BHARAT SCHOLL OF BANKING
VOLUME AND SURFACE AREAS

Q1. Surface area of a cube is 600 cm^2. Find out the length of its diagonal.
(a) 15√3
(b) 12√3
(c) 10√3
(d) 11√3
(e) None of these

S1. Ans.(c)
Sol. Surface area of a cube = $6\times(\text{side})^2$
$\therefore 6\times(\text{side})^2 = 600$
$\Rightarrow (\text{Sides})^2 = 100$
$\Rightarrow \text{Side} = \sqrt{100} = 10 \text{ cm}$
$\therefore$ Diagonal of the cube = $\sqrt{3} \times$ side
$= \sqrt{3} \times 10 = 10\sqrt{3}$ cm.

Q2. A roller is 120 cm long and has diameter 84 cm. If it takes 500 complete revolutions to level a play ground, then determine to cost of leveling at the rate of 30 paise per m^2.(Use π=22/7)
(a) Rs. 475.40
(b) Rs. 375.45
(c) Rs. 375.20
(d) Rs. 475.20
(e) None of these

S2. Ans.(d)
Sol. $r = \frac{84}{2}\ cm = \frac{21}{50} m,$
$h = 120\ cm = \frac{120}{100} m = \frac{6}{5} m$
The leveled area in one revolution of the roller
= curved surface = $2\pi rh$
$= 2\times\frac{22}{7}\times\frac{21}{50}\times\frac{6}{5}$
$= \frac{396}{125}\ m^2.$
The levelled area in 500 revolutions
$= \frac{396}{125}\times 500 = 1584\ m^2.$
The required cost of leveling = $\frac{30}{100}\times 1584$
= Rs. 475.20

Q3. The capacity of a tank, in the form of a cylinder, is 6160 m^3. If the diameter of its base is 28 m, find out the cost of painting its inner curved surface at the rate of Rs. 2.8 per m^2.(Use π=22/7)

(a) 2464
(b) 2664
(c) 3064
(d) 2864
(e) None of these

S3. Ans.(a)
Sol. Radius of the base of the cylinder
$= r = 14$ m.
h = Depth of the tank
Capacity = Volume of the tank
$= \pi r^2 h = 6160\ m^3$.
or, $\frac{22}{7} \times 14 \times 14 \times h = 6160 \quad \therefore h = 10\ m.$
T surface area $= 2\pi rh = 2 \times \frac{22}{7} \times 14 \times 10$
$= 880\ m^2$
$\therefore$ Cost of painting this curved surface
$= 880 \times 2.80 = \text{Rs. } 2464$

Q4. The ratio of total surface area to lateral surface area of a cylinder whose radius is 80 cm and height 20 cm, is:
(a) 2 : 1
(b) 3 : 1
(c) 4 : 1
(d) 5 : 1
(e) None of these

S4. Ans.(d)
Sol. $\frac{\text{Total surface area}}{\text{Lateral surface area}} = \frac{2\pi rh + 2\pi r^2}{2\pi rh}$
$= \frac{2\pi r(h+r)}{2\pi rh} = \frac{h+r}{h} = \frac{20+80}{20} = \frac{5}{1} = 5 : 1.$

Q5. The diameter and slant height of a conical tomb are 20 m and 50 m, respectively. The cost of white washing its curved surface at the rate of 80 paise per m^2 is:
(a) Rs. 2640
(b) Rs. 1760
(c) Rs. 26400
(d) Rs. 17600
(e) None of these

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S5. Ans.(d)
Sol. Curved surface of the tomb
$= \pi rl = \frac{22}{7} \times 14 \times 50 = 22000\ m^2$
$\therefore$ Cost of white washing
$= 22000 \times 0.80 = \text{Rs. } 17600$

Q6. The curved surface of a cylindrical pillar is 264 m^2 and its volume is 924 m^2. Taking π=22/7, find out the ratio of its diameter to its height:
(a) 7 : 6
(b) 6 : 7
(c) 3 : 7
(d) 7 : 3
(e) None of these

