

MT

2017 ____ 1100

Seat No.

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MT - GEOMETRY - SEMI PRELIM - II : PAPER - 2

Time : 2 Hours

(Pages 4)

Max. Marks : 40

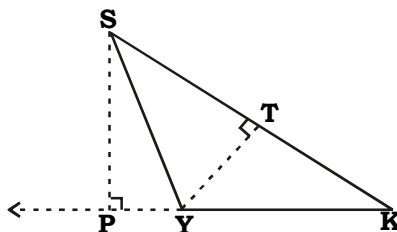
Note :

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

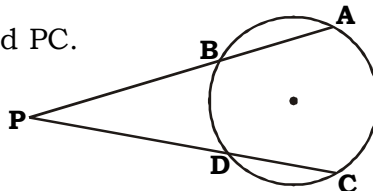
Q.1. Solve ANY FIVE of the following :

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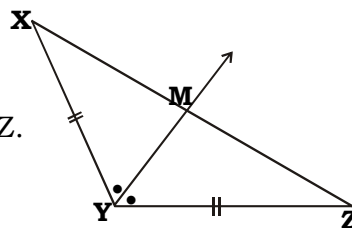
- (i) In the adjoining figure,
seg $SP \perp$ side YK and
seg $YT \perp$ seg SK .
If $SP = 6$, $YK = 13$, $YT = 5$
and $TK = 12$ then find :
 $A(\Delta SYK) : A(\Delta YTK)$.



- (ii) If $PB = 3$, $PD = 4$, $PA = 6$, find PC .



- (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 .

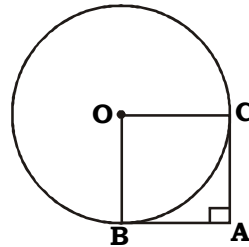


- (vi) The dimensions of a cuboid are $3 \text{ cm} \times 9 \text{ cm} \times x \text{ cm}$. The volume of this cuboid is equal to the volume of a cube with side 6 cm . What is the value of x ?

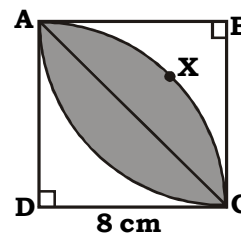
Q.2. Solve ANY FOUR of the following :

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- (i) In the adjoining figure, AB and AC are tangents drawn from A, and $BA \perp CA$. Prove that $\square BACO$ is a square.

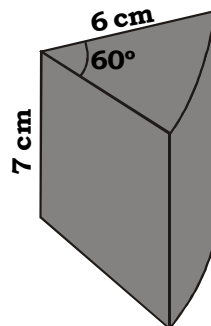


- (ii) Calculate the area of the shaded region in the adjoining figure where $\square ABCD$ is a square with side 8 cm each. ($f = 3.14$)

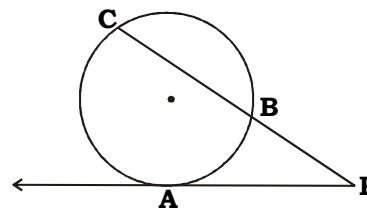


- (iii) $16\sqrt{2}$ cm.

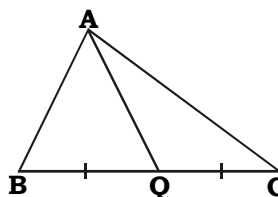
- (iv) A piece of cheese is cut in the shape of the sector of a circle of radius 6 cm. The thickness of the cheese is 7 cm. Find the curved surface area of the cheese.



- (v) In the adjoining figure, a tangent segment PA touching a circle at A and a secant PBC are shown. If $AP = 15$ and $BP = 10$, find BC.



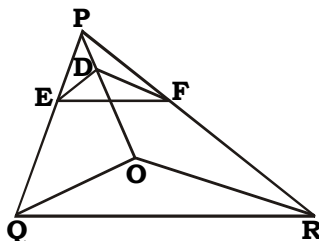
- (vi) In the adjoining figure, $AB^2 + AC^2 = 122$, $BC = 10$. Find the length of the median on side BC.



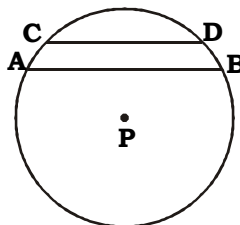
Q.3. Solve ANY THREE of the following :

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- (i) In the adjoining figure,
 seg ED \parallel seg QO and
 seg DF \parallel seg OR.
 Prove that seg EF \parallel side QR.



- (ii) A 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) Suppose AB and AC are equal chords of a circle and a line parallel to the tangent at A intersects the chords at D and E. Prove that AD = AE.
- (iv) Prove that three times the square of any side of an equilateral triangle is equal to four times the square of an altitude.
- (v) In the adjoining figure,
 two chords AB and CD
 of the same circle are parallel
 to each other. P is the centre
 of the circle.
 Prove : $m \angle CPA = m \angle DPB$.



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.
- (iii) An ink container of cylindrical shape is filled with ink upto 91%. Ball pen refills of length 12 cm and inner diameter 2 mm are filled upto 84%. If the height and radius of the ink container are 14 cm and 6 cm respectively, find the number of refills that can be filled with this ink.

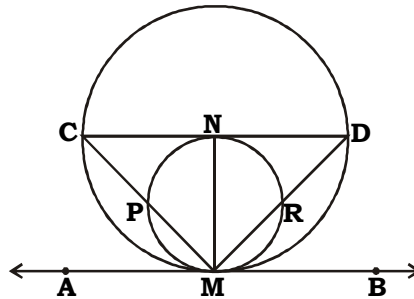
Q.5. Solve ANY TWO of the following :

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(i) In $\triangle ABC$, PQ is a line segment intersecting AB at P and AC at Q such that $PQ \parallel BC$. If PQ divides $\triangle ABC$ into two equal parts, means equal in area, find $\frac{BP}{AB}$.

(ii) A semi-circular sheet of metal of diameter 28 cm is bent into an open conical cup. Find the depth and capacity of cup. ($\sqrt{3} = 1.73$)

(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 🍀