TRIUMPH
ANNUAL INTENSIVE TEST SERIES
MATHEMATICS-XII
UNIT-3

HSE : II — Time : 1 Hr
Version: B — Marks : 25

Question 1 to 5 carry 1 score each

1. The vector having initial and terminal points as (2, 5, 0) and (-3, 7, 4) respectively is
   (a) $-\hat{i}+12\hat{j}+4\hat{k}$ (b) $5\hat{i}+2\hat{j}-4\hat{k}$
   (c) $-5\hat{i}+2\hat{j}+4\hat{k}$ (d) $\hat{i}+\hat{j}+\hat{k}$

2. The number of vectors of unit length perpendicular to the vectors $\hat{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ and $b = \hat{j} + \hat{k}$ is
   (a) One (b) Two (c) Three (d) Infinite

3. Distance of the point (∝, β, √) from y axis is
   (a) β (b) |β| (c) |β| + |√| (d) $\sqrt{\propto^2 + \surd^2}$

4. For two independent events A and B, which of the following pair of events need of be independent?
   (a) A^1, B^1 (b) A, B^1 (c) A^1, B, (d) A-B, B-A

5. If $P(A) = \frac{7}{13}$ $P(B) = \frac{9}{13}$ $P(A \cap B) = \frac{4}{13}$ then P(A/B) is
   (a) $\frac{9}{4}$ (a) $\frac{16}{13}$ (c) $\frac{4}{9}$ (d) $\frac{11}{13}$

Answer any four questions

6. (i) Consider the vector $\overline{P} = 2\hat{i} - \hat{j} + \hat{k}$. Find two vectors $\overline{q}$ and $\overline{r}$ such that $\overline{p}, \overline{q}$ and $\overline{r}$ are mutually perpendicular. [3]
   (ii) Find the area of a parallelogram whose adjacent sides are the rectors $2\hat{i} + \hat{j} + \hat{k}$ and $\hat{i} - \hat{j}$ [2]

7. Let A(2, 3, 4), B(4, 3, 2) and C (5, 2, -1) be three points
   (i) Find $\overline{AB}$ and $\overline{BC}$ [1]
   (ii) Find the projection of $\overline{BC}$ on $\overline{AB}$ [2]
   (iii) Find the area of the triangle ABC [2]

8. Cartensian equation of two lines are
   $\frac{x+2}{2} = \frac{y+2}{4} = \frac{z+2}{1}$, $\frac{x-1}{2} = \frac{y-1}{-3} = \frac{z-1}{-4}$
   (i) write the vector equation of the lines [2]
   (ii) Find the shortest distance between the lines [3]

9. Given the plane $5x - 2y + 4z - 9 = 0$
   (i) Find the foot of the perpendicular drawn from the origin to the plane [3]
   (ii) Write the vector and Cartesian equation of this perpendicular [2]

10. Consider the linear programming problem
    Minimise $Z = -3x + 4y$
    Subject to $x + 2y \leq 8$
    $3x + 2y \leq 12$
    $x, y \geq 0$
    (a) Mark its feasible region [3]
    (b) Find the corner at which Z attain its minimum [2]

11. The probability distribution of a random variable X is given below

x	0	1	2	3	4	5
p(x)	k	2k	3k	4k	5k	5k

   (a) Find the value of K [2]
   (b) Find the mean and variance of the variable [3]