align: center;">  </div> <p style="text-align: center;">(Note: <math>\frac{1}{2}</math> mark to be deducted for not drawing the arrows.)</p> <p style="text-align: center;"><b>OR</b></p> <p>(c)</p> <p>(i) <math>h = + 10\text{cm}</math>  <math>u = - 100\text{ cm}</math>  <math>v = - 100\text{ cm}</math></p> $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ $\frac{1}{100} - \frac{1}{100} = \frac{1}{f}$ $\frac{-2}{100} = \frac{1}{f}$ $f = -50\text{ cm}$ <p><b>Alternate answer for (i)</b>  Since <math>u = v</math>  Therefore, object is placed at centre of curvature (C)  <math>f = \frac{R}{2}</math></p>	<p><math>\frac{1}{2}, \frac{1}{2}</math></p>   <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>   <p>2</p>   <p><math>\frac{1}{2}</math></p>   <p><math>\frac{1}{2}</math></p>	

	$f = \frac{-100}{2}$ $f = -50 \text{ cm}$ (ii) $m = \frac{-v}{u} = \frac{-(-100)}{100} = -1$	1/2, 1/2	4
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**Strictly Confidential: (For Internal and Restricted use only)**  
**Secondary School Examination, 2023**  
**Marking Scheme – Science (SUBJECT CODE -086)**  
**(PAPER CODE –31/1/2)**

**General Instructions: -**

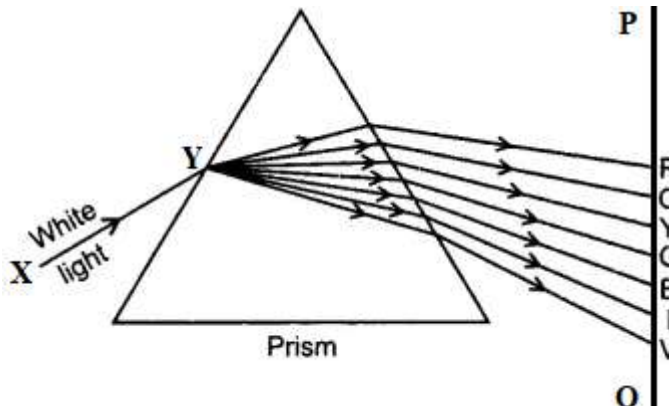
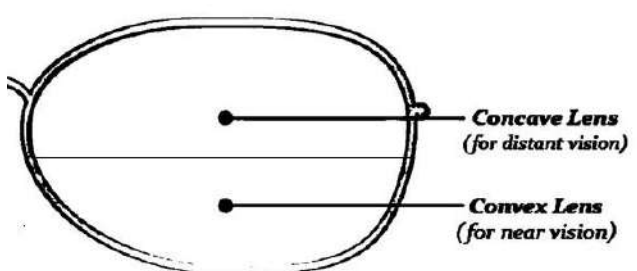
1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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 various rules of the Board and 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 due 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, due marks should be awarded.**
4. The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5. 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. If there is any variation, the same should be zero after deliberation and discussion. 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.
6. Evaluators will mark( ✓ ) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7. 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.
8. 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.
9. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **“Extra Question”**.
10. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.

11. A full scale of marks **80** (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12. Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 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.
13. 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 totaling on the title page.
  - Wrong totaling of marks of the two columns on the title page.
  - Wrong grand total.
  - Marks in words and figures not tallying / not same.
  - 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.
14. 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.
15. 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.
16. The Examiners should acquaint themselves with the guidelines given in the “**Guidelines for spot Evaluation**” before starting the actual evaluation. Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
17. 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.
18. The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the **Marking Scheme**.

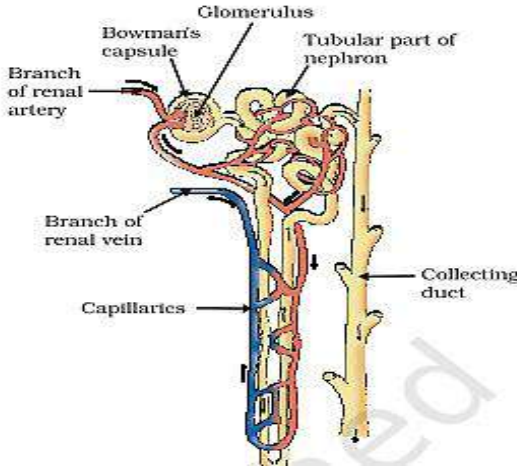
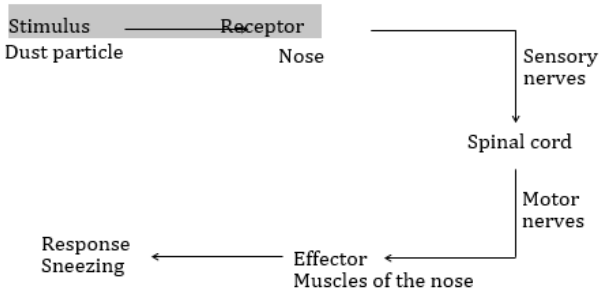
**MARKING SCHEME**  
Secondary School Examination 2023  
**SCIENCE (Subject Code-086)**  
[ Paper Code:31/1/2]

