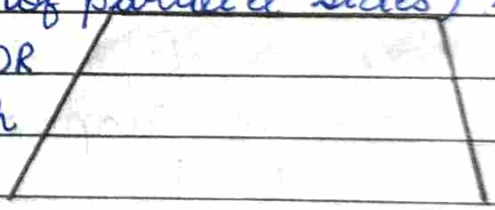
Page No.
Date : / /20

Chapter-14
Mensuration

1. Area of square = Side x Side
2. Area of rectangle = $l \times b$
3. Area of Triangle = $\frac{1}{2} \times b \times h$
4. Area of ||gm = Base x Height
5. Area of Rhombus = $\frac{1}{2} \times d_1 \times d_2$
6. Area of circle = πr^2
7. Area of Trapezium = $\frac{1}{2} \times$ (Sum of parallel sides) $\times h$

DR

$\frac{1}{2}(a+b)h$



WS-1

Q1. Here $a = 57$ cm, $b = 33$ cm, $h = 13$ cm

Area of Trapezium = $\frac{1}{2}(a+b)h$

$= \frac{1}{2}(57+33)13$

$= \frac{1}{2} \times 90 \times 13$

$= 585$ cm^2

Page No.
Date : / /20

Q2: Here $a = 64$ cm, $h = 17$ cm

Let length of other sides be b cm

Area of Trapezium $= 850$ cm

$$= \frac{1}{2}(a+b)h = 850$$

$$= \frac{1}{2}(64+b) \times 17 = 850$$

$$\Rightarrow 64 + b = \frac{850 \times 2}{17}$$

$$\Rightarrow 64 + b = 100$$

$$\Rightarrow b = 100 - 64$$

$$\Rightarrow b = 36$$

Q3: Here sum of parallel sides $= 122$ cm

Area of Trapezium $= 1586$ cm^2

Height $(h) = ?$

$\frac{1}{2} \times$ (sum of parallel lines) $\times h$

$$= \frac{1}{2} \times 122 \times h = 1586$$

$$\Rightarrow h = \frac{1586 \times 2}{122}$$

$$\Rightarrow h = 13 \times 2$$

$$= h = 26 \text{ cm}$$

Height $= 26$ cm

Date : / /20

Q4. Here $a = 8m$

$b = 60\ dm$ | $1m = 10\ dm$

$b = \frac{60}{10}\ m \quad = b = 6m$

Let altitude be h m

Area of trapezium $= 28\ m^2$

$\frac{1}{2}(a+b)h = 28$

$\frac{1}{2} \times (8+6) \times h = 28$

$\frac{1}{2} \times 14 \times h = 28$

$h = \frac{28}{14}$

$h = 4m$

Q5. Here $a = 55.6\ cm$, $b = 34.4\ cm$

Area of Trapezium $= 1080\ cm^2$

Let altitude be h cm

$\frac{1}{2} \times (a+b) \times h$

$= \frac{1}{2} \times (55.6 + 34.4) \times h = 1080$

$= \frac{1}{2} \times 90 \times h = 1080$

$h = \frac{1080}{45}$

$h = 24$

Date : / /20

Q6: Height of Trapezium (h) = ____ m

Area of Trapezium = $12 m^2$

$\frac{1}{2}$ (Sum of parallel sides) $\times h = 12 m^2$

$\frac{1}{2} \times$ (Sum of parallel sides) $3 = 12 m^2$

Sum of parallel sides = $\frac{12 \times 2}{3} = 8 m$

Q7: Let 2 parallel sides be x m and $(x-4)$ m

height (h) = 8 m

Area of Trapezium = $248 m^2$

$\frac{1}{2}$ (Sum of parallel sides) $\times h$

$\frac{1}{2} (x + x - 4) \times 8 = 248 m^2$

$2x - 4 = \frac{248}{4}\ 62$

$2x = 62 + 4$

$2x = 66$

$x = \frac{66}{2}\ 33$

Q8: Let parallel sides be x dm and $(x+8)$ dm

Altitude (h) = 10 dm

Area of Trapezium = $1.6 m^2$

$= 1.6 \times 100\ dm^2$

$\frac{1}{2}$ (Sum of parallel sides) $= 160\ dm^2$

$\frac{1}{2} \times (x+x+8) \times 5 = 160$

$2x + 8 = \frac{160}{5}\ 32$

$2x = 32 - 8$

$x = \frac{24}{2}\ 12$

$x = 12$

So sides are 12 dm & 12 + 8 dm = 20 dm
or 1.2 m

Q9. Area of cross section of canal = 138 m²

a = 15 m b = 8 m

$\frac{1}{2} \times (a+b) \times h$

$= \frac{1}{2} \times (15+8) \times h = 138$ m

$= \frac{1}{2} \times 23 \times h = 138$

$h = \frac{138 \times 2}{23}$

$h = 12$ m

Q11: Let parallel sides be 4x m and 7x m
Height = 14 m , Area = 385 m²

Area $= \frac{1}{2} \times (4x + 11x) \times 14 = 385$

$\frac{1}{2} \times 11x \times 14 = 385 \Rightarrow 11x = \frac{385}{7}^{55}$

$x = \frac{55}{11}^{5}$ So sides are 20m & 35m

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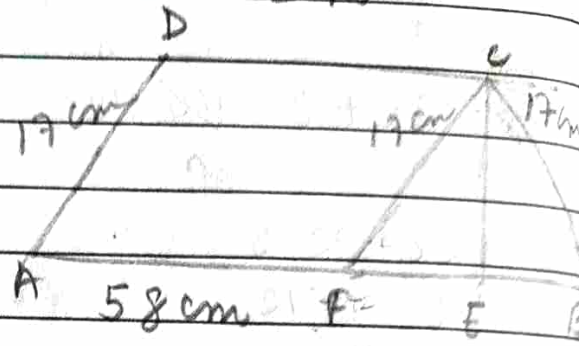
Page No.
Date : / /20

