

MT

2017 ____ 1100

Seat No.

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MT - GEOMETRY - SEMI PRELIM - I : PAPER - 4

Time : 2 Hours

(Pages 3)

Max. Marks : 40

Note :

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

Q.1. Attempt ANY FIVE of the following :

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- (i) Write the equation of the line if $m = 4$ and $c = 0$.
- (ii) If the terminal arm lies on the positive y-axis, what are the possible angles ?
- (iii) Write the equation of a line parallel to Y-axis and passing through point $(3, 0)$.
- (iv) If $\tan \theta = \sqrt{15}$, what is the value $\sec \theta$?
- (v) Write the slope of the line stated below :
 $y = -5(x + 3)$
- (vi) If $\alpha + \beta = 90^\circ$ and $\tan \alpha = \frac{3}{4}$ then what is the value of $\cot \beta$?

Q.2. Solve ANY FOUR of the following :

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- (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 $(5, 12)$.
- (iii) 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 $(10, k)$.

- (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) Write the equation of the line passing through the pair of points (0, 5) and (5, 6) in the form $y = mx + c$.

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

- (i) Construct the circumcircle of ΔKLM in which $KM = 7$ cm, $\angle K = 60^\circ$, $\angle M = 55^\circ$.
- (ii) If $\sec r = \frac{2}{\sqrt{3}}$, then find the value of $\frac{1 - \operatorname{cosec} r}{1 + \operatorname{cosec} r}$, where α is in IV quadrant.
- (iii) If the points $\left(\frac{2}{5}, \frac{1}{3}\right)$, $\left(\frac{1}{2}, k\right)$ and $\left(\frac{4}{5}, 0\right)$ are collinear then find the value of k .
- (iv) If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$, then prove that $a^2 + b^2 = m^2 + n^2$.
- (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) Prove : $\sqrt{\frac{\operatorname{cosec} x - 1}{\operatorname{cosec} x + 1}} = \frac{1}{\sec x + \tan x}$.
- (ii) Construct the incircle of ΔSRN , such that $RN = 5.9$ cm, $RS = 4.9$ cm, $\angle R = 95^\circ$.
- (iii) Show that : $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \cdot \operatorname{cosec} \theta$.

Q.5. Solve ANY TWO of the following :

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- (i) $\triangle SHR \sim \triangle SVU$, construct $\triangle SHR$, $SH = 4.5$ cm, $HR = 5.2$ cm, $SR = 5.8$ cm
and $\frac{SH}{SV} = \frac{3}{5}$; construct $\triangle SVU$.
- (ii) A straight highway leads to the foot of tower. A man standing at the top of tower observes a car at an angle of depression of 30° , which is approaching the foot of the tower with uniform speed. Six seconds later, the angle of depression of the car is found to be 60° . Find the time taken by the car to reach the foot of the tower from this point.
- (iii) A (5, 4), B (-3, -2) and C (1, -8) are the vertices of a triangle ABC. Find the equation of median AD and line parallel to AC passing through point B.

Best Of Luck 🍀