SUBJECT: GEOMETRY   PAPER NO.: 001

Time : 2 Hours   Max. Marks: 40

Note:-

(i) All questions are compulsory

(ii) Use of a calculator is not allowed.

(iii) The numbers to the right of the questions indicate full marks.

(iv) In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.

(v) For every MCQ, four alternatives (A), (B), (C), (D) of answers are given. Alternative of correct answer is to be written in front of the sub question number.

Q.1. (A) Four alternative answers are given for every sub question. Select the correct alternative and write the alphabet of that answer: 4

1. If a, b, c are sides of a triangle and $a^2 + b^2 = c^2$, name the type of triangle:

(A) Obtuse angled triangle

(B) Acute angled triangle

(C) Right angled triangle

(D) Equilateral triangle

2. Chords AB and CD of a circle intersect inside the circle at point E. If $AE = 4$, $EB = 10$, $CE = 8$, then find ED:

(A) 7

(B) 5

(C) 8

(D) 9

(3) Co-ordinates of origin are

(A) (0,0

(B) (O, 1)

(C) (0,0)

(D) (1,1)

(4) If radius of the base of cone is 7 cm and height is 24 cm, then find its slant height

(A) 23 cm

(B) 26 cm

(C) 31cm

(D) 25 cm

(B) Solve the following sub-questions : 4

(1) If $\Delta ABC \sim \Delta PQR$ and , $A(\Delta ABC)/A(\Delta PQR) = \frac{16}{25}$ then find AB: PQ

(2)In $\Delta RST, \angle S = 90°, \angle T = 30"$ $RT = 12$ cm then find RS.

(3)If radius of a circle is 5 cm, then find the length of longest chord of a circ1e

(4)Find the distance between the points O(0,0)and P(3,4)

Q.2. (A) Complete the following activities (any two): 4

(1) Find the total surface area of frustum, if its radii are 15 cm and 7 cm. Also, the slant height of the frustum is 14 cm.

Radii of the frustum =$\square$cm and $\square$cm

Slant height of the frustum = $\square$cm

$Total\ surface\ area\ = \pi[(r_1^2 + r_2^2 + (r_1 + r_2)l]$

$= \frac{22}{7}[\square + \square + (\square + \square)\square]$

$= \frac{22}{7}(\square)$

$=\square cm^2$

Hence, the total surface area of the frustum is $\square$

(2) $Show\ that, cot\theta + tan\theta\ =\ cosec\theta \times sec\theta$

Solution:

$L.H.S. =\ cot\theta\ +\ tan\theta$

$$= \frac{cos\theta}{sin\theta} + \frac{sin\theta}{cos\theta}$$

$$= \frac{\square + \square}{(sin\theta \times cos\theta)}$$

$$= \frac{1}{sin\theta\ \times cos\theta} \quad \dots\dots\dots\dots\dots\dots \boxed{}$$

$$= \frac{1}{Sin\theta} \times \frac{1}{\square}$$

$$= cosec\theta\ \times sec\theta$$

L.H.S.= R.H.S.

$\therefore cot\theta + tan\theta\ =\ cosec\theta \times sec\theta$

(3) Find the surface area of a sphere of radius 7 cm

Solution:

$surface\ area\ of\ the\ sphere = 4\pi r^2$

$$= 4 \times \frac{22}{7} \times \square\text{^}2$$

$$= 4 \times \frac{22}{7} \times \square$$

$$= \square \times 7$$

Surface area of the sphere = $\square$ sq.cm

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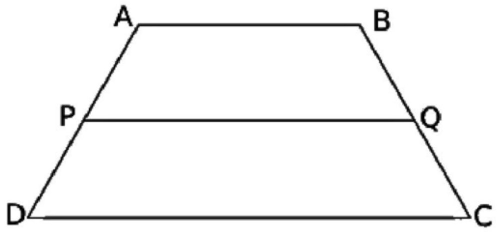
(B) Solve the following sub questions (Any four) 8

(1) In trapezium ABCD, side AB || side PQ || side DC, AP = 15, PD = 12, QC = 14, Find BQ.



(2) Find the length diagonal of a rectangle whose length is 35 cm and breadth is 12 cm.

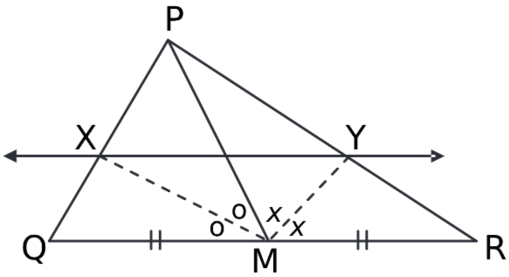
(3) A person is standing at a distance of 50 m from a temple looking at its top. The angle of elevation is 45°. Find the height of the temple.

