

Topics : Probability, Permutation & Combination, Vector, Definite Integration

Type of Questions		M.M., Min.
Single choice Objective (no negative marking) Q.1 to 4	(3 marks, 3 min.)	[12, 12]
Subjective Questions (no negative marking) Q.5 to 7	(4 marks, 5 min.)	[12, 15]
Match the Following (no negative marking) Q.8	(8 marks, 8 min.)	[8, 8]

- Two fair dice are rolled together, one of the dice showing 4, then the probability that the other is showing 6 is
 (A) $\frac{2}{11}$ (B) $\frac{1}{18}$ (C) $\frac{1}{6}$ (D) $\frac{1}{36}$
- If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ & $\vec{b} = \hat{i} - 2\hat{j} + \hat{k}$, then the vector \vec{c} such that $\vec{a} \cdot \vec{c} = 2$ & $\vec{a} \times \vec{c} = \vec{b}$ is
 (A) $\frac{1}{3}(\hat{i} - 2\hat{j} + \hat{k})$ (B) $\frac{1}{3}(-\hat{i} + 2\hat{j} + 5\hat{k})$ (C) $\frac{1}{3}(\hat{i} + 2\hat{j} - 5\hat{k})$ (D) $\frac{1}{3}(-\hat{i} + 2\hat{j} - 5\hat{k})$
- Number of permutations of alphabets a,b,c,d,e,f,g,h,i taken all at a time, such that the alphabet 'a' appearing some where to the left of 'b', 'c' appearing to the left of 'd', and 'e' somewhere to the left of 'f', is (Example - h a e g b c i d f would be one such permutation)
 (A) $5!4!$ (B) $8!$ (C) $8!4!$ (D) $9 \cdot 7!$
- Number of ways in which 5A's and 6B's can be arranged in a row which reads the same backwards and forwards, is
 (A) 12 (B) 10 (C) 8 (D) 6
- Let $E = \{1, 2, 3, 4\}$ and $F = \{1, 2\}$ A function is defined from E to F
 (i) Find the probability that it is onto
 (ii) Find the probability that it is one one
- There are two groups of subjects one of which consists of 5 science subjects and 3 engineering subjects and the other consists of 3 science and 5 engineering subjects. An unbiased die is cast. If number 3 or number 5 turns up, a subject is selected at random from the first group, otherwise the subject is selected at random from the second group. Find the probability that an engineering subject is selected ultimately.
- Three shots are fired independently at a target in succession. The probabilities of a hit in the first shot is $\frac{1}{2}$, in the second $\frac{2}{3}$ and in the third shot is $\frac{3}{4}$. In case of one hit, the probability of destroying the target is $\frac{2}{3}$ and in the case of two hits $\frac{7}{11}$ and in the case of three hits 1.0. Find the probability of destroying the target in three shots.
- Match the column

Column-I	Column-II
(A) $\int_{-2}^2 1-x^2 dx$	(p) 2
(B) $\frac{20}{\pi} \int_0^{\pi/2} \frac{dx}{1+\tan^3 x}$	(q) 3
(C) $\frac{2}{\pi} \int_0^3 \sqrt{\frac{x}{3-x}} dx$	(r) 4
(D) $\frac{8}{\pi^2} \int_0^1 \frac{\sin^{-1}(\sqrt{x}) dx}{\sqrt{x(1-x)}}$	(s) 5

Answers Key

1. (A) 2. (B) 3. (D) 4. (B)
5. (i) $\frac{7}{8}$ (ii) 0 6. $\frac{13}{24}$ 7. $\frac{17}{24}$
8. (A) \rightarrow (r) ; (B) \rightarrow (s) ; (C) \rightarrow (q) ; (D) \rightarrow (p)