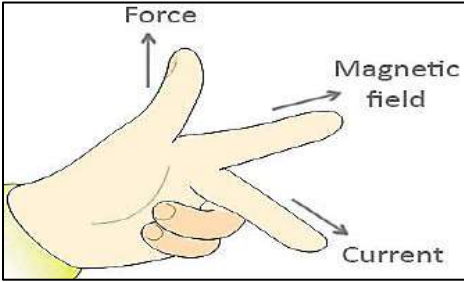
**Maximum Marks: 80**

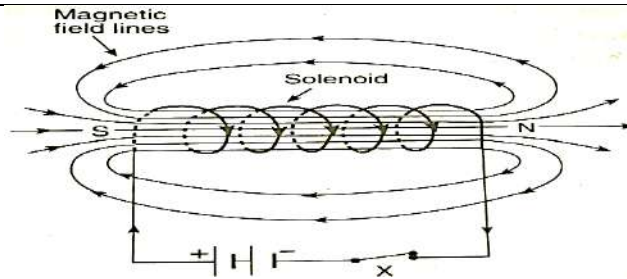
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	<b>SECTION—A</b>	1	1
1.	(c)	1	1
2.	(c)	1	1
3.	(d)	1	1
4.	(b)	1	1
5.	(c)	1	1
6.	(a)	1	1
7.	(b)	1	1
8.	(b)	1	1
9.	(d)	1	1
10.	(a)	1	1
11.	(d)	1	1
12.	(d)	1	1
13.	(c)	1	1
14.	(b)	1	1
15.	(a)	1	1
16.	(d)	1	1
17.	(a)	1	1
18.	(d)	1	1
19.	(c)	1	1
20.	(a)	1	1
	<b>SECTION B</b>		

21.	<ul style="list-style-type: none"> <li>• They help in the breakdown of organic matter/ dead and decaying matter into simple inorganic raw materials.</li> <li>• Help in natural replenishment of nutrient in soil.</li> <li>• Help in keeping the environment clean.</li> </ul> <p style="text-align: right;"><b>(Any two)</b></p>	1,1	2
22.	<p>(a)</p>  <ul style="list-style-type: none"> <li>• Dispersion of white light</li> <li>• Cause: Different colours of light bend through different angles w.r.t. the incident ray. / Different colours have different wavelengths.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) It is due to gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens.</p> <p>(ii) Presbyopia/ Presbyopia + Myopia</p> <p>(iii) Bifocal /Concave + Convex lens/ Diagram</p> 	<p style="text-align: center;">1</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2, 1/2</p> <p style="text-align: center;">1/2</p> <p style="text-align: center;">1/2</p>	2
23.	<ul style="list-style-type: none"> <li>• Kidneys <ul style="list-style-type: none"> <li>• Structure: A cluster of thin-walled capillaries (glomerulus) associated with cup-shaped end of a tube called Bowman's capsule. This further extends into a tubular part which ends in collective ducts. /</li> </ul> </li> </ul>	<p style="text-align: center;">1/2</p> <p style="text-align: center;">1</p>	



	 <p> <ul style="list-style-type: none"> <li>• Function: Filtration of nitrogenous waste from blood to form urine. / Reabsorption of useful materials from the filtrate. / Osmoregulation</li> </ul> <p style="text-align: right;"><b>(Any one function)</b></p> </p>	1/2	2
24.	Fruit is acidic in nature because acid turns blue litmus red.	1,1	2
25.	<p>•</p>  <p style="text-align: center;"><b>Or explain in the form of paragraph.</b></p>	2	2
26.	<p>(a) (i) X: Plaster of Paris/Calcium sulphate hemihydrate.</p> <p style="padding-left: 40px;">• <math>\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}</math></p> <p>(ii) • Baking Soda – <math>\text{NaHCO}_3</math> /Sodium hydrogen carbonate/ Sodium bicarbonate</p> <p style="padding-left: 40px;">• Baking Powder – A mixture of <math>\text{NaHCO}_3</math> /Baking soda + Tartaric acid/any mild edible acid</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) <math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \xrightarrow{\text{heat}} \text{CuSO}_4 + 5\text{H}_2\text{O}</math></p> <p>(ii) <math>2\text{NaHCO}_3 \xrightarrow{\text{heat}} \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2</math></p>	1/2 1/2 1/2 1/2 1 1	2

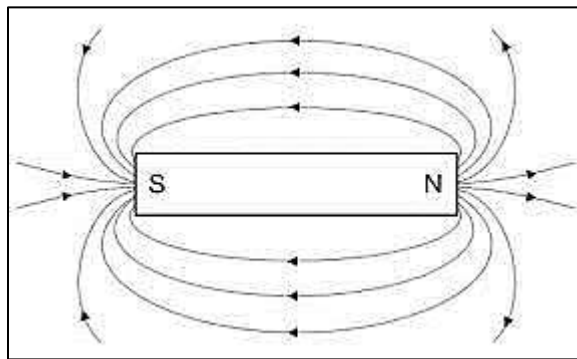
<b>SECTION C</b>			
27.	(a) (i) Kitchen Garden → A man made ecosystem / non-sustainable Forest → Ecosystem maintained by nature / self-sustainable	1	3
	(ii) In a jar containing water we can provide oxygen through a pump and add a few aquatic plants and animals to make it a self-sustaining system. Justification – • Oxygen is replenished continuously. • Aquatic plants serve as food.	1	
	<i>(or any other example)</i>		
	<b>OR</b>		
	(b) (i) Plants → Rats → Snakes → Hawks (ii) Energy available at second trophic level = 20,000 J Energy transferred from second to third trophic level = 2000 J Energy transferred from third to fourth trophic level = 200 J	1 1 1	
28.	(a) (i) Fleming's left-hand rule: Stretch the forefinger, the central finger and the thumb of your left hand in mutually perpendicular directions. If the forefinger shows the direction of the magnetic field and the central finger that of the current, then the thumb will point towards the direction of motion of the conductor or direction of force /	1	
			
