

## SEE CAPSULE-2082

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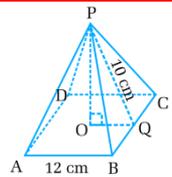
(Compulsory Mathematics)

## DAY-3

SEE Q. No. 5

1. In the adjoining square based pyramid,  $AB = 12$  cm and  $PQ = 10$  cm.

- (a) What does PQ represent? [1K]  
 (b) Find the volume of the pyramid. [3A]  
 (c) Will Rs 200 be enough to colour the total surface of pyramid at the rate of 50 paisa per square cm? [2A]



**Ans:** (a) Slant height (b)  $384 \text{ cm}^3$  (c) Yes

2. A hotel is planning to manage a tent with a shape of a square based pyramid for a group of tourists from or foreign country in which, the length of each side of base is 16 m and height is 15 m.

- (a) How many triangular surfaces are there in a square based pyramid? [1K]  
 (b) Find the cost of canvas required to make the tent at the rate of Rs 500 per sq. m. [3A]  
 (c) If a tourist need 20 cubic metre of air to accommodate in the tent, how many maximum numbers of tourists can be adjusted in the tent? Find it. [2HA]

**Ans:** (a) 3 (b) Rs 2,72,000 (c) 64

3. The height of a square based pyramid is 12 cm and its area of base is  $100 \text{ cm}^2$ .

- (a) Write the relation among base area (A), height (h) and volume (v) of the pyramid. [1K]  
 (b) Find the volume of the pyramid. [1U]  
 (c) Compare the base area and the area of triangular surfaces. [2HA]

**Ans:** (a)  $V = \frac{1}{3} A \times h$  (b)  $400 \text{ cm}^3$  (c) 5: 13

4. The volume of a metallic square based pyramid is 384 cubic centimeters and the length of the side of base is 12 centimeters.

- (a) What is the formula to find the lateral surface area of a square based pyramid? [1K]  
 (b) Find the cost of colouring the surfaces of the pyramid at the rate of Rs. 5 per  $8 \text{ cm}^2$ . [3A]  
 (c) If the pyramid is melted and recast into another square based pyramid of height 18 cm, what would be its length of base? [1HA]

**Ans:** (a)  $2al$  (b) Rs. 240 (c) 8 cm

5. The lateral surface area of a square based pyramid, with the length each side of base 6 cm, is  $60 \text{ cm}^2$ .

- (a) Define square based pyramid. [1K]  
 (b) Find the volume of the pyramid. [3A]  
 (c) By what percent is the total surface area of the pyramid more than its lateral surface area? [2HA]

**Ans:** (b)  $48 \text{ cm}^3$  (c) 60%

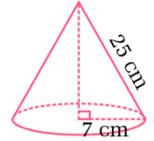
6. The total surface area of an aquarium in the shape of square based pyramid is 864 sq. inch and its slant height is 15 inch.

- (a) Write the formula to find the total surface area of a square based pyramid having 'length of each side of base 'a' units and slant height 'l' units? [1K]  
 (b) Find the length of each side of base of the aquarium. [2U]  
 (c) Find the area of triangular surface area of the aquarium. [2A]

**Ans:** (a)  $TSA = a^2 + 2al$  (b) 18 inch (c) 540 sq. inch

7. In a right circular cone, radius of base is 7 cm and its slant height is 25 cm.

- (a) Write the formula to find the curved surface area of a cone. [1K]  
 (b) Find the measure of its height. [1U]  
 (c) How much minimum cloth is required to cover its whole surfaces? [2A]



**Ans:** (a)  $CSA = \pi rl$  (b) 24 cm (c)  $704 \text{ cm}^2$

8. The total surface area and curved surface area of a cone are  $1320 \text{ cm}^2$  and  $704 \text{ cm}^2$ .

- (a) How many surfaces are there in a cone? [1K]  
 (b) Find the radius of base of the cone. [2A]  
 (c) Find the circumference of its base. [2U]

**Ans:** (a) 2 (b) 14 cm (c) 88 cm

9. The sum of radius of base and slant height of a cone is 64 cm and its total surface area is  $2816 \text{ cm}^2$ .

- (a) Write the formula to find the total surface area of a cone. [1K]  
 (b) Find the curved surface area of the cone. [3A]  
 (c) Gita said that the volume of the cone is above  $9000 \text{ cm}^3$ . Evaluate her statement. [2HA]

**Ans:** (a)  $TSA = \pi r(r + l)$  (b)  $2200 \text{ cm}^2$

10. A student studying in class 10 has prepared a cone made of wood as a task of his project work. The area of base and slant height of the cone are  $154 \text{ m}^2$  and 25 m respectively.