Q10: Let ABCD is a given trapezium in which AB = 58 m
CD = 42 m
AD = BC = 17m



Through C draw CF ∥ AD
Also CE ⊥ AB
Now AF ∥ CD [Given
AD ∥ CF [By construction
So AFCD is a ∥gm
AF = CD = 42 cm
AD = CF = 17 cm
FB = AB − AF = 58 − 42
= 16 cm
In △FBC, FB = BC = 17 cm

So it is isosceles Triangle
Also CF ⊥ FB So E is the midpoint of FB
$FE = \frac{1}{2} \times 16 = 8$ cm

In right angled △CFE by pythagoras Theorem
$FE^2 + CE^2 = CF^2$
$8^2 + h^2 = 17^2$
$64 + h^2 = 289$
$h^2 = 289 - 64$
$h^2 = 225$
$h = 15$ cm

Area of trapezium $= \frac{1}{2}$ (Sum of parallel sides) h
$= \frac{1}{2}(58 + 42) \times 15$

Page No.
Date : / /20

$\frac{1}{2} \times 100^{50} \times 15$

$= 750 \text{ cm}^2$

Q12 Perimeter of Trapezium = 104 m
Altitude (h) = 16 m
Sum of non parallel sides = (18 + 22) m
= 40 m
Sum of parallel sides = 104 − 40
$(a+b)$ = 64 m

Area of Trapezium = $\frac{1}{2}(a+b)h$

$= \frac{1}{2}(64) \times 16$

$= 512 \text{ m}^2$

WS-2

Q1: Find the area

(i) Area of quadrilateral PQRS = Area ΔPQS + Area ΔSRQ

$= \frac{1}{2} \times 50 \times 7 \times 4 + \frac{1}{2} \times 7 \times 3$

$= 14 + \frac{21}{2}$

$= 14 + 10.5$

$= 24.5 \text{ cm}^2$

Date : / /20

(iii) Area of polygon

Area of trap. ACDE + Area of Δ ABC

$= \frac{1}{2}(12+8)2 + \frac{1}{2} \times 12 \times 4$

$= 20 + 24$

$= 44\ cm^2$

Q2 (ii) Area of polygon = Area of ΔFED + Area Δ FCD + Area ΔFBC + Area ΔFBA

$= \left(\frac{1}{2} \times 5 \times 2\right) + \left(\frac{1}{2} \times 7 \times 4\right) + \left(\frac{1}{2} \times 7 \times 4\right) + \left(\frac{1}{2} \times 6.5 \times 2\right)$

$= 5 + 14 + 14 + 6.5$

$= 39.5\ cm^2$

Q3: Since it is a regular octagon so all sides are Sa

Area of octagon = Area of trapezium ABCH + Area of trap. GFED + Area of rectangle CDGH

$= \frac{1}{2}(11+5) \times 4 + \frac{1}{2}(11+5) \times 4 + 11 \times 5$

$= 16 \times 2 + 16 \times 2 + 55$

$= 32 + 32 + 55$

$= 119\ m^2$

TSA of Cube - $6\ side^2$

L.S.A of Cube - $4\ side^2$

TSA of cuboid - $2(lb + bh + hl)$

L.S.A of cuboid - $2h(l+b)$

Page No.
Date : / /20

Q4: Neha fig

Req. area = 2 x Area of Trapezium

$= 2 \times \frac{1}{2}(25+15)6$

$= 43 \times 6$

$= 258\ cm^2$

Nidhi's fig

Req. area = Area of triangle + Area of rectangle

$= \frac{1}{2} \times 6 \times 13 + 12 \times 15$

$= 78 + 180$

$= 258\ m^2$

WS-3

Q1: T.S.A of cube = 600 cm^2

$6\ side^2 = 600$

$side^2 = \frac{600}{6}\ 100$

$side^2 = 10^2$

So side = 10 cm

Q2: Length of room = (l) = 5m

Breadth of room = 4m

Height of room = 3m

Area of 4 walls and ceiling = $2h(l+b) + lb$

$= 2 \times 3(5+4) + 5 \times 40$

$= 6 \times 9 + 20$

$74\ m^2$

cost of whitewashing $1\ m^2$ = ₹50
cost of whitewashing $74\ m^2$ = ₹50 × 74
= ₹3700

Q3: Length of box = 0.5 m = 50 cm
Breadth of box = 25 cm
Height of box = 15 cm
T.S.A of box = $2(lb + bh + hl)$
$= 2(50 \times 25 + 25 \times 15 + 15 \times 50)$
$= 2(1250 + 375 + 740)$
$= 4750\ cm^2$