	(ii) (1) Force on electron is maximum in Fig (i) because the direction of motion of electron/current is at right angle/perpendicular to that of magnetic field.	½, ½	
	(2) Force on electron is minimum in Fig (iii) because the electron is moving along / parallel to the direction of magnetic field	½, ½	
	<b>OR</b>		
(b) (i) (1)			



Magnetic field lines of a current carrying solenoid

1

(2)



Magnetic field lines of a bar magnet

1

(ii)

Magnetic field of a solenoid	Magnetic field of a bar magnet
1. The strength of the magnetic field can be changed by changing the current.	1. The strength of the magnetic field for a bar magnet cannot be changed.
2. The direction of magnetic field can be reversed by reversing the direction of current.	2. The direction of magnetic field for a bar magnet cannot be changed.
3. It is a temporary magnetic field.	3. It is a permanent magnetic field.

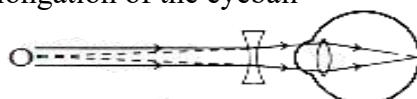
1/2, 1/2

(Any two)

3

29.

- Defect : Myopia/Short sightedness
- Two Causes :
- Excessive curvature of the eye lens
- Elongation of the eyeball

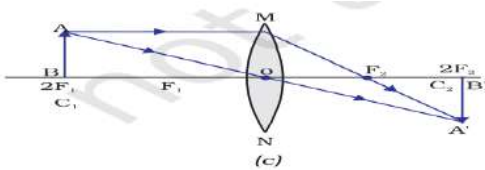


1

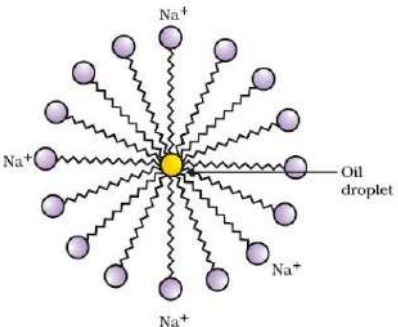
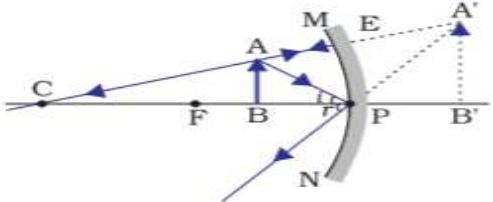
1/2

1/2

1

	<b>(Deduct ½ mark if arrows are not drawn.)</b>		3
30.	<p>(a)</p> <p>(i) As the image is of same size  <math>\therefore</math> Object distance = <math>2F = 30</math> cm  <math>\therefore</math> The image will be formed on the right side of lens at <math>2F' = 30</math> cm  The distance between the object and its image = 60 cm</p> <p>(ii) <math>f = 15</math>cm</p> <p>(iii)</p>  <p style="text-align: center;">(c)</p>	<p>½</p> <p>½</p> <p>1</p> <p>1</p>	3
31.	<p>(a) (i) Energy currency for cellular processes / ATP breaks down to give a fixed amount of energy which can drive the endothermic reactions taking place in the cell.</p> <p>(ii) Stomata and surface of leaves, stems and roots.</p> <p>(iii) Environmental conditions  Requirements of the plant.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) Plants -Starch  Animals- Glycogen</p> <p>(ii) Desert plants take up carbon dioxide at night and prepare an intermediate compound which is acted upon by the energy absorbed by the chlorophyll during the day.</p>	<p>1</p> <p>1</p> <p>½</p> <p>½</p> <p>1</p> <p>1</p> <p>1</p>	3
32.	<p>Calcium phosphate / Calcium hydroxyapatite  <math>(Ca_3(PO_4)_2)</math></p> <p>Tooth decay starts when the pH of the mouth is lower than 5.5.  Bacteria present in the mouth produces acid by degrading sugar and food particles.</p> <p>Using Toothpaste / Cleaning the mouth after every meal.</p>	<p>½</p> <p>½</p> <p>1</p> <p>1</p>	3
33.	<p>(a) (i) <math>NH_3</math>  (ii) <math>H_2O</math>  (iii) <math>CO</math>  (iv) <math>H_2</math></p> <p style="text-align: center;"><b>(Award full mark if part (ii) of (a) is attempted)</b></p> <p>(b) A reaction in which the gain or loss of oxygen takes place simultaneously is called a redox reaction.</p>	<p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>1</p>	3

