

# FOUNDATION

①

Class: VIII, MATHEMATICS

## 5. MENSURATION

### TEACHING TASK (JEE main)

01. Let 'a' be the dimensions of ~~new~~ cube

Dimensions of new cuboid

$$l = 3a, b = a, h = a$$

T.S.A. of new cuboid

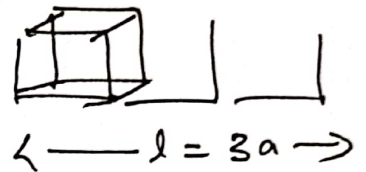
$$= 2(lb + bh + hl)$$

$$= 2(3a^2 + a^2 + 3a^2) = 14a^2$$

Sum of Surface areas of 3 cubes =  $3 \times 6a^2$

$$\therefore \text{Ratio} = \frac{14a^2}{3 \times 6a^2} = \frac{7}{9}$$

Ans: B



02.  $l = 3\text{cm}, b = 4\text{cm}, h = 5\text{cm}$

$$\text{length of the diagonal} = \sqrt{l^2 + b^2 + h^2}$$

$$= \sqrt{9 + 16 + 25}$$

$$= \sqrt{50} = 5\sqrt{2} \quad \text{Ans: B}$$

03.  $a = 5$

$$\text{T.S.A} = 6a^2 = 6 \times 5^2 = 150 \text{ cm}^2$$

Ans: D

04. Area of walls to be painted

$$= \text{Area of walls} - (\text{Area of 1 door} + \text{Area of 3 windows})$$

$$= 2 \times 4 \times (7 + 6.5) - (3 \times 1.4 + 3 \times 2 \times 1)$$

$$= 97.8 \text{ m}^2$$

$$\text{Total cost of 15 doors} = 15 \times 5.25 \times 97.8$$

$$= \text{Rs } 7702$$

Ans: B

05 Surface area of Tin =  $2(lb + bh + hl)$  (2)

$$= 2(30 \times 40 + 30 \times 50 + 40 \times 50)$$

$$= 9400 \text{ cm}^2$$

$$\text{Total Area (in } \text{m}^2) = 20 \times 9400 \text{ cm}^2$$

$$= 188000 \text{ cm}^2$$

$$\text{Total Area (in } \text{m}^2) = \frac{188000}{10000} \text{ m}^2$$

$$= 18.8 \text{ m}^2$$

$$\text{Total Cost} = 18.8 \times 20$$

$$= \text{Rs } 376$$

Ans: B

06 Cylinder

$$r = \frac{1.4}{2} = 0.7 \text{ m}$$

$$h = 2 \text{ m}$$

$$\text{Surface area} = 2\pi rh$$

$$= 2 \times \frac{22}{7} \times \frac{7}{10} \times 2 = \frac{88}{10}$$

$$\text{Area of 5 revolutions} = 5 \times \frac{88}{10} = 44 \text{ cm}^2$$

Ans: D

07 Cylinder

$$r = 7 \text{ cm}$$

$$h = 50 \times 0.5 = 25 \text{ cm}$$

$$\text{S.A} = 2\pi r(r+h)$$

$$= 2 \times \frac{22}{7} \times 7(7+25)$$

$$= 44 \times 32$$

$$= 1408 \text{ cm}^2$$

Ans: A

08 Difference in C.S.A = (3)

$$2\pi Rh - 2\pi rh = 44 \rightarrow (1)$$

Volume of metal used

$$\pi R^2 h - \pi r^2 h = 99 \rightarrow (2)$$

Given  $h = 14$

$$(1) \Rightarrow 2\pi h(R-r) = 44$$

$$\Rightarrow 2 \times \frac{22}{7} \times 14 \times (R-r) = 44$$

$$\Rightarrow R-r = 0.5 \rightarrow (3)$$

$$\pi h(R^2 - r^2) = 99$$

$$\Rightarrow \frac{22}{7} \times 14 (R^2 - r^2) = 99$$

$$\Rightarrow R^2 - r^2 = 2.25$$

$$\Rightarrow (R+r)(R-r) = 2.25$$

$$\Rightarrow (R+r)(0.5) = 2.25$$

$$\Rightarrow R+r = 4.5 \rightarrow (4)$$

Solving (3) & (4)

