

MT

2017 ____ 1100

Seat No.

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MT - GEOMETRY - SEMI PRELIM - II : PAPER - 6

Time : 2 Hours

(Pages 4)

Max. Marks : 40

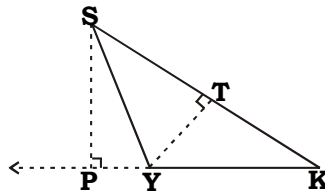
Note :

- (i) All questions are compulsory.
- (ii) Use of calculator is not allowed.

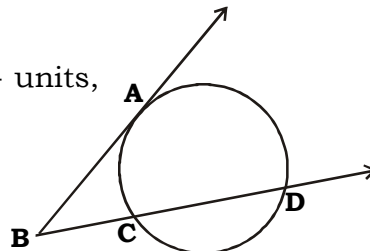
Q.1. Solve ANY FIVE of the following :

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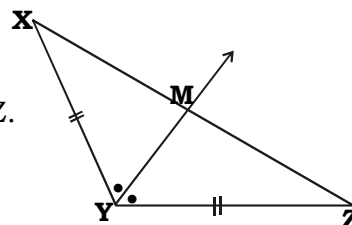
- (i) In the adjoining figure,
 seg $SP \perp$ side YK and
 seg $YT \perp$ seg SK .
 If $SP = 6$, $YK = 13$, $YT = 5$
 and $TK = 12$ then find :
 $A(\Delta SYK) : A(\Delta YTK)$.



- (ii) Line AB is a tangent and line BCD is a secant. If $AB = 6$ units, $BC = 4$ units, find BD .



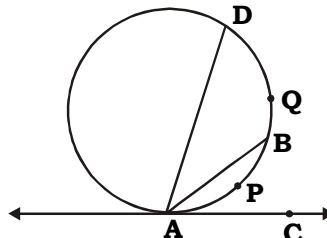
- (iii) Using Euler's formula, find F , if $V = 6$ and $E = 12$.
- (iv) If two circles touch externally then show that the distance between their centres is equal to the sum of their radii.
- (v) Ray YM is the angle bisector of $\angle XYZ$, where $XY = YZ$. Find the relation between XM and MZ .



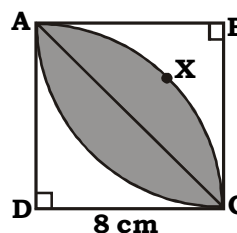
- (vi) The dimensions of a cuboid are $3 \text{ cm} \times 9 \text{ cm} \times x \text{ cm}$. The volume of this cuboid is equal to the volume of a cube with side 6 cm . What is the value of x ?

Q.2. Solve ANY FOUR of the following :

- (i) In the adjoining figure, seg AB and seg AD are chords of the circle. C be a point on tangent to the circle at point A. If $m(\text{arc APB}) = 80^\circ$ and $\angle BAD = 30^\circ$, then find (a) $\angle BAC$ (b) $m(\text{arc BQD})$

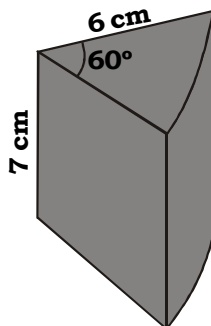


- (ii) Calculate the area of the shaded region in the adjoining figure where $\square ABCD$ is a square with side 8 cm each. ($f = 3.14$)

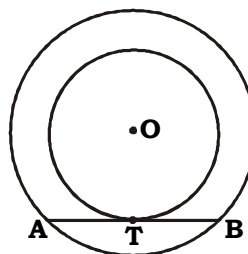


- (iii) D is a point on side BC of $\triangle ABC$ such that $\angle ADC = \angle BAC$. Show that $AC^2 = BC \times DC$.

- (iv) A piece of cheese is cut in the shape of the sector of a circle of radius 6 cm. The thickness of the cheese is 7 cm. Find the curved surface area of the cheese.



- (v)
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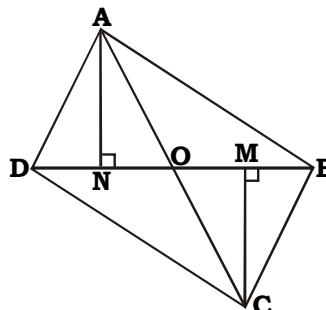


..... $\triangle PQR$, seg PM is the median. If $PM = 9$ and $PQ^2 + PR^2 = 290$. Find QR.