	<b>SECTION D</b>		
34.	<p>(a) When heating is at maximum rate.</p> <p>Power, P = 880 W</p> <p>Voltage, V = 220 V</p> <p>Current, <math>I = \frac{P}{V} = \frac{880}{220} = 4A</math></p> <p>Resistance, <math>R = \frac{V}{I} = \frac{220}{4} = 55 \Omega</math></p> <p>When heating is at minimum rate</p> <p>Power, P = 330W</p> <p>Voltage, V = 220 V</p> <p>Current, <math>I = \frac{P}{V} = \frac{330}{220} = \frac{3}{2} = 1.5A</math></p> <p>Resistance, <math>R = \frac{V}{I} = \frac{220}{1.5} = 146.6 \Omega</math></p> <p>(b) When electric current is passed through a resistor, electrical energy is dissipated and appears as heat energy. This is known as the heating effect or electric current.</p> <p>(c) <math>H = I^2Rt</math> / <math>H=VIt</math></p>	<p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p>1</p>	<p>5</p>
35.	<p>(a) The lining of uterus breaks down and comes out through vagina in the form of blood and mucus.</p> <p>(b) The sex chromosome in sperm is either X or Y while the sex chromosome in a human egg is only X.</p> <p>(c) (i). Surgical Method - In prevents sperm transfer and fertilisation.  (ii). Barrier Method - Sperm does not reach the egg/prevents STD's  (iii). Use of oral pills - Eggs are not released because hormonal balance is changed.  <b>(or any other)</b></p>	<p>1</p> <p>1</p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p>	<p>5</p>
36.	<p>(a) (i) A: CH<sub>3</sub>CH<sub>2</sub>OH / Ethanol / Ethyl alcohol</p> <p>B: CH<sub>2</sub> = CH<sub>2</sub> / Ethene</p> <p>C: CH<sub>3</sub> - CH<sub>3</sub> / Ethane</p> <p>(ii)</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <math display="block">\underset{\text{A}}{\text{CH}_3\text{CH}_2\text{OH}} \xrightarrow[443 \text{ K}]{\text{conc. H}_2\text{SO}_4} \underset{\text{B}}{\text{CH}_2=\text{CH}_2} + \text{H}_2\text{O}</math> </div>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p>	

	<p>(iii) Carbon dioxide and water are produced and a large amount of heat is released /  <math>C_2H_6 + O_2 \rightarrow 2CO_2 + 3H_2O + \text{Heat}</math>  <b>(Award full marks even if equation is not balanced.)</b></p> <p>(iv) Conversion of vegetable oil into fats.</p> <p>(v) Sodium ethoxide and hydrogen</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i)</p> <div style="text-align: center;">  </div> <p>(ii) (1) • Test tube 'Y'.  • Detergents are effective in hard water.</p> <p>(2) • Test tube 'X'  • Reaction between soap and calcium and magnesium salts of hard water form insoluble scum / due to formation of scum / insoluble ppt.</p>	<p>1</p> <p>½</p> <p>1</p> <p>2</p> <p>½+1</p> <p>½+1</p>	<p>5</p>
<b>SECTION E</b>			
<p>37.</p>	<p>(a) Torches, search light, vehicles head lights, shaving mirrors, dentist's mirror, Solar furnaces. <span style="float: right;"><b>(any two)</b></span></p> <p>(b) <math>f = 15\text{cm}</math>  <math>R = 2f</math>  <math>R = 2 \times 15\text{ cm} = 30\text{ cm}</math></p> <p>(c)</p> <div style="text-align: center;">  </div> <p style="text-align: center;">(Note: ½ mark to be deducted for not drawing the arrows.)</p> <p style="text-align: center;"><b>OR</b></p> <p>(c)</p> <p>(i) <math>h = + 10\text{cm}</math></p>	<p>½, ½</p> <p>½</p> <p>½</p> <p>2</p>	

	<p> <math>u = -100 \text{ cm}</math>  <math>v = -100 \text{ cm}</math>  <math>\frac{1}{v} + \frac{1}{u} = \frac{1}{f}</math>  <math>\frac{1}{100} - \frac{1}{100} = \frac{1}{f}</math>  <math>\frac{-2}{100} = \frac{1}{f}</math>  <math>f = -50 \text{ cm}</math> </p> <p><b>Alternate Answer for (i)</b></p> <p>Since <math>u = v</math></p> <p>Therefore, object is placed at centre of curvature (C)</p> <p><math>f = \frac{R}{2}</math></p> <p><math>f = \frac{-100}{2}</math></p> <p><math>f = -50 \text{ cm}</math></p> <p>(ii) <math>m = \frac{-v}{u} = \frac{-(-100)}{100} = -1</math></p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}, \frac{1}{2}</math></p>	<p>4</p>
<p>38.</p>	<p>(a) Tall - Dwarf (Height of plant)  White – Purple (Colour of flower) <span style="float: right;"><i>(or any other)</i></span></p> <p>(b) Dominant Trait – are expressed even if one copy of dominant trait exists.  Recessive Trait – Whose expression is suppressed by a dominant gene/ Expressed when two copies of recessive traits are present.</p> <p>(c) 9 : 3 : 3 : 1</p> <p>Interpretation: Traits are independently inherited.</p> <p style="text-align: center;"><b>OR</b></p> <p>(c)</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;"> <math>VV</math> (VIOLET) <math>\times</math> <math>vv</math> (WHITE)  <math>\downarrow</math>  <math>Vv</math> (VIOLET) <math>\rightarrow</math> F<sub>1</sub> Generation (VIOLET)  <i>(self Pollination)</i>  <math>Vv</math> (VIOLET) <math>\times</math> <math>Vv</math> (VIOLET)  <math>\downarrow</math>  <math>VV</math> (Violet) <math>Vv</math> (Violet) <math>Vv</math> (Violet) <math>vv</math> (White) <math>\rightarrow</math> F<sub>2</sub> Generation  3 Violet : 1 white </p> </div>	<p><math>\frac{1}{2}, \frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p>1</p> <p><math>\frac{1}{2} \times 4</math></p>	<p>4</p>