Q4: For cuboidal box :-
$l = 50$ cm
$b = 40$ cm
$h = 30$ cm

T.S.A of cuboid = $2(lb + bh + hl)$
$= 2(50 \times 40 + 40 \times 30 + 30 \times 50)$
$= 2(2000 + 1200 + 1500)$
$= 2 \times 4700$
$= 9400\ cm^2$

For cubical box
Side = 40 cm
T.S.A of cube = $6\ side^2$
$6\ side^2 = 40$
$= 6 \times 40^2$
$= 6 \times 1600$
$= 9600\ cm^2$

Date: / /20

Q5: For cubodial box

$l = 26\,cm$

$B = 26\,cm$

$h = 45\,cm$

Area of req. tin for 1 box $= 2(lb + bh + hl)$

$= 2(26 \times 26 + 26 \times 45 + 45 \times 26)$

$= 2(676 + 1170 + 1170)$

$= 2 \times 3016$

$= 6032\,cm^2$

Area of tin req. for 20 boxes $= 20 \times 6032$

$= 120640\,cm$

Q6: l of swimming pool $= 20\,m$

B of swimming pool $= 15\,m$

D of swimming pool $= 4\,m$

Area to be cemented $2h(l+b) + lb$

$= 2 \times 4(20 + 15) + 20 * 15$

$= 8 \times 35 + 300$

$= 280 + 300$

$= 580\,m^2$

Cost of cementing $1\,m^2 = ₹35$

Cost of cementing $580\,m^2 = 580 \times 35$

$= ₹20300$

Q7: Length of cubical box $= 30\,cm$

Area to

Since it is painted from inside & outside also

Date : / /20

req are = 2 × T.S.A of cube
= 2 × 6 side²
= 2 × 6 × 30 × 30
= 10800 cm²
= $\frac{10800}{100 \times 100}$ = 1.08 m²

cost of painting 1 m² = ₹ 5.50 /m²
Cost of painting 1.08 m² = 1.08 × 5.50
= ₹ 5.94

Q8: When two cubes of sides 4cm are fixed together we get a cuboid of 8 cm
Length = 8 cm, Breadth = 4cm, Height = 4cm
T.S.A of cuboid = 2(lb + bh + hl)
= 2(8 × 4 + 4 × 4 + 4 × 8)
= 2(32 + 16 + 32)
= 2(64 + 16)
= 2 × 80
= 160 cm²

C.S.A. of cylinder = 2πrh
T.S.A of cylinder = 2πrh + 2πr²
= 2πr(h + r)

WS-4

Q1: For right cylinder
h = 15 R = 7cm

CSA of cylinder = 2πrh

Date : / /20

$= \frac{2 \times 22}{7} \times 7 \times 15$

$= 660\ cm^2$

T.S.A of cylinder $= 2\pi r(h + r)$

$= \frac{2 \times 22}{7} \times 7 \times (7 + 5)$

$2 \times 22 \times 12$

$= 968\ cm^2$

Q2: For Right circular Cylinder :-

Diameter = 4.2 dm

$r = \frac{4.2}{2} = 2.1\ dm$

$= 2.1 \times 10\ cm$

$= 21\ cm$

$h = 1\ dm = 10\ cm$

C.S.A of Cylinder $= 2\pi rh$

$= 2 \times \frac{22}{7} \times 21 \times 10$

$= 1320\ cm^2$

Q3: $R = 10.5\ cm$, $h = ?$

C.S.A of cylinder $= 1320\ cm^2$

$2\pi rh = \frac{2 \times 22}{7} \times 10.5 \times 1320$

$h = \frac{1320 \times 7 \times 10}{2 \times 22 \times 105}$

$h = 20\ cm$

Q4: Height of cylinder (h) = 65 cm
Circumference of cylinder = 176 cm

$2\pi r = 176$

C.S.A of cylinder = $2\pi rh$
$= 176 \times 65$
$= 1440\ cm^2$

~~Q5. For first Cylin~~

Q5: Let radii of 2 cylinders be $2x$ and $3x$ and Heights be $5y$ and $3y$

Ratio = $\frac{\text{C.S.A of 1st cylinder}}{\text{C.S.A of 2nd cylinder}}$

$= \frac{2\pi \times 2x \times 5y}{2\pi \times 3x \times 3y} = \frac{10}{9}$

$= 10:9$

Q6: Diameter = 20 cm
$r = 10$ cm
$h = 70$ cm

C.S.A of cylinder = $2\pi rh$
$= 2 \times \frac{22}{7} \times 10 \times 70$
$= 4400\ cm^2$

Cost of painting $1\ cm^2$ = ₹4
Cost of painting $4400\ cm^2$ = 4400×4
= ₹17600

Q7. $r = 10\,cm$
$h = 14\,cm$
$\pi = 3.14\,cm$

Since cylindrical vessle is opened at top
T.S.A of vessel $= 2\pi rh + \pi r^2$
$= \pi r(2h + r)$
$=$
$= 3.14 \times 10(28 + 10)$
$= 31.4 \times 38$
$= 1193.2\,cm^2$