(4) $\frac{(\tan^3 \theta)}{(\tan\theta - 1)} = \sec^2 \theta + \tan\theta$

(5) A washing tub in the shape of a frustum of a cone has height 21 cm. The radii of the circular top and bottom are 20 cm and 15 cm respectively. What is the capacityof the tub ? ($\pi = \frac{22}{7}$)

Q.3. (A) Complete the following activities (any one): 3

(1)



In △PQR, seg PM is a median. Angle bisectors of ∠PMQ and ∠PMR intersect side PQ and side PR in points X and Y respectively. Prove that XY || QR. Complete the proof by filling in the boxes.

Solution:

In ΔPMQ,

Ray MX is the bisector of ∠PMQ.

$\therefore \frac{MP}{MQ} = \frac{\square}{\square}$ ....(I) [Theorem of angle bisector]

Similarly, in ΔPMR, Ray MY is the bisector of ∠PMR.

$\therefore \frac{MP}{MR} = \frac{\square}{\square}$ ....(II) [Theorem of angle bisector]

But $\frac{MP}{MQ} = \frac{MP}{MR}$ ....(III) [As M is the midpoint of QR.]

Hence MQ = MR

$\therefore \frac{PX}{\square} = \frac{\square}{YR}$ ....[From (I), (II) and (III)]

$\therefore$ XY || QR ....[Converse of basic proportionality theorem]

(2) The circumferences of circular faces of a frustum are 132 cm and 88 cm and its height is 24 cm. To find the curved surface area of the frustum complete the following activity. ($\pi = 22/7$)

circumference$_1$ = $2\pi r_1 = 132$

$$r_1 = \frac{132}{2\pi} = \boxed{}$$

circumference$_2$ = $2\pi r_2 = 88$

$$r_2 = \frac{88}{2\pi} = \boxed{}$$

slant height of frustum, $l = \sqrt{h^2 + (r_1 - r_2)^2}$

$$= \sqrt{\boxed{}^2 + \boxed{}^2}$$

$$= \boxed{} \text{ cm}$$

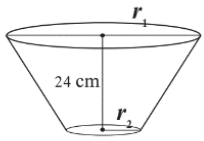


Fig. 7.23

(B) Solve the following sub-questions (any two): 6

(1) In △ABC, seg AP is a median. If BC = 18, $AB^2 + AC^2 = 260$, find AP.

(2) Draw a circle of radius 3.3 cm Draw a chord PQ of length 6.6 cm. Draw tangents to the circle at points P and Q. Write your observation about the tangents.

(3) The radii of ends of a frustum are 14 cm and 6 cm respectively and its height is 6 cm. Find its (π=3.14)

i) curved surface area ii) total surface area. iii) volume

(4) Draw ΔRSP ~ ΔTQP. In ΔTQP, TP = 5 cm, ∠P = 50°, PQ = 4.5 cm and $RS/TQ = 2/3$

Q.4. Solve the following sub-questions (any two): 8

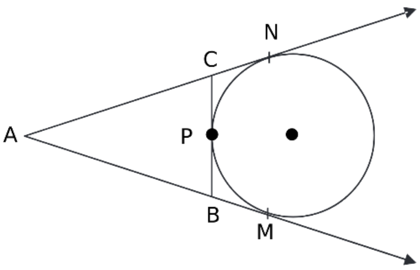
(1) In △ABC, seg DE || side BC. If 2A (△ADE) = A (□ DBCE), find AB : AD and show that $BC = \sqrt{3}DE$.

(2) △SHR ~ △SVU. In △SHR, SH = 4.5 cm, HR = 5.2 cm, SR = 5.8 cm and $\frac{SH}{SV} = \frac{3}{5}$,construct △SVU.

(3) An ice cream pot has a right circular cylindrical shape. The radius of the base is 12 cm and the height is 7 cm. This pot is completely filled with ice cream. The entire ice cream is given to the students in the form of right circular ice cream cones, having a diameter of 4 cm and a height is 3.5 cm. If each student is given one cone, how many students can be served?

Q.5. Solve the following sub-questions (any one): 3

(1) A circle touches side BC at point P of the ΔABC, from outside of the triangle. Further extended lines AC and AB are tangents to the circle at N and M respectively. Prove that : AM =$\frac{1}{2}$ (Perimeter of ΔABC)



(2) Eliminate θ if x = rcosθ and y = rsinθ.