

**TEST PAPER -3**  
**Mathematics – XII**

**TERM-II**

Time : 2 hr

Max Marks : 40

**GENERAL INSTRUCTIONS**

1. This question paper contains three parts A, B & C, each part is compulsory.
2. Part – A comprises of 6 questions of 2 marks each.
3. Part – B comprises of 4 questions of 3 marks each.
4. Part – C comprises of 4 questions of 4 marks each.

**PART – A**

- Q. 1. Evaluate :  $\int \frac{\sqrt[4]{x^4-x}}{x^5} dx$
- Q. 2. Show that  $y = e^x(a \cos x + b \sin x)$  is the solution of the differential equation  $y_2 - 2y_1 + 2y = 0$
- Q. 3. A girl walks 4km towards west, and then she walks 3km in a direction  $30^\circ$  east of north and stops. Determine the girl's displacement from her initial point of departure.
- Q. 4. Find the coordinates of foot of perpendicular drawn from origin to the plane  $2x + 3y + 4z = 12$ .
- Q. 5. Find the probability distribution of the number of successes in two tosses of a die, where a success is defined as six appears on at least one die.
- Q. 6. If A, B & C are three events then show that  $P\left(\frac{A \cup B}{C}\right) = P\left(\frac{A}{C}\right) + P\left(\frac{B}{C}\right) - P\left(\frac{A \cap B}{C}\right)$

**PART – B**

- Q. 7. Solve the differential equation:  $\left\{x \cos\left(\frac{y}{x}\right) + y \sin\left(\frac{y}{x}\right)\right\} y dx = \left\{y \sin\left(\frac{y}{x}\right) - x \cos\left(\frac{y}{x}\right)\right\} x dy$
- Q. 8. Evaluate :  $\int \left\{\frac{x^2+1}{(x+1)^2}\right\} e^x dx$  **OR** Evaluate :  $\int \frac{dx}{\sin x - \sin 2x}$
- Q. 9. If  $\vec{a}, \vec{b}, \vec{c}$  are mutually perpendicular vectors of equal magnitude, find the angle made by the vector  $\vec{a} + \vec{b} + \vec{c}$  with  $\vec{a}, \vec{b}$  &  $\vec{c}$  respectively. Hence show that the vector  $\vec{a} + \vec{b} + \vec{c}$  is equally inclined to  $\vec{a}, \vec{b}$  and  $\vec{c}$ .
- Q. 10. Find the vector and Cartesian equation of the plane passing through the line of intersection of the planes  $\vec{r} \cdot (i + j + k) = 1$  and  $\vec{r} \cdot (2i + 3j - k) + 4 = 0$  and parallel to x-axis.
- OR**
- Show that the lines  $\frac{x-3}{3} = \frac{y+4}{2} = \frac{z-1}{1}$  &  $\frac{x+1}{3} = \frac{y-2}{2} = \frac{z}{1}$  are coplanar. Also, find the equation of the plane containing these two lines.

**PART – C**

- Q. 11. Evaluate:  $\int_0^\infty \frac{x dx}{(1+x)(1+x^2)}$  **OR** Evaluate :  $\int_0^{\pi/2} \{2 \log(\sin x) - \log(\sin 2x)\} dx$
- Q. 12. Using the method of integration find the area of the triangle ABC, coordinates of whose vertices are A(2,0), B(4,5) & C(6,3).
- Q. 13. Find the distance of the point (2, 3, 4) from the plane  $3x + 2y + 2z + 5 = 0$  measured parallel to the line  $\frac{x+3}{3} = \frac{y-2}{6} = \frac{z}{2}$
- Q. 14. A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both diamonds. Find the probability of the lost card being a diamond.

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