

# MT

2017 \_\_\_\_ 1100

Seat No. 

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## MT - GEOMETRY - SEMI PRELIM - II : PAPER - 5

Time : 2 Hours

(Pages 4)

Max. Marks : 40

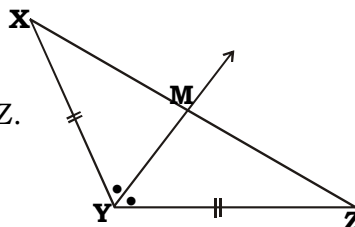
### Note :

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

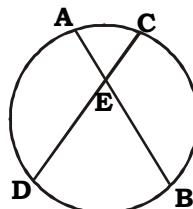
### Q.1. Solve ANY FIVE of the following :

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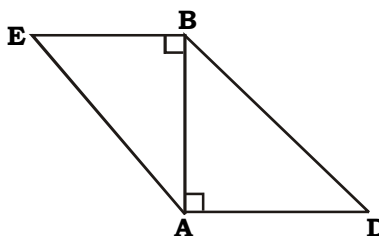
- (i) Ray YM is the angle bisector of  $\angle XYZ$ , where  $XY = YZ$ . Find the relation between XM and MZ.



- (ii) In the adjoining figure, chords AB and CD intersect at E. If  $DE = 6$ ,  $BE = 3$  and  $CE = 4$ , then find AE.



- (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) In the adjoining figure, seg  $BE \perp$  seg AB and seg  $BA \perp$  seg AD. If  $BE = 6$  and  $AD = 9$  find  $\frac{A(UABE)}{A(UABD)}$ .

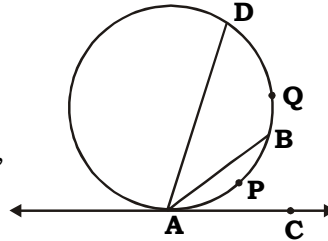


- (vi) A cylinder and a cone have equal radii and equal heights. If the volume of the cylinder is  $300 \text{ cm}^3$ , what is the volume of the cone ?

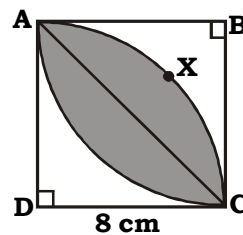
Q.2. Solve ANY FOUR of the following :

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- (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 (i)  $\angle BAC$  (ii)  $m(\text{arc BQD})$

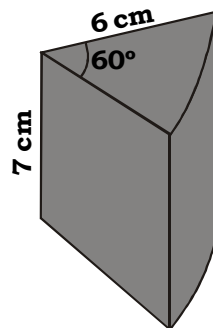


- (ii) Calculate the area of the shaded region in the adjoining figure where  $\square ABCD$  is a square with side 8 cm each. ( $f = 3.14$ )



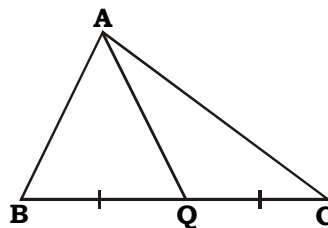
- (iii) Sides of a triangle are 12, 35, 37. Determine whether it is a right angled triangle or not ?

- (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) ABCD is a rectangle. Taking AD as a diameter, a semicircle AXD is drawn which intersects the diagonal BD at X. If  $AB = 12$  cm,  $AD = 9$  cm then find the values of BD and BX.

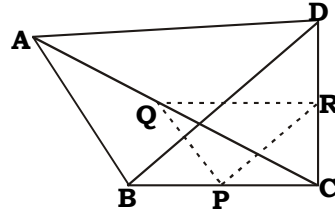
- (vi) In the adjoining figure,  $AB^2 + AC^2 = 122$ ,  $BC = 10$ . Find the length of the median on side BC.



**Q.3. Solve ANY THREE of the following :**

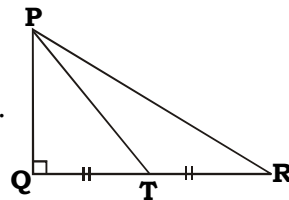
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- (i) Two triangles ABC and DBC lie on the same side of the base BC. From a point P on BC, PQ || AB and PR || BD are drawn. They intersect AC at Q and DC at R. Prove that QR || AD.

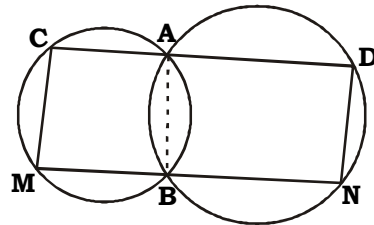


- (ii) The curved surface area of the frustum of a cone is 180 sq. cm and the circumference of its circular bases are 18 cm and 6 cm respectively. Find the slant height of the frustum of a cone.
- (iii) Suppose ABC is a triangle inscribed in a circle, the bisector of  $\angle ABC$  intersects the circle again in D, the tangent at D intersect the line BA and line BC in E and F respectively. Prove that  $\angle EDA \cong \angle FDC$ .

- (iv) In the adjoining figure,  $\angle PQR = 90^\circ$ . T is the mid point of the side QR. Prove that  $PR^2 = 4PT^2 - 3PQ^2$ .



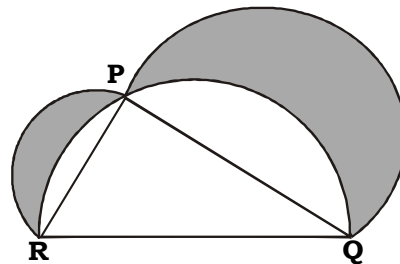
- (v) Two circles intersect each other in points A and B. Secants through A and B intersect circles in C, D and M, N. Prove that CM || DN.



**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) In the adjoining figure, PR = 6 units and PQ = 8 units. Semicircles are drawn taking sides PR, RQ and PQ as diameters as shown in the figure. Find out the area of the shaded portion. ( $\pi = 3.14$ )



**Q.5. Solve ANY TWO of the following :**

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- (i) Through the midpoint  $M$  of the side  $CD$  of parallelogram  $ABCD$ , the line  $BM$  is drawn intersecting  $AC$  in  $L$  and  $AD$  produced in  $E$ . Prove that  $EL = 2BL$ .
- (ii) 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.
- (iii) Prove that the quadrilateral formed by the angle bisectors of a cyclic quadrilateral is also cyclic.

*Best Of Luck* 🍀