*(or with punnet square diagram)*

39	(a) $2\text{Cu} + \text{O}_2 \longrightarrow 2\text{CuO}$	1	
	(b) • Because they react with both acids and bases to produce salt and water.	1/2	
	• $\text{Al}_2\text{O}_3 / \text{ZnO}$ <span style="float: right;"><i>(any one)</i></span>	1/2	
	(c) (i) $\text{Na}_2\text{O}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow 2\text{NaOH}(\text{aq})$	1	
	(ii) $\text{Al}_2\text{O}_3 + 2\text{NaOH} \longrightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}$	1	
	<b>OR</b>		
	(c) (i) $\text{S} + \text{O}_2 \longrightarrow \text{SO}_2$	1/2	
	(ii) Sulphur dioxide	1/2	
	(iii) Acidic	1/2	
	(iv) No change	1/2	4

\*\*\*



**Strictly Confidential: (For Internal and Restricted use only)**  
**Secondary School Examination, 2023**  
**Marking Scheme – Science (SUBJECT CODE -086)**  
**(PAPER CODE –31/1/3)**

**General Instructions: -**

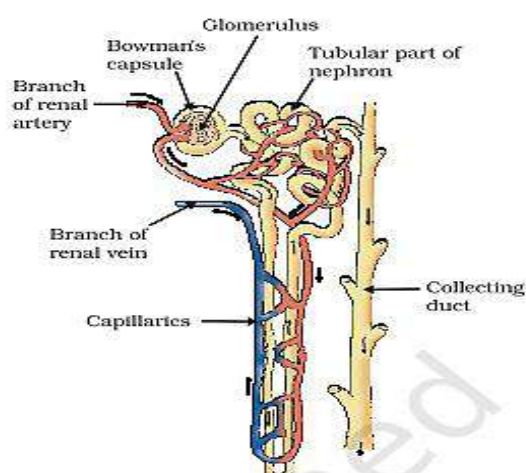
1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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 various rules of the Board and 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 due 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, due marks should be awarded.**
4. The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5. 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. If there is any variation, the same should be zero after deliberation and discussion. 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.
6. Evaluators will mark(  $\surd$  ) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right ( $\surd$ )while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
7. 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.
8. 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.
9. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **“Extra Question”**.

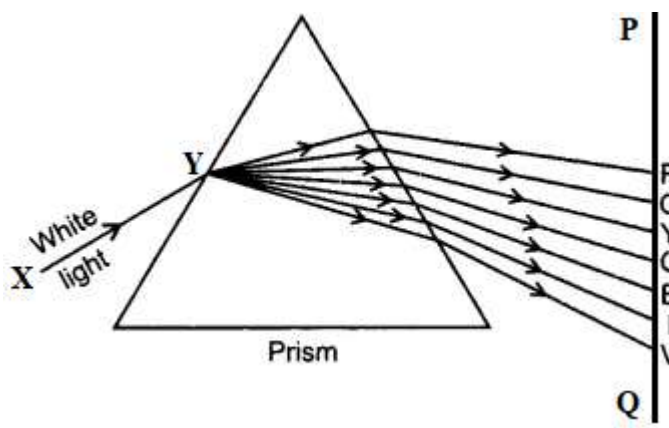
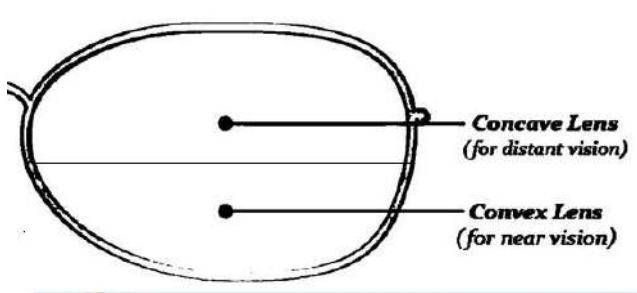
10. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11. A full scale of marks **80** (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12. Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 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.
13. 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 totaling on the title page.
  - Wrong totaling of marks of the two columns on the title page.
  - Wrong grand total.
  - Marks in words and figures not tallying / not same.
  - 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.
14. 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.
15. 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.
16. The Examiners should acquaint themselves with the guidelines given in the “**Guidelines for spot Evaluation**” before starting the actual evaluation. Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.
17. 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.
18. The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

**MARKING SCHEME**  
Secondary School Examination 2023  
**SCIENCE (Subject Code–086)**  
[ Paper Code:31/1/3]

**Maximum Marks: 80**

<b>Q. No.</b>	<b>EXPECTED ANSWER / VALUE POINTS</b>	<b>Marks</b>	<b>Total Marks</b>
	<b>SECTION—A</b>	<b>1</b>	<b>1</b>
<b>1.</b>	(a)	1	1
<b>2.</b>	(b)	1	1
<b>3.</b>	(b)	1	1
<b>4.</b>	(c)	1	1
<b>5.</b>	(c)	1	1
<b>6.</b>	(c)	1	1
<b>7.</b>	(a)	1	1
<b>8.</b>	(d)	1	1
<b>9.</b>	(d)	1	1
<b>10.</b>	(c)	1	1
<b>11.</b>	(d)	1	1
<b>12.</b>	(a)	1	1
<b>13.</b>	(a)	1	1
<b>14.</b>	(d)	1	1
<b>15.</b>	(c)	1	1
<b>16.</b>	(c)	1	1
<b>17.</b>	(c)	1	1
<b>18.</b>	(a)	1	1
<b>19.</b>	(a)	1	1

