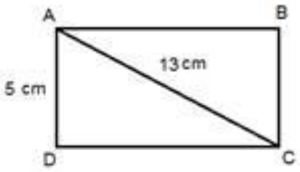
Answer Set

1. Ans. A.



By Pythagoras theorem
$AC^2 = AD^2 + DC^2$

DC$= \sqrt{AC^2 - AD^2}$

$= \sqrt{13^2 - 5^2}$

DC=12cm
Perimeter=2(AD+DC)
=2(5+12)
$= 2 \times 17$
= 34

2. Ans. C.

Given, area of a rhombus-shaped garden = $200\sqrt{3}$ square meter and the acute angle formed by the two sides of the rhombus is 60 degree

We know that,

Area of a rhombus with side length ‘a’ and acute angle θ formed by sides = a x a x sin θ

$200\sqrt{3} = \text{a x a x sin } 60$

On solving, we get, a = 20 metres

Perimeter = 4 x side = 80 m

Since the boundary is half meter high. Thus, area of boundary = 0.5 x 80 = 40

The cost of making a boundary per square meter = Rs. 148

Therefore, the cost of making a half meter high boundary around the garden if the cost of making boundary per square meter be Rs. 148 = 40 x 148 = Rs. 5920

So option (c) is the correct answer.

3. Ans. B.

Let breadth of room (b) = x m.
Length of room (l) = 2x m.
Given, height of room = 4 m.
According to question,

$2h(l+b) = 120$

$\Rightarrow 2 \times 4(2x + x) = 120$

$\Rightarrow 3x = \frac{120}{2\times4} = 15$

$\Rightarrow x = \frac{15}{3} = 5\ m.$

So, length of room $= 5 \times 2 = 10\ m.$

Breadth of room $= 5\ m.$

Area of the floor $= l \times b$

$= 10 \times 5 = 50\ m^2$

Hence option (b)

4. Ans. D.

In a rectangle, consecutive sides are perpendicular to each other.
Thus, if slope of side DA of a rectangle, m = 5/3
Then slope of side AB = -1/m = -3/5

5. Ans. C.

Diagonal of square = 14√2
Let the side of square = a
Let the radius of circle = r
Diagonal of square = √2a = 14√2
a = 14
As circle is inscribed in a square then circle diameter is equal to the length of side
2r = 14
r = 7
Area of cirle = πr^2

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

6. Ans. B.

Quantity 1: Let the radius of cone be r cm
Given, CSA of cone = CSA of cylinder

$= 25\pi r = 2\pi x 5 x 17.5$

r = 7 cm

Now, for cone
$= h^2 = 25^2 - 7^2$
=h = 24 cm
Therefore, volume of cone
$= \frac{1}{3} \times \frac{22}{7} \times 7^2 \times 24 = 1232\ cm^2$

Quantity 2: Volume of cuboidal box = 15 x 12 x 8 = 1440 cm^2

Therefore, Quantity 2 > Quantity 1
So option (b) is the correct answer.

7. Ans. C.

PQ is parallel to side AB and side CD.
Length of PQ = $\frac{AP \times DC + PD \times AB}{AP + PD}$
Length of PQ = $\frac{3 \times 15 + 2 \times 40}{3+2} = \frac{125}{5} =$ 25 cm

8. Ans. E.

Let base radius and height of conical pit is 21x and 40x respectively
Volume of 22 cuboidal bricks + volume of 22 cylindrical bricks = volume of mud from conical pit
$= 22 \times \left[(14 \times 4 \times 4) + \frac{22 \times 7 \times 7 \times 4}{7}\right] = \frac{1}{3} \times \frac{22}{7} \times (21x)^2 \times 40x$
$= 840 = 21 \times 40 \times x^3$
$= x^3 = 1; x = 1$
Quantity I:
Half of height of conical pit = $\frac{40x}{2} = 20$ cm
Quantity II:
Two less than the total number of cuboidal bricks made = 22 – 2 = 20
So, Quantity I = Quantity II
So option (e) is the correct answer.