$$R = 2.5 \text{ cm}$$

$$r = 2 \text{ cm}$$

Ans: A

09. L.S.A of right Pyramid =  $\frac{1}{2} \times p \times l$

$$\Rightarrow 260 = \frac{1}{2} \times 40 \times l$$

$$\Rightarrow l = 13 \text{ cm}$$

Ans: C

10 Sphere

$$\text{radius} = \frac{21}{2} \text{ cm.}$$

$$\text{Surface area of 5 balls} = 5 \times 4\pi r^2$$

$$= 5 \times 4 \times \frac{22}{7} \times \frac{21}{2} \times \frac{21}{2}$$

$$= 6930 \text{ cm}^2$$

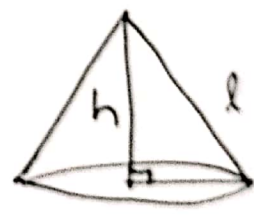
Ans: D

11. Let  $a$  be the edge of the cube. (4)  
 Given T.S.A =  $\frac{1}{2} \times \text{Volume}$   
 $\Rightarrow 6a^2 = \frac{1}{2} \times a^3$   
 $\Rightarrow 12 = a$  or  $a = 6 \times 2$  Ans: C, D

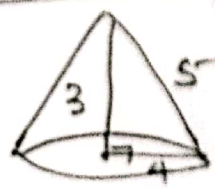
12. Base perimeter =  $4a$   
 $= 4 \times 4$   
 $= 16$  or  $\frac{32}{2}$  Ans: B, C, D

13. Statement I:  $2 \times \pi \times r = 44$   
 $\Rightarrow 2 \times \frac{22}{7} \times r = 44$   
 $\Rightarrow r = 7 \text{ cm}$   
 Surface area =  $4\pi r^2$   
 $= 4 \times \frac{22}{7} \times 7 \times 7 = 616 \text{ cm}^2$  (True)  
Statement II: Conceptual (True) Ans: A

14. Statement I: Conceptual (True)  
Statement II: Conceptual (True) Ans: A

15. Assertion: Conceptual (True)  
Reason: Conceptual (False)  
  $l > h$   
 Ans: C

16. Assertion: L.S.A of cube =  $4a^2$  (True)  
Reason: Conceptual (True) Ans: A

17.  Cone  $d = 8 \text{ m}$   
 $r = 4 \text{ m}$   
 $h = 3 \text{ m}$   
 $\therefore \text{slant height} = 5 \text{ m}$  Ans: B

18. C.S.A =  $\pi r l$   
 $= \frac{22}{7} \times 4 \times 5 = \frac{440}{7} = 62 \frac{6}{7}$  (5)  
Ans: A

19. Conceptual Ans: A

20. Conceptual Ans: A

21. Cylinder.  $r = 42 \text{ cm}, h = 120 \text{ cm}$   
 Area of play ground =  $500 \times \cancel{2\pi r h} \quad 2\pi r h$   
 $= 500 \times 2 \times \frac{22}{7} \times 42 \times 120$   
 $= 15,840,000 \text{ cm}^2$   
 $= 1584 \text{ m}^2$  Ans: 1584

22. TSA =  $2(lb + bh + hl)$   
 $= 2(15 \times 10 + 10 \times 5 + 5 \times 15)$   
 $= 2(275)$   
 $= 550 \text{ cm}^2$  Ans: 550

23. a)  $100 \text{ cm}^2 (r)$   
 b)  $1000000 \text{ m}^2 (p)$   
 c) ~~100~~  $100 \text{ mm}^2 (s)$   
 d)  $1000 \text{ cm}^2 (q)$  Ans: r, p, s, q