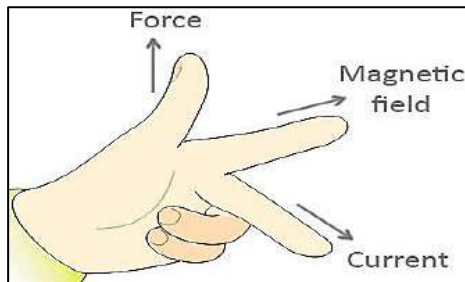
20.	(b)	1	1
<b>SECTION B</b>			
21.	<ul style="list-style-type: none"> <li>• Auxin</li> <li>• When light is coming from one side of the plant, auxin diffuses towards the shady side of the shoot. This stimulates the cells of the shoot to grow longer and bend towards light.</li> </ul>	1	
		1	2
22.	<p>(a) (i) X: Plaster of Paris/Calcium sulphate hemihydrate.</p> <p style="text-align: center;">• <math>\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}</math></p> <p>(ii) • Baking Soda – <math>\text{NaHCO}_3</math> /Sodium hydrogen carbonate/ Sodium bicarbonate</p> <p style="text-align: center;">• Baking Powder – A mixture of <math>\text{NaHCO}_3</math> /Baking soda + Tartaric acid/any mild edible acid</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) <math>\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \xrightarrow{\text{heat}} \text{CuSO}_4 + 5\text{H}_2\text{O}</math></p> <p>(ii) <math>2\text{NaHCO}_3 \xrightarrow{\text{heat}} \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2</math></p>	<p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>1</p> <p>1</p>	2
23.	<ul style="list-style-type: none"> <li>• Kidneys <ul style="list-style-type: none"> <li>• Structure: A cluster of thin-walled capillaries (glomerulus) associated with cup-shaped end of a tube called Bowman's capsule. This further extends into a tubular part which ends in collective ducts. /</li> </ul> </li> </ul>	<p>½</p> <p>1</p>	
	 <p>• Function:</p>	½	

	Filtration of nitrogenous waste from blood to form urine. / Reabsorption of useful materials from the filtrate. / Osmoregulation <b>(Any one function)</b>		2
24.	<ul style="list-style-type: none"> <li>• Lead and Tin / Pb+Sn</li> <li>• Low melting point</li> </ul>	1 1	2
25.	<ul style="list-style-type: none"> <li>• UV rays reach the earth and cause ill effects like skin cancer in human beings.</li> <li>• (a) Minimize the use of CFC's</li> <li>(b) Forging on agreement to freeze CFC production at 1986 levels.</li> </ul>	1  ½ ½	2
26.	<p>(a)</p>  <ul style="list-style-type: none"> <li>• Dispersion of white light</li> <li>• Cause: Different colours of light bend through different angles w.r.t. the incident ray. / Different colours have different wavelengths.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) It is due to gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens.</p> <p>(ii) Presbyopia/ Presbyopia + Myopia</p> <p>(iii) Bifocal /Concave + Convex lens/ Diagram</p> 	1  ½ ½  ½, ½  ½ ½	2

SECTION C			
<b>27.</b>	(a) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ / washing soda / sodium carbonate decahydrate (b) $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$ $2\text{NaHCO}_3 \xrightarrow{\text{heat}} \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$ $\text{Na}_2\text{CO}_3 + 10\text{H}_2\text{O} \rightarrow \text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ (c) 10	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3
<b>28.</b>	(a) (i) $\text{NH}_3$ (ii) $\text{H}_2\text{O}$ (iii) $\text{CO}$ (iv) $\text{H}_2$ <b>(Award full mark if part (ii) of (a) is attempted)</b> (b) A reaction in which the gain or loss of oxygen takes place simultaneously is called a redox reaction.	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1	3
<b>29.</b>	(a) Concave Mirror / Converging Mirror (b) (i). $m = \frac{-v}{u} = - \frac{(-60)}{(-15)} = -4$ (ii). 45 cm from the object (c) <div style="text-align: center;"> </div> <b>(Note: <math>\frac{1}{2}</math> mark to be deducted for not drawing the arrows.)</b>	$\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ 1	3
<b>30.</b>	(a) (i) Energy currency for cellular processes / ATP breaks down to give a fixed amount of energy which can drive the endothermic reactions taking place in the cell. (ii) Stomata and surface of leaves, stems and roots. (iii) Environmental conditions Requirements of the plant. <b>OR</b> (b) (i) Plants -Starch Animals- Glycogen (ii) Desert plants take up carbon dioxide at night and prepare an intermediate compound which is acted upon by the energy absorbed by the chlorophyll during the day.	1 1 $\frac{1}{2}$ $\frac{1}{2}$ 1 1 1	3
<b>31.</b>	(a) (i) Flemings left-hand rule:		

Stretch the forefinger, the central finger and the thumb of your left hand in mutually perpendicular directions. If the forefinger shows the direction of the magnetic field and the central finger that of the current, then the thumb will point towards the direction of motion of the conductor or direction of force /

1



(ii) (1) Force on electron is maximum in Fig (i) because the direction of motion of electron/current is at right angle/perpendicular to that of magnetic field.