- (a) Write the relationship between slant height 'l', radius 'r' and height 'h' of a cone. [1K]  
 (b) Find the diameter of the cone. [2U]  
 (c) How much does it cost to color the surface of the cone excluding the base at the rate of Rs. 1.50 per square cm? [3A]

**Ans:** (a)  $l^2 = r^2 + h^2$  (b) 14 cm (c) Rs 825

11. A wooden conical toy has base diameter 14 cm. It costs Rs. 880 to color its whole surface at the rate of Rs. 1.25 per square cm.

- (a) Express slant height 'l' in terms of radius 'r' and height 'h' of a cone. [1K]  
 (b) Find the total surface area of the cone. [1U]  
 (c) Find the volume of the toy. [3A]

**Ans:** (a)  $l = \sqrt{r^2 + h^2}$  (b)  $704 \text{ cm}^2$  (c)  $1232 \text{ cm}^3$

12. The height of a conical pot is 20 cm and the radius of its base is 21 cm.

- (a) Write the type of triangle POQ. [1K]  
 (b) Find the curved surface area of the cone. [2A]  
 (c) If the pot is filled with water and two smaller solid cones with equal dimensions are immersed into the pot, one third of water is displaced out, find the volume of each cone immersed in the pot. [2HA]

**Ans:** (a) right angled triangle (b)  $1914 \text{ cm}^3$  (c)  $1540 \text{ cm}^3$

13. The height and slant height of a cone are in the ratio of 24: 25. The curved surface area of the cone is  $2200 \text{ cm}^2$ .

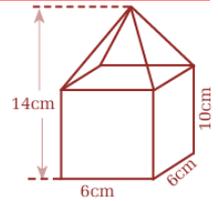
- (d) Write the formula for calculating the curved surface area of a cone. [1K]  
 (e) Find the volume of the cone. [3A]  
 (f) Compare the circumference and height of the cone. [1HA]

**Ans:** (a)  $\pi rl$  (b)  $9856 \text{ cm}^3$  (c) 11: 6

## SEE Q. No. 6

1. A solid is composed up of a square based pyramid and a cuboid of equal side length.

- (a) How many surfaces are there in the solid? [1K]  
 (b) Find the total surface area of the solid. [3A]  
 (c) The volume of cuboidal part is 15 times the volume of such 2 pyramidal parts. Justify it. [2HA]



**Ans:** (a) 9 (b)  $336 \text{ cm}^2$

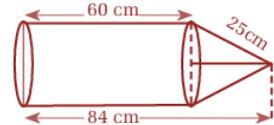
2. The gate of a stadium has two pillars, each of height is 8 ft. with four visible lateral faces and 6 ft.  $\times$  6 ft. bases. The top of each pillar has a combined pyramid of height 4 feet.

- (a) How many faces are visible in each combined structure? [1K]  
 (b) Find the area of visible surfaces of both the structures. [3A]  
 (c) Will Rs 37,000 be sufficient to paint the surfaces of both the combined structures of both pillars and pyramids at the rate of Rs 75 per sq. ft.? [1HA]

**Ans:** (a) 8 (b)  $504 \text{ ft}^2$  (c) No

3. A pencil shaped object composed up of a cylinder and a cone is given alongside.

- (a) Write the formula for calculating the curved surface area of a cone. [1K]  
 (b) Find the total surface area of the pencil. [3A]  
 (c) By how many times is the volume of cylindrical part of the object more than the volume of conical part? [2HA]



**Ans:** (a)  $\pi r l$  (b)  $3344 \text{ cm}^2$  (c) 7.5 times

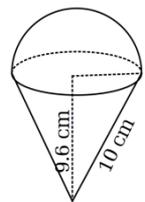
4. The given solid is made up of a cylinder and a cone having equal radius and the volume of the solid is  $5,544 \text{ cm}^3$ . The total length of the solid is 52 cm and the length of cylindrical part is 28 cm.

