MATHEMATICS

DPP

DAILY PRACTICE PROBLEMS

DPP No. 51

Total Marks : 30

Max. Time : 33 min.

Topic : Vector

Type of Questions		**M.M., Min.**
Single choice Objective (no negative marking) Q.1,2,3	**(3 marks, 3 min.)**	**[9, 9]**
Multiple choice objective (no negative marking) Q.4	**(5 marks, 4 min.)**	**[5, 4]**
Subjective Questions (no negative marking) Q.5,6,7,8	**(4 marks, 5 min.)**	**[16, 20]**

1. Let $\hat{a}, \hat{b}, \hat{c}$ are three unit vectors such that $\hat{a}+\hat{b}+\hat{c}$ is also a unit vector. If pairwise angles between $\hat{a}, \hat{b}, \hat{c}$ are θ_1, θ_2 and θ_3 respectively then $\cos\theta_1 + \cos\theta_2 + \cos\theta_3$ equals

(A) $(-3/2)$ (B) -3 (C) 1 (D) -1

2. A tangent is drawn to the curve $y = \frac{8}{x^2}$ at a point $A(x_1, y_1)$, where $x_1 = 2$. The tangent cuts the x-axis at point B. Then the scalar product of the vectors $\vec{AB}$ and $\vec{OB}$ is :

(A) 3 (B) -3 (C) 6 (D) -6

3. If the angle between $\vec{a}$ and $\vec{c}$ is 25° and the angle between $\vec{b}$ and $\vec{c}$ is 65° and $\vec{a}+\vec{b}=\vec{c}$ then the angle between $\vec{a}$ and $\vec{b}$

(A) 45° (B) 60° (C) 65° (D) 90°

4. The vectors $\vec{a} = 3\hat{i}-2\hat{j}+2\hat{k}$ and $\vec{b} = -\hat{i}-2\hat{k}$ are adjacent sides of a parallelogram. Then angle between its diagonals is

(A) $\pi/4$ (B) $\pi/3$ (C) $3\pi/4$ (D) $2\pi/3$

5. If $\overrightarrow{OA} = \hat{i}+2\hat{j}+3\hat{k}$, $\overrightarrow{OB} = 3\hat{i}+4\hat{j}+7\hat{k}$, $\overrightarrow{OC} = -3\hat{i}-2\hat{j}-5\hat{k}$ where O is origin then find the ratio in which point B divide AC.

6. If $\vec{a}$ and $\vec{b}$ are non collinear vectors and $\vec{A} = (p+4q)\vec{a}+(2p+q+1)\vec{b}$, $\vec{B} = (-2p+q+2)\vec{a}+(2p-3q-1)\vec{b}$ then determine p and q such that $3\vec{A} = 2\vec{B}$

7. In a triangle OAB, E is mid point OB and D is point on AB such that AD : DB = 2 : 1. If OD and AE intersects at P determine ratio OP : PD using vector method (where O is origin)

8. In a ΔABC, D divides BC in the ratio 3 : 2 internally and E divides CA in the ratio 1 : 3 internally. The lines AD and BE meet at H and CH meet AB in F, Find the ratio in which F divides AB

Answers Key

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

5. 1 : 3 externally **6.** p = 2, q = –1

7. 3 : 2 **8.** 2 : 1