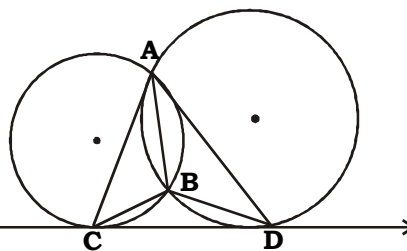
Q.3. Solve ANY THREE of the following :

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- (i) In the adjoining figure, $\triangle ADB$ and $\triangle CDB$ have the same base DB . If AC and BD intersect at O then prove that $\frac{A(\triangle ADB)}{A(\triangle CDB)} = \frac{AO}{CO}$.



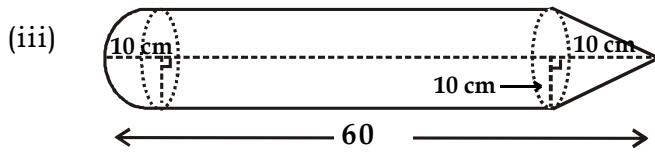
- (ii) An oil funnel of tin sheet consists of a cylindrical portion 10 cm long attached to a frustum of a cone. If radius of the top and bottom of the frustum is 9 cm and 4 cm respectively and the slant height of the frustum of cone is 13 cm. Find the surface area of the tin required to make the funnel. (Express your answer in terms of π)
- (iii) If the chord AB of a circle is parallel to the tangent at C , then prove that $AC = BC$.
- (iv) Triangle ABC has sides of length 5, 6 and 7 units while $\triangle PQR$ has perimeter of 360 units. If $\triangle ABC$ is similar to $\triangle PQR$ then find the sides of $\triangle PQR$.
- (v) Two circles intersect each other at A and B . Let DC be a common tangent touching the circle C and D .
Prove that $\angle CAD + \angle CBD = 180^\circ$.



Q.4. Solve ANY TWO of the following :

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- (i) Prove that : The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides.
- (ii) Prove that : The opposite angles of a cyclic quadrilateral are supplementary.



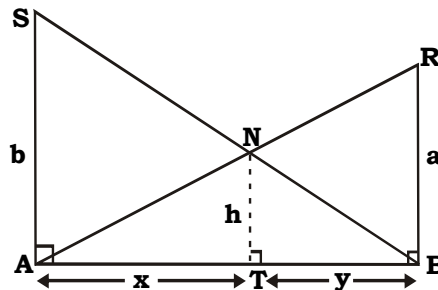
A toy is a combination of a cylinder, hemisphere and a cone, each with radius 10cm. Height of the conical part is 10 cm and total height is 60cm. Find the total surface area of the toy.

($\pi = 3.14, \sqrt{2} = 1.41$)

Q.5. Solve ANY TWO of the following :

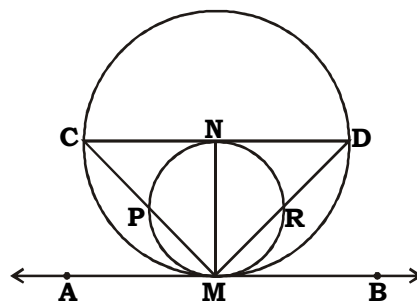
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- (i) Two poles of height 'a' meters and 'b' meters are 'p' meters apart. Prove that the height 'h' drawn from of the point of intersection N of the lines joining the top of each pole to the foot of the opposite pole is $\frac{ab}{a + b}$ meters.



- (ii) Marbles of diameter 1.4 cm are dropped into a beaker containing some water and are fully submerged. The diameter of the beaker is 7 cm. Find how many marbles have been dropped in it if the water rises by 5.6 cm.

- (iii) Let M be a point of contact of two internally touching circles. Let line AMB be their common tangent. The chord CD of the bigger circle touches the smaller circle at point N and chord CM and chord DM of bigger circle intersect smaller circle at the points P and R respectively. Prove that $\angle CMN \cong \angle DMN$.



Best Of Luck 🍀