- (a) Write the formula to find the volume of combined solid. [1K]  
 (b) Find the radius of the base of the solid. [3A]  
 (c) Find curved surface area of cylindrical part. [2A]

**Ans:** (a)  $\pi r^2 \left( h_1 + \frac{h_2}{3} \right)$  (b) 7 cm (c)  $1232 \text{ cm}^2$

5. In the figure, a cone is filled with ice-cream making hemispherical top. The vertical and slant heights of the conical part are 9.6 cm and 10 cm respectively.

- (a) Write the relation among the height (h), radius (r) and slant height (l) of the cone. [1K]  
 (b) Find the volume of ice-cream in conical and hemi-spherical parts. [2A]  
 (c) Compare the quantities of ice-cream in the conical and hemi-spherical parts. [1HA]



**Ans:** (a)  $h^2 + r^2 = l^2$  (b)  $124.84 \text{ cm}^3$  (c)  $32.9 \text{ cm}^3$

6. In a tank, the lowermost part is cylindrical and the uppermost part is hemispherical. The radius of both parts is the same. The total internal height of the tank is 4 m and the internal height of the cylindrical part is 2.95 m.

- (a) Write the formula to find the curved surface area of a cylinder. [1K]  
 (b) Find the total cost of filling the tank at the rate of Rs. 20 per 15 litres. [3A]  
 (c) If the tank completely filled with water is poured into a cylindrical tank of internal radius 2 m, what would the height of the water level in the second tank? [1HA]

**Ans:** (a)  $2\pi r h$  (b) Rs. 16,863 (c) 1.006 m

7. A solid cone is surmounted by a hemisphere of same radius. The common radius is 7 cm. The total cost to color the object is Rs. 1716 at the rate of Rs. 2 per square cm.

- (a) Write the relation among the surface areas to be colored (A), rate of colouring (R) and the total cost of colouring (T). [1K]  
 (b) Find the total surface area of the combined solid. [1U]  
 (c) Calculate the volume of the conical part. [3A]  
 (d) Compare the the volume of conical part and hemispherical part. [1HA]

**Ans:** (a)  $T = A \times R$  (b)  $858 \text{ cm}^2$  (c)  $1232 \text{ cm}^3$  (d)  $513.33 \text{ cm}^3$  or 12: 7

8. **A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. When the bucket is emptied on the ground and a conical heap of sand is formed with height 24 cm.**

- (a) Write the relation between the volume of cement in the cylindrical bucket and the volume of the cement in the conical pile. [1K]  
 (b) Find the radius of the conical shaped heap of cement. [2U]  
 (c) Find the cost of plastic required to cover the conical pile of the cement at the rate of Rs 500 per sq. meter. [2HA]

**Ans:** (b) 36 cm (c) Rs. 244.77

### SEE Q. No. 7

1. **The length, breadth and height of a rectangular room are 15 feet, 12 feet, and 10 feet respectively. There are 2 square windows of edge 3 feet and a door of size 6 feet  $\times$  3 feet in the room.**

- (a) Find the cost of painting the four walls and ceiling of the room excluding doors and windows at the rate of Rs. 50 per square feet? [3A]  
 (b) How much the total cost will increase to paint on same part if the cost of painting per square meter is increased by one third of what it was before due to the increase in the market price? [2HA]

**Ans:** (a) Rs. 34,200 (b) Rs. 11,400

2. **The volume and height of a square based room are  $224 \text{ m}^3$  and 3.5 m. respectively. The area occupied by a door and two windows in the room is 6 sq. m.**

- (a) Find the total cost of plastering the four walls at the rate of Rs. 150 per sq. meter. [3A]  
 (b) If the rate of plastering per square meter is increased by one-third, then what will be the increment in the total cost of plastering the walls? [2HA]

**Ans:** (a) Rs. 15,900 (b) Rs. 5,300

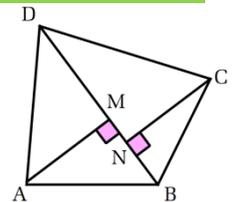
3. **The inner length, breadth and height of a rectangular tank made for drinking water by two families are 3 m, 1.5 m and 1.6 m respectively.**

- (a) Calculate the total cost of coloring the inner four walls of the tank at the rate of Rs. 100 per 3 square meters. [3A]  
 (b) If 2 families pay equal amounts for consuming water from a full tank, how much will one family have to pay at the rate of Rs 50 per 100 liters? [2HA]