Q8: Length of roller $= (h) = 40\,cm = 0.4\,m$
$d = 21\,cm$
$r = \frac{21}{2}\,cm$

C.S.A of cylinder $= 2\pi rh$
$= 2 \times \frac{22}{7} \times \frac{21}{2} \times 40$
$= 66 \times 40 = 2640\,cm^2$

Area covered in 1 revolution $= 2640\,cm^2$
Area covered in 300 revolutions $= 2640 \times 300$
$= 792000\,cm^2$
$= \frac{792000\,cm^2}{10,000}$
$= 79.3\,m^2$

Date: / /20

Q9: For closed mettalic cylinder diameter = 56cm

$r = 28\ cm = 0.28\ m$

$h = 2.25\ m$

Area of metal sheet used = T.S.A of cylinder

$= 2\pi r(r+h)$

$= \frac{2}{1} \times \frac{22}{7} \times 0.28\ (0.28 + 2.25)$

$= 2 \times 22 \times \frac{28}{100}\ (2.53)$

$= \frac{176}{100} \times 2.53\ m^2$

$= \frac{445.28}{100} = 4.4528$

Cost of $1\ m^2$ metal = ₹80

Cost of $4.4528\ m^2$ = 4.4528×80

= ₹356.22

imp

Length of rectangular paper - 22cm

Breadth of rectangular paper - 10cm

Since it is rolled along its length to get cylinder

So circumference of cylinder = Lenght of paper

$2\pi r = 22\ cm$

Height of cylinder (h) = Breadth of paper

$h = 10\ cm$

S.A. of cylinder = $2\pi rh$

$= 22 \times 10$

$= 220\ cm^2$

Page No.
Date : / /20

Q1: Outer diameter = 21m

$R = 10.5m$

Inner diameter = 14m

$r = 7$ ~~10.5~~ m

$h = 21$

Inner C.S.A. + Outer C.S.A.

$2\pi rh + 2\pi Rh$

$= 2\pi h(r + R)$

$= 2 \times \frac{22}{7} \times 21^{3} \times (7 + 10.5)$

$= 132 \times 17.5$

Cost $1m^2 = ₹25$

$₹25 \times 132 \times 17.5$

$= ₹57750$

WS-5

Q1: When 2 cubes of same side 6cm joined together we get a cuboid of

$l = 6 + 6 = 12cm$

$B = 6cm$

$H = 6cm$

V. of cuboid $= l \times b \times h$

$= 12 \times 6 \times 6$

$= 12 \times 36$

$= 432 cm^2$

2. Base area of cuboid ($l \times b$) = $25 cm^2$

Volume of cuboid = $275 cm^3$

$l \times b \times h = 275$

$25 \times h = 275$

$h = \frac{275}{25} = 11$

$h = 11 cm$

Q3: Dimensions of cuboid

$l = 60 cm$

$b = 54 cm$

$h = 30 cm$

Side of cube = 6 cm

No. of cube which can be placed in cuboid

$= \frac{\text{V. of cuboid}}{\text{V. of cube}}$

$= \frac{l b h}{side^3}$

$= \frac{60 \times 54 \times 30}{6 \times 6 \times 6}$

$= 450$ cubes

Q5: Dimension of cuboid

$l = 4 cm$

$b = 2.5 cm$

$h = 1.5 cm$

Volume of 1 match box = $l \times b \times h$

Page No.
Date : / /20

Volume of 12 math box = 12 lbh
= 12 × 4 × 2.5 × 1.5
= 180 cm

Q4: Let original edge of cube be x units when edge is doubled. So now:-
Edge = 2x units

(i) Original S.A = $6 \cdot x^2$
New S.A. = $6(2x)^2$
= $6 \times 4x$
= $4 \times 6x^2$
= 4x is the original S.A.
So S.A. becomes 4 times

(ii) Original volume x^3
New volume = $(2x)^3$
= $8x^3$
= 8x is the original volume
So volume becomes 8 times

Q6: volume of cube = $1000\ cm^3$
$Side^3 = 1000$
$Side^3 = \sqrt[3]{1000}$
Side = 10 cm

T.S.A of Cube = $6\ side^2$
6×10^2
6×100
= $600\ cm^2$

Date : / /20

Q7: Dimensions of wooden ~~block~~ ~~plank~~

$l = 6m = 600cm, b = 15cm \quad h = 40cm$

Dimensions of the plank are, length =

$l = 2m = 200cm \quad B = 2.5cm \quad h = 4cm$

Since planks are to cut off from wooden block

No. of planks = $\frac{\text{No. of wooden block}}{\text{V. of planks}}$

$$= \frac{\overset{3}{\cancel{600}} \times 15 \times \overset{10}{\cancel{40}}}{\underset{1}{\cancel{200}} \times 2.5 \times \underset{1}{\cancel{4}}}$$

$$= \frac{\overset{3}{\cancel{3}} \times \overset{20}{\cancel{15}} \times \overset{10}{\cancel{10}} \times 10}{\underset{8}{\cancel{25}}}$$