9. Ans. D.

Let the side of the square = a metre
and the radius of the circle = r metre
According to question,

$$a = 2r \Rightarrow a^2 - \pi r^2 = 168$$

$$(2r)^2 - \pi r^2 = 168$$

$$4r^2 - \frac{22}{7}r^2 = 168$$

$$r^2(28-22) = 168 \times 7$$

$$r^2 = \frac{168 \times 7}{6} = 198 \times 7$$

$$r = 14 \text{ m}$$

Side of square $= a = 2r = 2 \times 14 = 28$ m

Perimeter of square $= 4a = 4 \times 28 = 112$ m

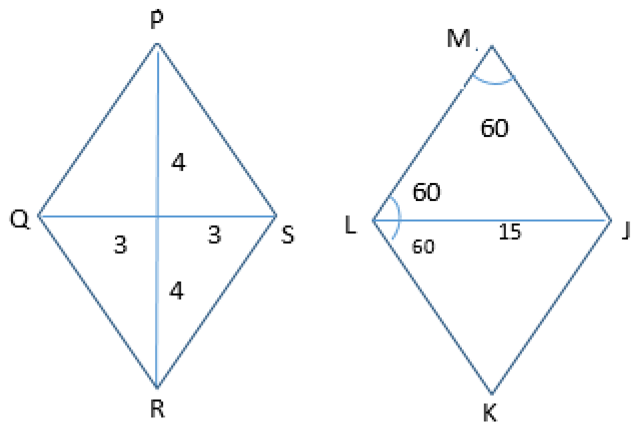
∴ Required cost $= 112 \times 20 =$ 2,240

10. Ans. C.

L/B=5/4.......1)
& L=20+B........2)
Putting 2) in 1),we get:
(20+B)/B=5/4
→ 80+4B=5B
→ B=80
→ L=100
So, Perimeter=2(L+B)
→ Perimeter=2(100+80)=360

11. Ans. C.

As per the given information I draw two rhombuses PQRS, JKLM
Then side of PQRS=AB=5 (right angle is formed)
Then side of MLKJ=CD=15 (MLJ is an equilateral triangle)
hence median MN= (AB+CD)/2=(15+5)/2=10



12. Ans. C.

Length of the diagonal of I[st] square = √(2*200) = 20 m
∴Length of the diagonal of new square = 20√2m
∴Area of the new square = 1/2×(20.√2)2 = 400 sq. m

13. Ans. A.

Let the side of the square be x cm, then
Length × breadth =3 (side)^2

⇒ side = 10 cm

14. Ans. C.

Given radius of cone = 8.4 m
Vertical height of cone = 3.5 m

Number of bag = $\frac{Volume\ of\ conical\ tent}{Volume\ of\ each\ bag}$

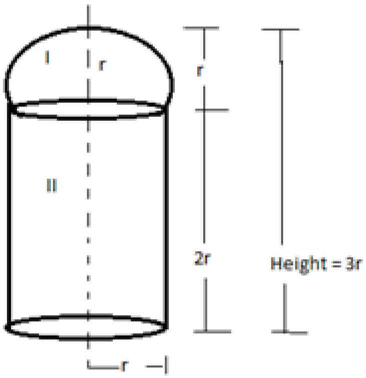
$= \frac{\frac{1}{3}\pi r^2 h}{1.96}$

$= \frac{1 \times 22 \times 8.4 \times 8.4 \times 3.5}{3 \times 7 \times 1.96}$

$= 22 \times 6 = 132$

Hence option (c)

15. Ans. A.



Volume of $I = \frac{2}{3}\pi r^3$ [r = radius]

Volume of $II = \pi r^2(2r) = 2\pi r^3$ [As h=2r]

Volume of building $= \frac{2}{3}\pi r^3 + 2\pi r^3$

$= \frac{8}{3}\pi r^3$

According to question:

$\frac{8}{3}\pi r^3 = 67\frac{1}{21} = \frac{1408}{21}$

$\Rightarrow r^3 = \frac{1408\times3}{21\times8\times\pi}$
$\Rightarrow r^3 = \frac{1408\times3\times7}{21\times8\times22} = 8$
$\Rightarrow r^3 = 2^3$
$\Rightarrow r = 2$
Hence, height of building $= 3r = 3\times2 = 6\,m$
Hence option (a)

16. Ans. C.

Let radius and height of base of solid circular cylinder be r and h respectively.
Given,
$\frac{r}{h} = \frac{2}{3}$
$\Rightarrow r = \frac{2h}{3}$ ………. (i)
Volume of cylinder $= \pi r^2 h$
$\Rightarrow 1617 = \frac{22}{7}\times\left(\frac{2h}{3}\right)^2\times h$
$\Rightarrow \frac{1617\times7}{22} = \frac{4h^2}{9}\times h$
$\Rightarrow h^3 = \frac{9\times1617\times7}{22\times4}$
$\Rightarrow h^3 = 1157.625$
$\Rightarrow h^3 = (10.5)^3$
$\Rightarrow h = 10.5\,cm$
so, $r = \frac{2\times10.5}{3}$ [From (i)]
$\Rightarrow r = 7$
Total surface Area of cylinder $= 2\pi r^2 + 2\pi rh$
$= 2\pi r(r+h)$
$= 2\times\frac{22}{7}\times7\times(7+10.5)$
$= 770\,cm^2$
Hence option (c)