**Ans:** (a) Rs. 480 (b) Rs. 1800

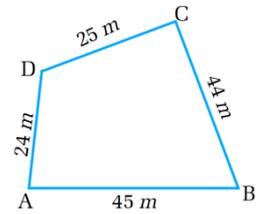
4. **The given figure, ABCD is a quadrilateral shaped land. The length between the corners B and D is 200 m. The length of perpendiculars drawn from the corners A and C to the diagonal BD are  $AM = 100 \text{ m}$  and  $CN = 120 \text{ m}$  respectively.**

- (a) Write the formula to find the area of quadrilateral. [1K]  
 (b) Find the area of the land. [1U]  
 (c) If 3 male workers can finish the work of labeling the ground in 2 days and he receives wage at the rate of Rs 1500 per day. Then, 5 female workers complete planting paddy on it in 2 days and at the rate of Rs. 0.5 per square meter. Find the total cost of plantation. [2A]



**Ans:** (a)  $A = \frac{1}{2} d(p_1 + p_2)$  (b)  $22000 \text{ m}^2$  (c) Rs 20,000

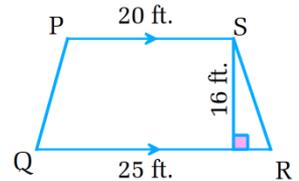
5. The figure given aside is a garden which is on the right side of a newly constructed temple. The management committee of temple has decided to fence 5 rounds around the temple with barbed wire. It can be completed by 3 workers in 2 days. The cost of wire per meter is Rs. 80 and the wage per worker per day is Rs. 1500.



- (a) What is the perimeter of the garden? [1U]  
 (b) Find the length of wire required for fencing the garden. [1U]  
 (c) Calculate the total cost of fencing the garden including the wages to the worker. [2A]

**Ans:** (a)  $A = \frac{1}{2} d(p_1 + p_2)$  (b) 690 m (c) Rs 64,200

6. The parking area outside the National Insurance Company Limited Nepal is in geometric shape as shown in the figure. It is planning to pave the area with bricks. A brick occupies the area of  $0.2 \text{ ft}^2$  and the cost of brick per piece is Rs. 15.



- (a) Find the area of the parking land.  
 (b) How many bricks are needed to pave the whole parking area?  
 (c) If 2 workers can complete the work of paving bricks in 3 days and the wage of a worker per day is Rs. 1200, how much does it cost to pave the bricks including the cost of bricks?

**Ans:** (a) 88 sq. ft. (b) 1800 (c) Rs. 34,200

7. A pyramid shaped tent is formed using 8 equal triangular shaped pieces of canvas and the lengths of sides of each triangular piece of canvas are 10 m, 12 m and 12 m.

- (a) Write the formula to find the area of isosceles triangle having length of each equal side 'a' m and base 'b' m? [1K]  
 (b) Find the area of a piece of a canvas. [1U]  
 (c) If the cost of canvas per square meter is Rs. 500, find the total cost for the construction of the tent. [2A]

**Ans:** (a)  $\frac{b}{4} \sqrt{4a^2 - b^2}$  (b)  $48 \text{ m}^2$  (c) Rs. 1,92,000

8. 60 concrete rings each of diameter 3.5 ft and height 1 ft. are used to construct a well. The cost of a ring is Rs. 1200. 2 workers can complete the work of keeping rings in 5 days and the wage of 1 worker is Rs. 1500 per day. (1 cubic foot = 28.317 liters)

- (a) What is the cost of the rings only? [1U]  
 (b) How much does it cost to construct the well? [1A]  
 (c) Find the maximum amount of water that can be filled in the well. [2A]  
 (d) If the water level is seen at the 40<sup>th</sup> ring, how many liters of water is needed to fill the well completely? [2HA]

**Ans:** (a) Rs 72,000 (b) Rs 87,000 (c) 16350.5 l (d) 5,848.47 l

9. A pyramid shaped tent is formed using 8 equal triangular shaped pieces of canvas and the lengths of sides of each triangular piece of canvas are 10 m, 12 m and 12 m.

- (a) Write the formula to find the area of isosceles triangle having length of each equal side 'a' m and base 'b' m? [1K]  
 (b) Find the area of a piece of a canvas. [1U]  
 (c) If the cost of canvas per square meter is Rs. 500, find the total cost for the construction of the tent. [2A]

**Ans:** (a)  $\frac{b}{4} \sqrt{4a^2 - b^2}$  (b)  $48 \text{ m}^2$  (c) Rs. 1,92,000