$= 180$ planks

Q8: Edges of 3 small cubes are 6 cm, 8 cm, 10 cm

Since 3 cubes melted to form a big cube

So V. of big cube = Sum of volume of 3 small cubes

$= 6^3 + 8^3 + 10^3$

$= 1728$

Q9: S. A. of cube = $150\ m^2$

$6\ side^2 = 150$

$side^2 = \frac{\cancel{150}\ 25}{\cancel{6}}$

$side = 5m$

Page No.
Date : / /20

volume of cube = side^3
= 5^3
= $125\ m^3$

Q10: Area of one face of cube = $81\ m^2$
side^2 = $81\ m^2$
side = 9m

volume of cube = side^3
= 9^3
= $729\ m^3$

WS-6

Q1: $r = 7cm$
$h = 15cm$
$\pi r^2 h = 154cm$
Volume of cylinder = $\pi r^2 h$
154×15
= $231\ cm^3$

Q2: height of cylinder (h) = 25cm = 0.25m

Circumfrence of base = 1.32m
$2\pi r = 1.32m$
$r = \frac{1.32}{2\pi}$

$= \frac{132 \times 7}{100 \times 2 \times 22}$
$= 0.21$ or $\frac{21}{100}$

Date: / /20

V. of cylinder = $\pi r^2 h$

$$\frac{22}{7} \times \frac{21}{100} \times \frac{21}{100} \times \frac{25}{100}$$

$$= \frac{346500}{10000000}$$

$$= 0.03465\ m^3$$

Q2: $h = 16\ m$

$d = 7\ m$

$r = \frac{7}{2}\ m$

Req. amount of earth = V. of cylinder

$= \pi r^2 h$

$$\frac{22}{7} \times 7 \times \frac{7}{7} \times 168$$

$= 616\ m^3$

Q3: Diameter = 28 m

$r = 14\ m$

$h = 7\ m$

Amount of water it can hold = V. of cylinder

$= \pi r^2 h$

$$= \frac{22}{7} \times 14 \times 14 \times 7$$

$= 4312\ kl$ | $1\ kl = 1\ m^3$

Q4: For cylindrical oil can

$r = 4\ m$

Amount of oil it can hold

$\pi r^2 h = 1408\ kl$

Date : / /20

$\frac{22}{7} \times 14 \times 14 \times h = 1408\ m^3$

$h = \frac{1408 \times 7}{22 \times 14 \times 14}$

$h = 28\ m$

Q5: Let radius and height of cylinder are $5x$ cm & $7x$ cm

Volume $= 550\ cm^3$

$\pi r^2 h = 550$

$\frac{22}{7} \times 5x \times 5x \times 7x = 550$

$x^3 = \frac{550}{22 \times 5 \times 5} = 1$

$x = 1$

So radius $5x = 5$ cm

Height $7x = 7$ cm

Q6: For hollow mettalic cylinder

$h = 35$ cm

Inner radius $(r) = 12$ cm

Thickness $= 2$ cm

Outer radius $(R) = 12 + 2$

$= 14$ cm

Since it is opened from both ends

Volume of metal required

Outer V. − Inner V.