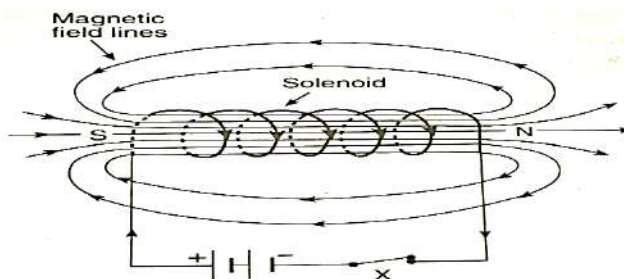
(2) Force on electron is minimum in Fig (iii) because the electron is moving along / parallel to the direction of magnetic field

1/2,1/2

OR

1/2,1/2

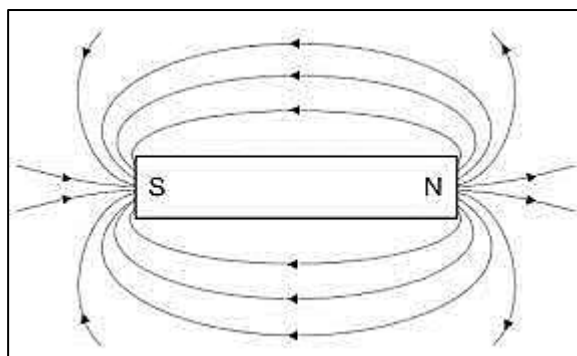
(b) (i) (1)



Magnetic field lines of a current carrying solenoid

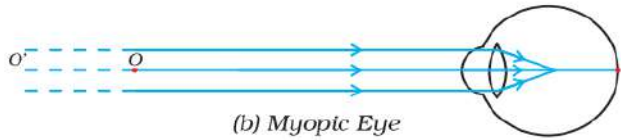
1

(2)

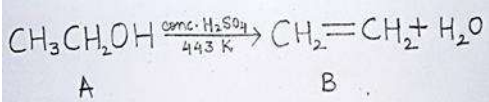


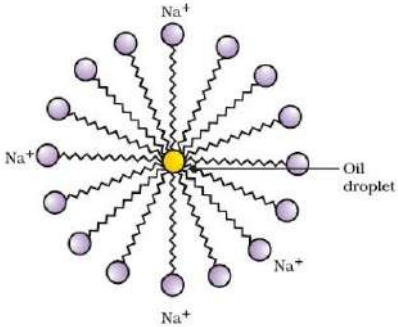
Magnetic field lines of a bar magnet

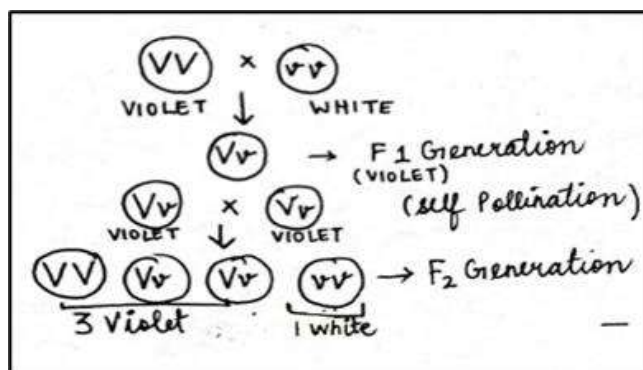
1

	(ii)										
	<table border="1"> <thead> <tr> <th>Magnetic field of a solenoid</th> <th>Magnetic field of a bar magnet</th> </tr> </thead> <tbody> <tr> <td>1. The strength of the magnetic field can be changed by changing the current.</td> <td>1. The strength of the magnetic field for a bar magnet cannot be changed.</td> </tr> <tr> <td>2. The direction of magnetic field can be reversed by reversing the direction of current.</td> <td>2. The direction of magnetic field for a bar magnet cannot be changed.</td> </tr> <tr> <td>3. It is a temporary magnetic field.</td> <td>3. It is a permanent magnetic field.</td> </tr> </tbody> </table> <p style="text-align: right;"><b>(Any two)</b></p>	Magnetic field of a solenoid	Magnetic field of a bar magnet	1. The strength of the magnetic field can be changed by changing the current.	1. The strength of the magnetic field for a bar magnet cannot be changed.	2. The direction of magnetic field can be reversed by reversing the direction of current.	2. The direction of magnetic field for a bar magnet cannot be changed.	3. It is a temporary magnetic field.	3. It is a permanent magnetic field.	1/2+1/2	3
Magnetic field of a solenoid	Magnetic field of a bar magnet										
1. The strength of the magnetic field can be changed by changing the current.	1. The strength of the magnetic field for a bar magnet cannot be changed.										
2. The direction of magnetic field can be reversed by reversing the direction of current.	2. The direction of magnetic field for a bar magnet cannot be changed.										
3. It is a temporary magnetic field.	3. It is a permanent magnetic field.										
32.	<p>(a) (i) Kitchen Garden → A man made ecosystem / non-sustainable Forest → Ecosystem maintained by nature / self-sustainable</p> <p>(ii) In a jar containing water we can provide oxygen through a pump and add a few aquatic plants and animals to make it a self-sustaining system.</p> <p>Justification –</p> <ul style="list-style-type: none"> <li>• Oxygen is replenished continuously.</li> <li>• Aquatic plants serve as food.</li> </ul> <p style="text-align: center;"><b>(or any other example)</b></p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) Plants → Rats → Snakes → Hawks</p> <p>(ii) Energy available at second trophic level = 20,000 J Energy transferred from second to third trophic level = 2000 J Energy transferred from third to fourth trophic level = 200 J</p>	1 1 1 1 1 1	3								
33.	<ul style="list-style-type: none"> <li>• Myopia / Short Sightedness</li> </ul> <div style="text-align: center;">  <p>(b) Myopic Eye</p> </div> <ul style="list-style-type: none"> <li>• Two Causes : <ul style="list-style-type: none"> <li>(i). Excessive curvature of the eye lens</li> <li>(ii). Elongation of eye ball</li> </ul> </li> <li>• Concave lens / Diverging lens</li> </ul>	1/2 1 1/2 1/2 1/2	3								



