MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 47

Total Marks : 25

Max. Time : 27 min.

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 Δ 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 $f(x) = \sin(\ell n\, x) - \cos(\ell n\, x)$ is monotonically increasing

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

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

4. If $\vec{a} = 2\hat{i} - 7\hat{j} + \hat{k}$, $\vec{b} = \hat{i} + 3\hat{j} - 5\hat{k}$ and $\vec{a}.m\vec{b}$ = 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, a^n) on the curve $y = x^n$ in the first quadrant. The normal intersects the y-axis at the point (0, b). If $\lim_{a\to 0} b = \frac{1}{2}$, 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 $\vec{Q} = -\hat{i} - \cos x\,\hat{j}$, $x \in (0, 2n\pi)$, $n \in N$.

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 $\overrightarrow{DA} + \overrightarrow{DB} + \overrightarrow{DC} + \overrightarrow{AE} + \overrightarrow{BE} + \overrightarrow{CE}$ is equal to

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

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)