MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 45

Total Marks : 30

Max. Time : 30 min.

Topics : Solution of Triangle, Application of Derivatives, Straight Line

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,2,3,4	**(3 marks, 3 min.)**	**[12, 12]**
Multiple choice objective (no negative marking) Q.5,6	**(5 marks, 4 min.)**	**[10, 8]**
Subjective Questions (no negative marking) Q.7,8	**(4 marks, 5 min.)**	**[8, 10]**

1. In a ΔABC, a = 5, b = 4 and $\tan\frac{C}{2} = \sqrt{\frac{7}{9}}$, then the side c is equal to

(A) 2 (B) 3 (C) 6 (D) None of these

2. In a triangle ABC, if $a^3\cos(B-C) + b^3\cos(C-A) + c^3\cos(A-B) = \lambda abc$, then '$\lambda$' is equal to

(A) 1 (B) 2 (C) 3 (D) None of these

3. With usual notations, in a ΔABC $\frac{r_1}{(s-b)(s-c)} + \frac{r_2}{(s-c)(s-a)} + \frac{r_3}{(s-a)(s-b)}$ is equal to

(A) $\frac{1}{r}$ (B) $\frac{2}{r}$ (C) $\frac{3}{r}$ (D) $\frac{4}{r}$

4. Let $f(x) = \begin{cases} \sin\frac{\pi x}{2}, & 0 \le x < 1 \\ 3 - 2x, & x \ge 1 \end{cases}$ then :

(A) f(x) has local maxima at x = 1
(B) f(x) has local minima at x = 1
(C) f(x) does not have any local extrema at x = 1
(D) f(x) has a global minima at x = 1

5. In a ΔABC, if a + b = 3c, then cosA + cosB is equal to

(A) 3cos C (B) $6\sin^2\frac{C}{2}$ (C) 3 cos (A + B) (D) 3 + 3 cos (A + B)

6. If H $\equiv$ (3, 4) and C $\equiv$ (1, 2) are orthocentre and circumcentre of ΔPQR and equation of side PQ is x – y + 7 = 0, then

(A) equation of circum circle $(x-1)^2 + (y-2)^2 = 80$
(B) equation of circum circle $(x-1)^2 + (y-2)^2 = 70$
(C) centroid is $\left(\frac{5}{3}, \frac{8}{3}\right)$
(D) circumradius = $\sqrt{70}$

7. The function $f(x) = \sqrt{ax^3 + bx^2 + cx + d}$ has its non zero local minimum and maximum values at x = –2 and x = 2 respectively. If a is a root of the equation $x^2 - x - 6 = 0$. Find all possible values of a, b, c, and d.

8. Let $f(x) = \begin{cases} |x-2| + a^2 - 9a - 9 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \ge 2 \end{cases}$

Then find the value of 'a' for which f(x) has local minimum at x = 2

Answers Key

1. (C) **2.** (C) **3.** (C) **4.** (A)

5. (B)(D) **6.** (A)(C) **7.** $a = -2, b = 0, c = 24, d > 32$

8. $(-\infty, -1] \cup [10, \infty)$