$\pi R^2 h - \pi r^2 h$

$= \pi h (R^2 - r^2)$

$= \frac{22}{7} \times 35 (14^2 - 12^3)$

$110 (196 - 144)$

110×52

$= 5720 \text{ cm}^3$

Q7: Length of rectangular Sheet = 33 cm

Breadth = 32 cm

Since sheet is rolled along its length to make cylinder

So circumfrence of cylinder = 33 cm

$2\pi r = 33$

$r = \frac{33}{2\pi} = \frac{33 \times 7}{22 \times 2}$

$r = \frac{21}{4}$

Height of cylinder (h) = 32 cm

Capacity of cylinder = $\pi r^2 h$

$= \frac{22}{7} \times \frac{21}{4} \times \frac{21}{4} \times 32$

$= 2772 \text{ cm}^3$

Q8: Height of cylinder = 6 cm

Volume of cylinder = 150π

$\pi r^2 h = 150\pi$

$r^2 \times 6 = 150$

$r^2 = \frac{150}{6} 25$

$= r^2 = 5$

T.S.A = $2\pi r (r + h)$

$= 2 \times \frac{22}{7} \times 5 (5 + 6) = \frac{2420}{7} = 345\frac{5}{7}$

Page No.
Date : / /20

Q8: For 2 cylinders

$h_1 = 49cm$ $h_2 = 35cm$

$d_1 = 16cm$ $d_2 = 14cm$

$r_1 = 8cm$ $r_2 = 7cm$

Since both cylinders are melted to form a single cylinder of height (h) = 56 cm

→ Sum of volume of 2 cylinders = V. of big cylinder

$= \pi r^2 h_1 + \pi r_2^2 h_2 = \pi R^2 H$

$\pi(r^2 h_1 + r_2^2 h_2) = \pi R^2 H$

$= 8^2 \times 49 + 7^2 \times 35 = R^2 \times 56$

$= 49(64 + 35) = R^2 \times 56$

$= 49 \times 99 = R^2 \times 56$

$= \frac{49 \times 99}{8} = R^2$

$R^2 = \frac{693}{8} = 86.625$

$R = 9.3$

$D = 18.6\ cm$

Q9: For mettalic cylinderical pipe

$h = 14cm$

External Radius (R) = 9cm

Let internal Radius be r cm

volume of metal = $748\ cm^3$

$\pi R^2 h - \pi r^2 h = 748$

$\pi h(R^2 - r^2) = 748$

$\frac{22}{7} \times 1 \times (9^2 - r^2) = 748$

$44(81 - r^2) = 748$

$81 - r = \frac{748}{44}$ 6817

$= r^2 = 17 - 81$

$= r^2 = -64$

$= r = 8$ cm

So thickness $R - r = 9 - 8$

$= 1$

Q11: Volume of cylindrical pillar = $924\ m^3$

$\pi r^2 h = 924$ — 1

C.S.A. of cylindrical pillar = $264\ m^2$

$2\pi r h = 264$ — 2

Dividing 1 by 2

$\frac{\pi r^2 h}{2\pi r h} = \frac{924}{264}\ 7$

$\frac{r}{2} = \frac{7}{1}$

$r = 7 \times 2$

$2\pi(7)h = 264$

$2 \times \frac{22}{7} \times 7 \times h = 264$

$h = \frac{264 \times 1}{2 \times 22 \times 7}$

Date : / /20

So height of pillar is 6cm

$r = 7$ cm

So $d = 2 \times 7 = 14$ cm

WS-8

Q1- Done in book

Q2- Done in book

Q3: No, because in square prism all the faces may not be a square

Q4: (i) $p = 6$

$V = 8$

$E = 12$

$F + V - E = 2$

$6 + 8 - 12 = 2$

$2 = 2$

LHS = RHS

Hence verified

(ii) $F = 9$

$E = 16$

$V = 9$

$F + V - E = 2$

$9 + 9 - 16 = 2$

$2 = 2$

LHS = RHS

Hence Verified

(iii) $F = 5$

$E = 8$

$V = 5$

$F + V - E = 2$

$5 + 5 - 8 = 2$

$10 - 8 = 2$

$2 = 2$

LHS = RHS

Hence verified

(iv) $F = 5$

$E = 8$

$V = 5$

$F + V - E = 2$

$5 + 5 - 8 = 2$

$10 - 8 = 2$

$2 = 2$

LHS = RHS

Hence verified

Q5: (i) $F = 8, E = 12, V = ?$

$F + V - E = 2$

$8 + V - 12 = 2$

$-4 + V = 2$

$V = 2 + 4$

$V = 6$

(ii) $F = ?, E = 9, V = 6$

$F + V - E = 2$

$F + 6 - 9 = 2$

$F = 2 + 3$

$F = 5$

(iii) $F = 10, V = 12, E = ?$

$F + V - E = 2$

$10 + 12 - E = 2$

$22 - E = 2$

$-E = 2 - 22$

$-E = -20$

$= E = 20$

Q6: $F = 10$

$E = 20$

$V = 15$

$F + V - E = 2$

$10 + 15 - 20 = 2 \quad = 25 - 20 = 2$

$5 = 2$

∴ So no it is not a polyhedron

Value Based Questions

Q1: a) For first room the dimensions are -

$l = 10\,m \qquad B = 12\,m \qquad h = 3.5\,m$

Area of 4 walls and ceiling $= 2h(l + b) * lb$

$2 \times 3.5 (10 + 12) * 10 \times 12$

$7 \times 22 * 120$

$= 274\,m^2$

For second room the dimensions are –

$l = 8\,m$ $b = 6\,m$ $h = 3.5\,m$

Area of 4 walls and ceiling $= 2h(l+b) + lb$

$= 2 \times 3.5 (8+6) + 8 \times 6$

$= 7 \times 14 + 48$

$= 146\,m^2$

For third room the dimensions are –

$l = 7\,m$ $b = 5\,m$ $h = 3.5\,m$

Area of 4 walls and ceiling $= 2h(l+b) + lb$

$= 2 \times 3.5 (7+5) + 7 \times 5$

$= 7 \times 12 + 35$

$= 119\,m^2$

Total Area of 3 rooms $= (274 + 146 + 119)\,m^2$

$= 539\,m^2$

Cost of painting $1\,m^2 = ₹30$

Cost of painting $539\,m^2 = 539 \times 30$

$= ₹16170$

Q1: b) Amount of money given to orphanage $= \frac{1}{5}$ of ₹16170

$= ₹3234$

$\frac{1}{5} \times 16170^{3234}$

c) Caring, Helpful, Kind

Q2: a) Area of Trapezium $= \frac{1}{2}(a+b)h$

$= \frac{1}{2}(90+60)50^{25}$ $= 150 \times 25$

$= 3750$

b. Girl education is must

c. Encourage people to send girls to school.

