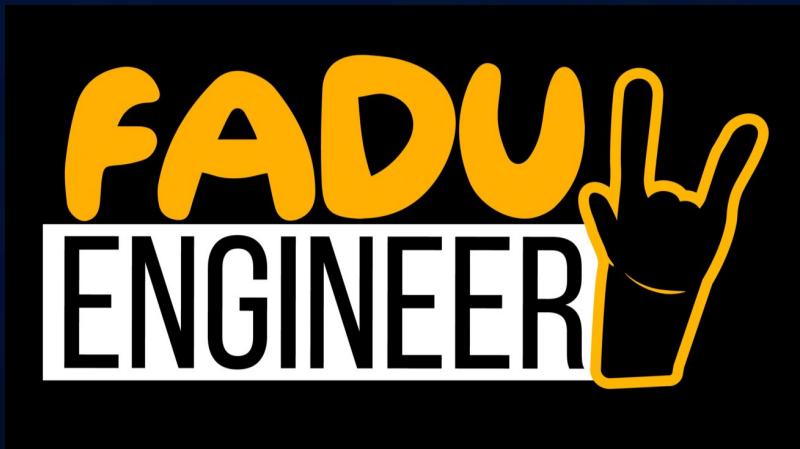


PROBABILITY

Important Question Bank

Designed By

SAURABH DAHVADKAR



Important Questions

- 1) The probability that three Students A, B and C will pass the Common entrance test for engineering are $\frac{4}{9}$, $\frac{2}{9}$ and $\frac{1}{3}$ respectively. The probabilities that they will get admission in the same engineering college are $\frac{3}{10}$, $\frac{1}{2}$ and $\frac{4}{5}$ respectively. Find the Probability that they will get admission in the same Engineering college.
- 2) A box contains three biased coins A, B and C. The Probability that a head will result when A is tossed it $\frac{1}{3}$, when B is tossed it is $\frac{2}{3}$, when C is tossed it is $\frac{3}{4}$,
- (a) If one of the coins is chosen at random and is tossed 3 times, head resulted twice & tail once. what is the probability that the coin chosen was A ?
- (b) what is the probability of getting head when a coin Selected at random is tossed once ?
- 3) A bag contains five balls, the colours of which are not known. Two balls were drawn from the bag and they were found to be white. what is the probability that all balls are white ?

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4) In a bolt factory, machines A, B, C produces respectively 25%, 35% and 40% of their output 5%, 4% and 2% are defective. A bolt is drawn at random from a day's production and is found defective. What is the probability that it was produced by machines A, B, C ?.

5) A man has three coins A, B, C. A is unbiased. The probability that head will result when B is tossed is $\frac{2}{3}$. The probability that head will result when C is tossed is $\frac{1}{3}$. If one of the coins is chosen at random and is tossed three times it gave two heads and one tail. Find the Probability that the coin A was chosen.

6) There are three urns having the following compositions of black and white balls,

Urn 1 : 7 white, 3 black balls.

Urn 2 : 4 white, 6 black balls.

Urn 3 : 2 white, 8 black balls.



One of the Urns is chosen at random with Probabilities 0.2, 0.6 and 0.2 respectively. From the chosen Urn two balls are drawn at random without replacement. Calculate the probabilities that both these balls are white.

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7) There are three boxes containing respectively 1 white, 2 red, 3 black & 2 white, 3 red and 1 black ball, 3 white, 1 red and 2 black balls. A box is chosen at random and two balls are drawn from it. The two balls are found to be one red and one white. Find the probability that those have come from box 1, box 2 and box 3.

8) The probability mass function of a random variable x is zero except at the points $x=0, 1, 2$. At these points it has the values $P(0)=3c^3$, $P(1)=4c-10c^2$, $P(2)=5c-1$. Determine ① c ,
 ② $P(x<1)$, $P(1 < x \leq 2)$
 ③ $P(0 < x \leq 2)$.



9) A random variable X has the following probability distribution,

$$\begin{array}{cccccccc} X : & 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ P(X=x) : & 0 & K & 2K & 2K & 3K & K^2 & 2K^2 & 7K^2+K. \end{array}$$

$$\textcircled{1} \text{ Find } K \quad \textcircled{2} \text{ } P\left(\frac{1.5 < x < 4.5}{x > 2}\right)$$

10) The probability density function of a random variable X is,

$$\begin{array}{ccccccc} X : & 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ P(X=x) : & K & 3K & 5K & 7K & 9K & 11K & 13K \end{array}$$

$$\textcircled{1} \text{ Find } P(x < 4) \quad \textcircled{2} \text{ } P(3 < x \leq 6)$$

11) Given the following probability function of a discrete random variable X

X	: 0	1	2	3	4	5	6	7
$P(X=x)$: 0	c	$2c$	$2c$	$3c$	c^2	$2c^2$	$7c^2+c$

- ① Find c
- ② Find $P(X \geq 6)$
- ③ $P(X < 6)$
- ④ $P(1.5 < X < 4.5 / X > 2)$.

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- 12) Let X be a continuous random variable with P.d.f $f(x) = Kx(1-x)$, $0 \leq x \leq 1$. Find K and determine a number b , such that $P(X \leq b) = P(X \geq b)$.
- 13) Find the value of K such that the following will be the probability density function. Find also $P(X \leq 1.5)$.

$$f(x) = \begin{cases} Kx & \dots 0 \leq x \leq 1 \\ K & \dots 1 \leq x \leq 2 \\ K(3-x) & \dots 2 \leq x \leq 3 \end{cases}$$

- 14) A function is defined as,

$$f(x) = \begin{cases} 0 & \dots x < 2 \\ \frac{2x+3}{18} & \dots 2 \leq x \leq 4 \\ 0 & \dots x > 4 \end{cases}$$

Show that $f(x)$ is probability density function & find the probability that $2 < x < 3$.

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