24. a) 6 (r)  
 b) 12 (t)  
 c) 8 (s)  
 d) rectangle (q) Ans: r, t, s, q

# LEARNERS TASK (CUES) (6)

|     |            |        |
|-----|------------|--------|
| 01. | Conceptual | Ans: C |
| 02  | Conceptual | Ans: B |
| 03  | Conceptual | Ans: C |
| 04. | Conceptual | Ans: D |
| 05  | Conceptual | Ans: B |
| 06  | Conceptual | Ans: B |
| 07  | Conceptual | Ans: C |
| 08  | conceptual | Ans: C |
| 09  | Conceptual | Ans: D |
| 10  | Conceptual | Ans: A |

## JEE MAINS

|     |                                                                                                                                                                                                                            |        |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 01. | Conceptual                                                                                                                                                                                                                 | Ans: C |
| 02  | 8                                                                                                                                                                                                                          | Ans: B |
| 03  | $\begin{aligned} \text{L.S.A} &= 2h(l+b) \\ &= 2 \times 5(10+8) \\ &= 180 \text{ cm}^2 \end{aligned}$                                                                                                                      | Ans: A |
| 04  | $\begin{aligned} 2(2b+bh+hl) &= 100 \\ 2(7 \times b + b \times 2 + 2 \times 7) &= 100 \\ \Rightarrow b &= 4 \text{ cm} \end{aligned}$                                                                                      | Ans: B |
| 05  | $\begin{aligned} 2\pi r &= 154 \Rightarrow r = \frac{49}{2}, \quad h=15 \\ \text{T.S.A} &= 2\pi r(r+h) \\ &= 2 \times \frac{22}{7} \times \frac{49}{2} \left( \frac{49}{2} + 15 \right) = 6083 \text{ cm}^2 \end{aligned}$ | Ans: C |

06 Conceptual

Ans. A

07 Hemisphere.  $r = 10 \text{ cm}$ 

$$\begin{aligned}
 \text{T.S.A} &= 3\pi r^2 \\
 &= 3 \times \frac{22}{7} \times (10)^2 \\
 &= 942.85
 \end{aligned}$$

Ans. B

08  $l = 60 \text{ cm}$ ,  $b = 40 \text{ cm}$ ,  $h = 30 \text{ cm}$ 

$$\begin{aligned}
 \text{T.S.A} &= 2(lb + bh + hl) \\
 &= 2(60 \times 40 + 40 \times 30 + 30 \times 60) \\
 &= 10800 \text{ cm}^2
 \end{aligned}$$

Cost:  $20 \text{ cm}^2 \rightarrow 50 \text{ paise}$ 

$$1 \text{ cm}^2 \rightarrow \frac{50}{20} \text{ paise}$$

$$10800 \text{ cm}^2 \rightarrow \frac{5}{2} \times 10800 \text{ paise}$$

$$= 27000 \text{ paise}$$

$$= \text{Rs } 270.$$

Ans. C

09. Cone \*Please, discard this problem

$$\cancel{\text{Hemisphere}} \quad \text{T.S.A} = 113\frac{1}{7} = \frac{792}{7} \text{ cm}^2$$

$$\Rightarrow \pi r(r+l) = \frac{792}{7}$$

$$\Rightarrow \frac{22}{7} r(r+l) = \frac{792}{7}$$

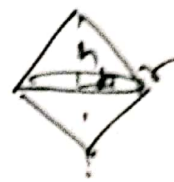
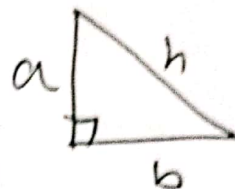
$$\Rightarrow r^2 + rl = 36$$

$$\Rightarrow r^2 + r\sqrt{r^2 + b^2}$$

10. Let  $a = 15 \text{ cm}$ ,  $b = 20 \text{ cm}$

$$h = \sqrt{a^2 + b^2}$$

$$= \sqrt{15^2 + 20^2} = 25$$



Now,  $\frac{1}{2} \times a \times b = \frac{1}{2} \times h \times r$

$$\Rightarrow 15 \times 20 = 25 \times r$$

$$\Rightarrow r = 12 \text{ cm}$$

$$S.A = \pi r (a + b)$$

$$= \frac{22}{7} \times 12 \times (15 + 20) = 1320 \text{ cm}^2$$

Ans: C

11.