SECTION D			
34	(a)		
	(i) Testis – To produce male gametes/sperm/Male hormone/Testosterone (Any one).	½	
	(ii) Scrotum – To provide optimal temperature to testis for the formation of sperm.	½	
	(iii) Vas deferens – Transport the sperm to urethra.	½	
	(iv) Seminal vesicles – To secrete the fluid which provides nutrition and medium for the transport of sperms.	½	
(b) <u>Placenta</u> – A disc shaped specialized tissue embedded in the uterine wall which connects the mother to the embryo. It contains villi on the embryo’s side and blood spaces on the mother’s side.	2		
Function: – Helps in exchange of nutrients, gases and waste materials between the mother and embryo/foetus.	1		5
35.	(a) When heating is at maximum rate.		
	Power, P = 880 W		
	Voltage, V = 220 V		
	Current, $I = \frac{P}{V} = \frac{880}{220} = 4A$	½, ½	
	Resistance, $R = \frac{V}{I} = \frac{220}{4} = 55 \Omega$	½, ½	
	When heating is at minimum rate		
	Power, P = 330W		
Voltage, V = 220 V			
Current, $I = \frac{P}{V} = \frac{330}{220} = \frac{3}{2} = 1.5A$	½		
Resistance, $R = \frac{V}{I} = \frac{220}{1.5} = 146.6 \Omega$	½		
(b) When electric current is passed through a resistor, electrical energy is dissipated and appears as heat energy.	1		
(c) $H = I^2Rt / H = VIt$	1		5
36.	(a) (i) A: CH <sub>3</sub> CH <sub>2</sub> OH / Ethanol / Ethyl alcohol	½	
	B: CH <sub>2</sub> = CH <sub>2</sub> / Ethene	½	
	C: CH <sub>3</sub> - CH <sub>3</sub> / Ethane	½	
	(ii)		
		1	

	<p>(iii) Carbon dioxide and water are produced and a large amount of heat is released /</p> $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow 2\text{CO}_2 + 3\text{H}_2\text{O} + \text{Heat}$ <p><b>(Award full marks even if equation is not balanced.)</b></p> <p>(iv) Conversion of vegetable oil into fats.</p> <p>(v) Sodium ethoxide and hydrogen</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i)</p>  <p>(ii) (1) • Test tube 'Y'. • Detergents are effective in hard water.</p> <p>(2) • Test tube 'X' • Reaction between soap and calcium and magnesium salts of hard water form insoluble scum / due to formation of scum / insoluble ppt.</p>	<p>1</p> <p>½</p> <p>1</p> <p>2</p> <p>½,1</p> <p>½,1</p>	<p>5</p>
<p><b>37.</b></p>	<p>(a) Tall – Dwarf (Height of plant) White – Purple (Colour of flower) <span style="float: right;"><i>(or any other)</i></span></p> <p>(b) Dominant Trait – are expressed even if one copy of dominant trait exists. Recessive Trait – Whose expression is suppressed by a dominant gene/ Expressed when two copies of recessive traits are present.</p> <p>(c) 9 : 3 : 3 : 1</p> <p>Interpretation: Traits are independently inherited.</p> <p style="text-align: center;"><b>OR</b></p> <p>(c)</p>	<p>½,½</p> <p>½</p> <p>½</p> <p>1</p> <p>1</p>	



1/2x4

4

(or with punnet square diagram)

38. (a) Torches, search light, vehicles head lights, shaving mirrors, dentist's mirror, Solar furnaces. (any two)

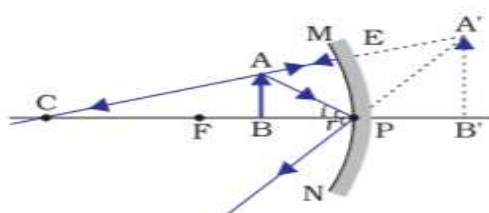
1/2+1/2

- (b)  $f = 15\text{cm}$   
 $R = 2f$   
 $R = 2 \times 15\text{ cm} = 30\text{ cm}$

1/2

1/2

(c)



2

(Note: 1/2 mark to be deducted for not drawing the arrows.)

**OR**

- (c)  
 (i)  $h = + 10\text{cm}$   
 $u = - 100\text{ cm}$   
 $v = - 100\text{ cm}$   
 $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$   
 $-\frac{1}{100} - \frac{1}{100} = \frac{1}{f}$   
 $\frac{-2}{100} = \frac{1}{f}$   
 $f = -50\text{ cm}$

1/2

**Alternate answer for (i)**

Since  $u = v$

Therefore, object is placed at centre of curvature (C)

$$f = \frac{R}{2}$$

1/2

	$f = \frac{-100}{2}$ $f = -50 \text{ cm}$ <p>(ii) <math>m = \frac{-v}{u} = \frac{-(-100)}{100} = -1</math></p>	1/2, 1/2	4
<b>39</b>	<p>(a) <math>2\text{Cu} + \text{O}_2 \longrightarrow 2\text{CuO}</math></p> <p>(b) • Because they react with both acids and bases to produce salt and water. • <math>\text{Al}_2\text{O}_3/\text{ZnO}</math> <span style="float: right;"><i>(any one)</i></span></p> <p>(c) (i) <math>\text{Na}_2\text{O}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow 2\text{NaOH}(\text{aq})</math> (ii) <math>\text{Al}_2\text{O}_3 + 2\text{NaOH} \longrightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(c) (i) <math>\text{S} + \text{O}_2 \longrightarrow \text{SO}_2</math> (ii) Sulphur dioxide (iii) Acidic (iv) No change</p>	1 1/2 1/2 1 1  1/2 1/2 1/2 1/2	4

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