

Topics : Solution of Triangle, Vector, Application of Derivatives

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.3,4,5,7,8	(3 marks, 3 min.)	[15, 15]
True or False (no negative marking) Q.1	(2 marks, 2 min.)	[2, 2]
Subjective Questions (no negative marking) Q.2,6	(4 marks, 5 min.)	[8, 10]

1. True/False type questions :

(i) Length of median AD in $\Delta ABC = \sqrt{2b^2 + 2c^2 - a^2}$

(ii) Length of angle bisector of angle A in $\Delta ABC = \frac{2bc}{b+c} \cos A$

(iii) Every hyperbola has 2 asymptotes.

(iv) Orthocentre of the triangle inscribed in a hyperbola lies on its directrix.

(v) In ΔABC (with usual notation) $\sin \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{2bc}}$

(vi) Incentre of pedal triangle of ΔABC is orthocentre of ΔABC

2. Show that for interval $e^{-\pi/4} < x < e^{3\pi/4}$ in which $f(x) = \sin(\ln x) - \cos(\ln x)$ is monotonically increasing

3. Point P is on circumference of circle. Chord QR is drawn parallel to tangent at P. Then maximum possible area of ΔPQR is :

(A) $\frac{\sqrt{3}}{4} r^2$ (B) $\frac{3\sqrt{3}}{4} r^2$ (C) $\sqrt{3} r^2$ (D) $\frac{\sqrt{3}}{4} r^2$

4. If $\vec{a} = 2\hat{i} - 7\hat{j} + \hat{k}$, $\vec{b} = \hat{i} + 3\hat{j} - 5\hat{k}$ and $\vec{a} \cdot m\vec{b} = 120$ where m is scalar then value of m is equal to

(A) 5 (B) -24 (C) -5 (D) 24

5. A normal is drawn at the point P(a, aⁿ) on the curve $y = x^n$ in the first quadrant. The normal intersects

the y-axis at the point (0, b). If $\lim_{a \rightarrow 0} b = \frac{1}{2}$, then 'n' equals

(A) 1/2 (B) 3/2 (C) 2 (D) 4

6. Let $\vec{p} = \sin x \hat{i} + \cos x \hat{j}$ and $\vec{q} = -\hat{i} - \cos x \hat{j}$, $x \in (0, 2n\pi)$, $n \in \mathbb{N}$.

If \vec{p} and \vec{q} are equal vectors, then find the number of values of x.

7. A, B, C, D, E, are five coplanar points then $\vec{DA} + \vec{DB} + \vec{DC} + \vec{AE} + \vec{BE} + \vec{CE}$ is equal to

(A) \vec{DE} (B) $3 \vec{DE}$ (C) $2 \vec{DE}$ (D) $4 \vec{DE}$

8. If \vec{a} and \vec{b} are non collinear vector such that vectors $(x - 2)\vec{a} + \vec{b}$ and $(2x + 1)\vec{a} - \vec{b}$ are parallel, then

(A) $x = 1/3$ (B) no real value of x
(C) infinite values of x (D) $x = -1/3$

Answers Key

1. (i) False (ii) False (iii) True (iv) False

(v) False (vi) True

3. (B) 4. (C) 5. (C) 6. n 7. (B)

8. (A)