Brain Teasers

Q1: Tick

(A) a) Side of cube = 0.01m

$= 0.01 \times 100$

$= 1cm$

Volume = $Side^3$

$1 \times 1 \times 1$

$= 1cm^3$

b. radius = (r)

height = (h)

V. of cylinder = $\pi r^2 h$

new radius = r

new height = $\frac{h}{2}$

new V. = $\frac{\pi r^2 h}{2}$ $= \frac{1}{2}(\pi r^2 h)$

$= \frac{1}{2}$ times

c. a = 10cm, b = 12cm, h = 4cm

Area of trap. = $\frac{1}{2}(a+b)h$

$= \frac{1}{2}(10+12)\cancel{42}^{21}$

22×2

$= 44cm^2$

Page No.
Date : / /20

d) Triangular pyramid
= 4 Ans

e) Original cube
side = x
$V = x^3$

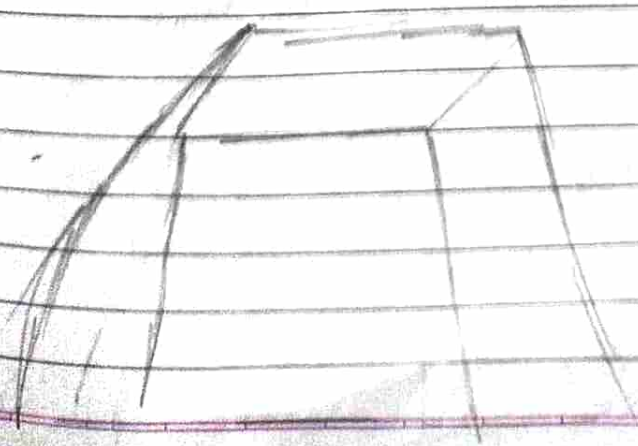
New cube
side = 2x
$V = 8x^3$

$\frac{\text{V. of new cube}}{\text{V. of original cube}} = \frac{8x^3}{x^3} = 8:1$

B b. V. of cube = $729\ m^3$
$Side^3 = 729$
side = 9m
S.A. of cube = $6\ side^2$
$= 6 \times 9 \times 9$
$= 486\ m^2$

c) For cylinder
D = 12 cm
r = 6 cm
V. of cylinder = $2376\ cm^3$
$\pi r^2 h = 2376$
$\frac{22}{7} \times 6 \times 6 \times h = 2376$
$h = \frac{2376 \times 7}{22 \times 6 \times 6} = 21 cm$

d)



e) $l = 10\ cm$, $b = 8\ cm$, $h = 6\ cm$

T.S.A. of cubiod $= 2(lb + bh + hl)$

$2(80 + 48 + 60)$

$= 376\ cm^2$

Q2: Area of quadr. = Area of ΔABC + Area of ΔACD

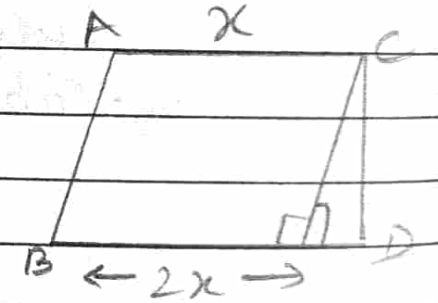
$= \left(\frac{1}{2} \times 6 \times 3.8\right) + \left(\frac{1}{2} \times 6 \times 7.2\right)$

$= 11.4 + 21.6$

$= 33\ cm^2$

Q3: Let 2 || sides of trapezium be x m and $2x$ m

Distance between || sides $(h) = 100$ m



Area of Trapezium $= 10,500\ m^2$

$\frac{1}{2}$ (Sum of parallel sides) $h = 10,500$

$\frac{1}{2}(x + 2x)100 = 10500$

$\Rightarrow 3x = 210$

$\Rightarrow x = 70$

So || sides are 70 m & $2 \times 70 = 140$ m

Q4: Let in fig ABCD in given trapezium in which

AB = 36 cm, CD = 12 cm

AD = BC = 15 cm

through C draw CE || AD

Draw CF ⊥ AB

EB = 36 − 12 = 24 cm

In ΔCEB, CE = BC = 15 cm

So it is isoscless triangle
CE ⊥ FB, so F is midpoint EF = FB = 12 cm
In Right angled triangle CFE by pythagoras th.

