

# MT

2017 \_\_\_\_ 1100

Seat No. 

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## MT - GEOMETRY - SEMI PRELIM - I : PAPER - 1

**Time : 2 Hours**

**(Pages 3)**

**Max. Marks : 40**

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**Note :**

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

**Q.1. Attempt ANY FIVE of the following :**

**5**

- (i) Write the equation of the line if  $m = 5$  and  $c = -1$ .
- (ii) What is the value of  $\cot^2 \theta - \frac{1}{\sin^2 \theta}$  ?
- (iii) What is the equation of a line parallel to X-axis and passing through the point  $(5, -7)$  ?
- (iv) If  $3 \sin \theta - 4 \cos \theta = 0$ , what is the value of  $\tan \theta$  ?
- (v) Write the slope of the line stated below :  
 $y - 5 = 2(x - 7)$
- (vi) If  $r + s = 90^\circ$  and  $\tan r = \frac{3}{4}$  then what is the value of  $\cot s$  ?

**Q.2. Solve ANY FOUR of the following :**

**8**

- (i) Draw a tangent at any point R on the circle of radius 3.4 cm and centre 'P'.
- (ii) Find the trigonometric ratios in standard position whose terminal arm passes through the point  $(4, 3)$ .

- (iii) Write the equation of the line passing through the origin and the point  $(-3, 5)$ .
- (iv) Draw a circle of radius 3.6 cm, take a point M on it. Draw a tangent to the circle at M without using centre of the circle.
- (v) If  $\sin \theta + \sin^2 \theta = 1$  then prove that  $\cos^2 \theta + \cos^4 \theta = 1$ .
- (vi) Find the value of k so that PQ will be parallel to RS where P (2, 4), Q (3, 6), R (8, 1) and S (10, k).

**Q.3. Solve ANY THREE of the following :****9**

- (i) Construct a right angled triangle  $\Delta PQR$  where  $PQ = 6$  cm,  $\angle QPR = 40^\circ$ ,  $\angle PRQ = 90^\circ$ . Draw circumcircle of  $\Delta PQR$ .
- (ii) If  $\cot \theta = -\frac{7}{24}$ , then find the values of  $\sin \theta$  and  $\sec \theta$ ,  $\theta$  is in IV quadrant.
- (iii) Using slope concept, check whether the following points are collinear : V  $(-7, 8)$ , W  $(-5, 2)$  and U  $(3, 6)$ .
- (iv) Find the possible values of  $\sin x$  if  $8 \sin x - \cos x = 4$ .
- (v) Show that the line joining  $(-1, 1)$  and  $(-9, 6)$  is parallel to the line joining  $(-2, 14)$  and  $(6, 9)$ .

**Q.4. Solve ANY TWO of the following :****8**

- (i) Eliminate  $\theta$ , if  $x = 3 \operatorname{cosec} \theta + 4 \cot \theta$ ,  $y = 4 \operatorname{cosec} \theta - 3 \cot \theta$ .
- (ii) Construct the incircle of  $\Delta RST$  in which  $RS = 6$  cm,  $ST = 7$  cm and  $RT = 6.5$  cm.
- (iii) Show that :  $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$ .

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

**10**

- (i)  $\triangle AMT \sim \triangle AHE$ , construct  $\triangle AMT$ ,  $MA = 6.3$  cm,  $\angle MAT = 120^\circ$ ,  $AT = 4.9$  cm and  $\frac{MA}{HA} = \frac{7}{5}$ , construct  $\triangle AHE$ .
- (ii) A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is  $60^\circ$ . When he moves 40 m away from the bank, he finds the angle of elevation to be  $30^\circ$ . Find the height of the tree and the width of the river. ( $\sqrt{3} = 1.73$ )
- (iii) Show that  $(-2, 1)$ ,  $(0, 3)$ ,  $(2, 1)$  and  $(0, -1)$  are the vertices of a parallelogram.

*Best Of Luck* 🍀