17. Ans. A.

Given, height (h) = 24 cm
Radius of bottom circle (r) $= \frac{18}{2} = 9cm$
Also, given capacity of glass
i.e. volume of glass is in shape of frustum be πx ……. (i)

As, volume of frustum $= \frac{\pi h}{3}[r^2 + R^2 + rR]$
$= \pi \times \frac{24}{3}[2^2 + 9^2 + 2 \times 9]$
$= \pi \times 8[4 + 81 + 18]$
$= \pi \times 824$ …………(ii)
After comparing (i) and (ii), we get
$x = 824$
Hence option (a)

18. Ans. C.

Given diameter of base and height of cylinder vessel be 2 m and 3.5 m respectively.
Then radius of base (r) $= \frac{2}{2} = 1\,m$
$h = 3.5$ m
Let height of roof be H m
Then volume of roof $= 22 \times 20 \times H$ ……. (i)
Volume of cylindrical vessel $= \pi r^2 h$
$= \frac{22}{7} \times 1^2 \times 3.5$ …… (ii)
As $(i) = (ii)$
Then, $22 \times 20 \times H = \frac{22}{7} \times 1 \times 3.5$
$\Rightarrow H = \frac{22 \times 3.5}{7 \times 22 \times 20}$
$\Rightarrow H = 0.025$
$\Rightarrow H = 0.025 \times 100\,cm$
$\Rightarrow H = 2.5\,cm$
Hence option (c)

19. Ans. B.

Area of base =38.5=πr^2
$\frac{22}{7} \times r^2 = 38.5$
=r^2 =12.25
r=3.5
Volume of tent =154
Then 154=$\frac{1}{3}\pi r^2 \times h$
154× 3= 38.5× h
h=12
slant height of tent =√(12.25+144)=√(156.25) =12.5=l
canvas required to built the tent=π r(l+r)= $\frac{22}{7} \times 3.5 \times (12.5 + 3.5) = 176$ sqcm

width of canvas=2cm
so length of canvas=176/2=68cm

20. Ans. C.

The total surface area of a hemisphere = 166.32 sq cm
$3\pi r^2 = 166.32$
$\Rightarrow r = 4.2$ cm
Now, it's curved surface area = $2\pi r^2$
$= 2 \times (22/7) \times (4.2)^2$
= 110.88 sq. cm

21. Ans. C.

Curved surface of cone = $\pi r l$
Let the curved surface area of first cone be= $\pi r_1 l_1$
Let the curved surface area of second cone be= $\pi r_2 l_2$
According to question,
$\frac{\pi r_1 l_1}{\pi r_2 l_2} = \frac{1}{9}$ -------(i)
And
$\frac{l_1}{l_2} = \frac{3}{1}$ --------(ii)
Therefore,
Putting equation (ii) in equation (i) we get,
$$\frac{r_1 \times 3}{r_2 \times 1} = \frac{1}{9}$$
$$\Rightarrow \frac{r_1}{r_2} = \frac{1}{27}$$

22. Ans. A.

On melting and recasting, volume doesn't change.
So, volume of cone = volume of sphere
$$\Rightarrow \frac{1}{3}\pi r^2 h = \frac{4}{3}\pi R^3$$
Here, R = 21 cm and r = (21/2) cm
$$\therefore h = 4 \times \frac{R^3}{r^2}$$
$$= 4 \times \frac{21^3}{\left(\frac{21}{2}\right)^2}$$
= 336 cm

23. Ans. B.

Side of square base=14cm
Area of square base=14× 14=196
Volume of pyramid=area of base× height='196'× 22
Let the radius of sphere=r

Then $196\times22 = 4\times\frac{22}{7}\times r^3$
r^3=49×7
r=7cm

24. Ans. B.

Volume of earth taken out = $\pi r^2 h$
= (22/7) × $(7)^2$ × 80
= 12320 m^3
Area of field which is not dug = l × b - πr^2
= 28 × 22 – (22/7) × $(7)^2$
= 616 – 154
= 462 m^2
Now, increase in the level of the field = volume of earth taken out/area of field which is not dug
= 12320/462
≈ 26.66 m

25. Ans. D.

The volume in both cases would be the same.
Let the height of the cone = *h*
Then, external radius = 6 cm
Internal radius = 4 cm
4 Î*(1/8) (6^3-4^3)/3= Î *4^2*h/3
H= (6^3-4^3)/32= 38/8cm = 4.75cm