S6. Ans.(d)
Sol. Curved surface of a pillar = $264\ m^2$
or, $2\pi rh = 264\ m^2$
or, $rh = \frac{264 \times 7}{2 \times 22}$
$\therefore rh = 42\ m^2$ ...(1)
Again, $\pi r^2 h = 924\ m^3$
$r^2 h = \frac{924}{22} \times 7$
$\therefore\ r^2 h = 294$ ...(2)
Dividing Equation (2) by Equation (1)
$r = 7\ m$
$\therefore h = \frac{42}{7} = 6\ m$
Hence, required ratio = $7 \times 2 : 6 = 7 : 3$

Q7. If the surface area of a sphere is 346.5 cm^2 , then its radius is [taking π=22/7]
(a) 7 cm
(b) 3.25 cm
(c) 5.25 cm
(d) 9 cm
(e) None of these

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S7. Ans.(c)
Sol. Surface area of sphere = $4\pi r^2$
Now, according to the question,
$4\times\frac{22}{7}\times r^2 = 346.5$
$\Rightarrow 4\times22\times r^2 = 346.5\times7$
$\Rightarrow r^2 = \frac{346.5\times7}{4\times22} = 27.5625$
$\Rightarrow r = \sqrt{27.5625} = 5.25\ cm$

Q8. The base of a right prism is an equilateral triangle. If the lateral surface area and volume is 120 cm^2 and 40√3 cm^3, respectively, then the side of base of the prism is:
(a) 4 cm
(b) 5 cm
(c) 7 cm
(d) 40 cm
(e) None of these

S8. Ans.(a)
Sol. Lateral surface area of prism = 3 × side × height
∴ 3 × side × height = 120
$\Rightarrow$ Side ×height $= \frac{120}{3} = 40\ cm^2$ ...(1)
Volume of prism = Area of base × height
$\Rightarrow 40\sqrt{3} = \frac{\sqrt{3}}{4}\times side^2\times height$
$\Rightarrow \frac{40\sqrt{3}\times4}{\sqrt{3}} = side^2\times height$
∴ $side^2\times height = 160\ cm^3$ ...(2)
Dividing equation (2) by (1), we get
Side $= \frac{160}{40} = 4$ cm

Q9. If a right circular cone of height 24 cm has a volume of 1232 cm^3, then the area (in cm^2) of curved surface is:
(a) 550
(b) 704
(c) 924
(d) 1254
(e) None of these

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S9. Ans.(a)
Sol. Let, the radius of cone be r cm.
Now, according to the question,
$\frac{1}{3}\times\frac{22}{7}\times r^2\times 24 = 1232$
$\therefore\ r^2 = \frac{1232\times 3\times 7}{22\times 24} = 49$
$\therefore r = \sqrt{49} = 7\ cm$
$\therefore$ Area of the curved surface $= \pi rl = \pi r\sqrt{h^2 + r^2}$
$= \frac{22}{7}\times 7\sqrt{24^2 + 7^2} = 22\times 25 = 550\ cm^2$

Q10. A semicircular sheet of metal of diameter 28 cm is bent into an open conical cup. The capacity of the cup (taking π=22/7) is:
(a) 624.26 cm^3
(b) 622.36 cm^3
(c) 625.56 cm^3
(d) 623.20 cm^3
(e) None of these

S10. Ans.(b)
Sol. If the radius of the base of cup be r cm, then $2\pi r = \pi\times 14$
$\Rightarrow r = 7$ cm
Slant height = 14 cm
$\therefore$ Height $= \sqrt{14^2 - 7^2} = \sqrt{21\times 7} = 7\sqrt{3}\ cm$
$\therefore$ Capacity of cup $= \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}\times\frac{22}{7}\times 7\times 7\times 7\sqrt{3} = 622.36\ cm^3.$