$CF^2 + EF^2 = CE^2$

$= h^2 + 12^2 = 15^2$

$= h^2 + 144 = 225$

$= h^2 = 225 - 144$

$= h^2 = 81$, $h = 9$ cm

So area of trapezium ABCD $= \frac{1}{2}(AB + CD)h$

$= \frac{1}{2}(36 + 12) \times 9$

$= \frac{1}{2} \times 48 \times 9$

$= 216\ m^2$

So req. area is $216\ m^2$

Q5: For cuboidal box

$l = 2$ m 10 cm $= 210$ cm

$b = 1$ m $= 100$ cm

$h = 80$ cm

Area of canvas required to cover the box = T.S.A of cuboid

$= 2(lb + bh + hl)$

$= 2(210 \times 100 + 100 \times 80 + 80 \times 210)$

$= 2(21000 + 8000 + 16800)$

$= 2(45800)\ cm^2$

$= \frac{91600}{100 \times 100}\ cm^2$

$= 9.16\ m^2$

Date : / /20

Q6: Inner Radius (r) = 3.5 cm

Thickness = 0.7 cm

Outer Radius (R) = 3.5 + 0.7

= 4.2 cm

height (h) = 5 dm = 5 × 10 = 50 cm

T.S.A = Inner C.S.A + Outer C.S.A + Area of 2 rings

$2\pi rh + 2\pi Rh + 2(\pi R^2 - \pi r^2)$

$= 2\pi(rh + RH + R^2 - r^2)$

$= \frac{2 \times 22}{7}(3.5 \times 50 + 4.2 \times 50 + 4.2^2 - 3.5^2)$

$= \frac{44}{7}(175 + 210 + 17.64 - 12.25)$

$= \frac{44}{7}(385 + 5.39)$

$= \frac{44}{7} \times 390.39$

$= 44 \times 55.77 = 2453.88 \text{ cm}^2$

Q7: Let breadth of rectangle be x m

Length be = $2x$ m

Since sheet is folded to form a cylinder

So Area of sheet = C.S.A. of cylinder

$l \times b = 1250 \text{ m}^2$

$2x \times x = 1250$

$x^2 = \frac{1250}{2} = 625$

$x = \sqrt{625} = 25$ m

So breadth = 25 m, length = 25 m

Page No.
Date : / /20

Q8: Diameter of roller = 84 cm

$r = \frac{84}{2} = 42$ cm

length of roller (h) = 120 cm

Area to be leveled = 15844 m^2

req. no. of revolutions = $\frac{\text{Area}}{2\pi rh}$

$= \frac{15844 \times 100 \times 7}{2 \times 22 \times 42 \times 120}$

$= 500$

Q9: Total volume of reservoir = 180 m^3

$= 108 \times 1000$ | $1 m^3 = 1000 l$

$= 108000\ l$

Rate of pouring = 60 l/min

req. time to fill = $\frac{V}{\text{Rate}} = \frac{108000}{60}$ min

$= 1800$

$\frac{1800}{60} = 30$ hrs

Q10: Exterior diameter = 8 cm

$R = 4$ cm

Thickness = 1 cm

Inner Radius = 3 cm

V. of pipe = Outer V. − Inner V.

$\pi R^2h - \pi r^2h$

$= \pi h(R^2 - r^2)$

$= \frac{22}{7} \times 30 \times (4^2 - 3^2)$

$= 6600(16-9)$

$= 6600 \times 7$

$= 46200\ cm^3$

Weight of $1\ cm^3$ iron $= 8g$

Weight of $46200\ cm$ iron $= 46200 \times 8$

$= 369600g$

$= 369.6\ kg$

Q11: Depth of well $= 20m$

Diameters $= 7m$

Radius $= \frac{7}{2}$

Length of plot $= 22m$

Breadth of plot $= 14m$

Let height be $x\ m$

Since earth taken out from well to get a platform

volume of platform $= \pi r^2h$

$22 \times 14 \times h = \frac{11}{7} \times \frac{7}{2} \times \frac{7}{2} \times 20$

$h = \frac{5}{2} = 2.5\ m$

Q12: Height of cylinder $= 7cm$

volume of cylinder $= 448\pi$

$\pi r^2h = 448\pi$

$r^2 = \frac{448}{h}$

$r^2 = \frac{448}{7}\ 64$

$r^2 = 64$, $r = 8$ cm

L·S·A of cylinder $= 2\pi rh$

$2 \times \frac{22}{7} \times 8 \times 7 = 352$ cm

T·S·A of cylinder $= 2\pi r(r+h)$

$2 \times \frac{22}{7} \times 8(8+7)$

$= 2 \times \frac{22}{7} \times 8 \times 15$

$= \frac{5280}{7} = 754.28$

Q13: For Square pyramid=

F = 5 E = 8 V = 5

F + V − E = 2

5 + 5 − 8 = 2

10 − 8 = 2

2 = 2

L·H·S = RHS

Hence verified

Triangular Prism

F = 5 E = 6 V = 9

F + V − E = 2

5 + 9 − 6 = 2

2 = 2

LHS = RHS

Rectangular pyramid

$F = 6 \qquad V = 8 \qquad E = 12$

$F + V - E = 2$

$6 + 8 - 12 = 2$

$2 = 2$

LHS = RHS

Hence verified

HOTS

1. $\pi r^2 = 154 \text{ unit}^2$

$r^2 = \frac{154}{\pi}$

$r^2 = \frac{154 \times 7}{22}$

$r^2 = 49$

$r = 7 \text{cm}$

C.S.A of cylinder = 880 unit

$2\pi rh = 880$

$2 \times \frac{22}{7} \times 7 \times h = 880$

$h = \frac{880}{2 \times 22} = 20 \text{ unit}$

2. Let Breadth of room be x m

Length = $x + 50\%$ of x

$= x + \frac{50}{100} \times x$

$= x + \frac{x}{2}$

Page No.
Date : / /20

Length = $\frac{3x}{2}$ m

Rate of carpenting = ₹38.50/m²
Total cost of carpenting = ₹924
Area of room = $\frac{924}{38.50}$

$\frac{3x}{2} \times x = \frac{924 \times 100}{3850 \times 77}$

$x^2 = \frac{24 \times 2}{8}$

$x^2 = 16$

$x = 4$ m

So breadth is 4 m
Length = $\frac{3x}{2} = \frac{3 \times 4}{2} = 6$ m

Rate of paiting 4 walls = ₹5.50 m²
Total cost of painting 4 walls = ₹1320
Area of 4 walls = $\frac{1320}{5.50}$

$2h(l+b) = \frac{1320 \times 10}{55}$

$2h(6+4) = 240$
$2 \times h \times 10 = 240$
$h = \frac{240}{10}$
$h = 12$ m

Answer
01/9/22