MT

Seat No.

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

| 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 : 5

(i) Write the equation of the line if m = 0 and c = – 3.

(ii) What is the value of $(1 + \cot^2 \theta) (1 + \cos \theta) (1 - \cos \theta)$?

(iii) What are the co-ordinates of the midpoint of the line segment joining A (2, 5) and B (4, 1) ?

(iv) If $\theta + \alpha = 90°$ and $\operatorname{cosec} \theta = \sqrt{2}$, then find the value of sec α ?

(v) Write the slope of the line stated below :
y – 5 = 2 (x – 7)

(vi) If $\alpha + \beta = 90°$ and $\tan \alpha = \dfrac{3}{4}$ then what is the value of cot β ?

Q.2. Solve ANY FOUR of the following : 8

(i) Draw a tangent to a circle of a radius 3.1 cm and centre O at any point 'R' on the circle.

(ii) Find the trigonometric ratios in standard position whose terminal arm passes through the point (– 2, – 3).

(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)   Prove : $\sec^2 \theta + \csc^2 \theta = \sec^2 \theta \cdot \csc^2 \theta$.

(vi)   Write the equation of the line passing through the pair of points $(-2, -5)$ and $(-4, -3)$ in the form $y = mx + c$.

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

(i)   Construct a right angled triangle $\triangle PQR$ where PQ = 6 cm, $\angle QPR = 40°$, $\angle PRQ = 90°$. Draw circumcircle of $\triangle PQR$.

(ii) $3 \sin \alpha - 4 \cos \alpha = 0$, then find the values of $\tan \alpha$, $\sec \alpha$ and $\csc \alpha$, where α is an acute angle.

(iii) If the points $\left(\dfrac{2}{5}, \dfrac{1}{3}\right)$, $\left(\dfrac{1}{2}, k\right)$ and $\left(\dfrac{4}{5}, 0\right)$ are collinear then find the value of k.

(iv)   Prove : $\sqrt{\dfrac{1 - \cos A}{1 + \cos A}} = \csc A - \cot A$.

(v)   If the slope of the line joining points $(k, -3)$ and $(4, 5)$ is $\dfrac{1}{2}$ then find the value of k.

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

(i)   If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$ then
       show that $m^2 - n^2 = 4\sqrt{mn}$.

(ii)   Construct $\triangle DAT$ such that DA = 6.4 cm, $\angle D = 120°$, $\angle A = 25°$ and draw incircle of $\triangle DAT$.

(iii) Show that : $\dfrac{\cos^2 \theta}{1 - \tan \theta} + \dfrac{\sin^3 \theta}{\sin \theta - \cos \theta} = 1 + \sin \theta \cdot \cos \theta$

Q.5. Solve ANY TWO of the following :   **10**

(i) $\triangle$SHR ~ $\triangle$SVU, construct $\triangle$SHR, SH = 4.5 cm, HR = 5.2 cm, SR = 5.8 cm and $\dfrac{SH}{SV} = \dfrac{3}{5}$; construct $\triangle$SVU.

(ii)   A tree 12m high, is broken by the wind in such a way that its top touches the ground and makes an angle 60º with the ground. At what height from the bottom, the tree is broken by the wind ? ($\sqrt{3}$ = 1.73)

(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 👍