$$4\pi r^2 = 154$$

$$\Rightarrow 4 \times \frac{22}{7} \times r^2 = 154$$

$$\Rightarrow r = \frac{7}{2} \text{ or } 3.5$$

Ans: C, D

12

Cube L.S.A =  $4a^2$ , T.S.A =  $6a^2$

$$\frac{\text{L.S.A}}{\text{T.S.A}} = \frac{4a^2}{6a^2} = \frac{2}{3} \text{ or } \frac{4}{6}$$

$$\text{T.S.A} = \frac{3}{2} \cdot \text{L.S.A} = 1.5 \cdot \text{L.S.A}$$

Ans: A, B, C

13. Statement I: Conceptual (True)

Statement II: Conceptual (True)

Ans: A

14.

Statement I: Conceptual (False)

Statement II: Conceptual (True)

Ans: D

15

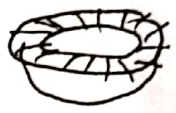
Assertion: Conceptual (True)

Reason: Conceptual (True)

Ans: A

16. Assertion: Conceptual (True) (9)  
Reason: Conceptual (True) Ans. A

17.  $r = 7\text{cm}, R = 10.5\text{cm}$   
External Surface Area  $= 2\pi R^2$   
 $= 2 \times \frac{22}{7} \times (10.5)^2$   
 $= 693\text{cm}^2$  Ans. B

18. Area of Ring  $= \pi(R^2 - r^2)$    
 $= \frac{22}{7} ((10.5)^2 - 7^2)$   
 $= \frac{22}{7} \times 17.5 \times 3.5$   
 $= 192.5\text{cm}^2$  Ans. A

19. Conceptual Ans. C

20 Conceptual Ans: A, C

21. Let the no. of bangles be  $n$ .  
Height of the cylinder  $= n \times 2\text{mm} = n \times 0.2\text{cm}$   
radius " "  $= 1.4\text{cm}$ .  
C.S.A  $= 2\pi rh = 572$   
 $\Rightarrow 2 \times \frac{22}{7} \times 1.4 \times n \times 0.2 = 572$   
 $\Rightarrow n = 325$  Ans 325

22. T.S.A  $= 4\pi r^2$   
 $= 4 \times \frac{22}{7} \times 7 \times 7 =$   
 $= 616$  Ans: 616

23

A) cube (r)

B) cylinder (s)

C) pyramid (q)

D) Cone (p)

(10)

24 A) L.S.A prism = perimeter of the base  $\times$  height  
 $= 25 \times 10$   
 $= 250 \text{ cm}^2 (P)$

B) Area =  $2 \times 30 = 60 \text{ cm}^2 (q)$

C) T.S.A = ~~surface~~  
 Base perimeter = 25  
 $5 \times a = 25$

$\Rightarrow a = 5 \text{ cm}$

= side of pentagonal Prism =  $a = 5 \text{ cm}$   
 Height " " =  $h = 10 \text{ cm}$

Area of each rectangle =  $l \times b = 5 \times 10 = 50 \text{ cm}^2$

Q L.S.A =  $5 \times 50 = 250 \text{ cm}^2$

$\therefore$  T.S.A = L.S.A +  $2 \times$  Base area  
 $= 250 + 2 \times 30 = 250 + 60 = 310 \text{ cm}^2 (r)$

d) No. of faces =  $5 + 2 = 7 (s)$

Ans: P, q, r, s

 $\Rightarrow$  THE END  $\Leftarrow$ 