

B.Sc. (Data Science) (NEP) Semester-III
BSCDS032 - Probability & Statistics

P. Pages : 2

Time : Two Hours



GUG/W/24/16145

Max. Marks : 40

1. a) A marble is drawn at random from a box containing 10 red, 30 white, 20 blue and 15 orange marbles find the probability that it is. 4

i) Orange or Red $\frac{1}{3}$

ii) Not red not blue $\frac{3}{5}$

iii) Not blue $\frac{2}{5}$

iv) White $\frac{2}{5}$

- b) The probabilities that husband and wife will be a live 20 years from now are given by 0.8 and 0.9 find the probability that in 20 years (i) both (ii) neither (iii) Atleast one will be alive. 4

OR

- c) A and B - throw a pair of dice alternately, till one of them get's a total of 10 and wins the game. Find their respective probabilities of winning, if A starts first. 4

- d) Probabilities of solving a specific problem independently by A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If both try to solve problem independently, then find the probability that 4

i) Problem is solved

ii) Exactly one of them solves the problem.

2. a) The distribution function for a random variable X is : 4

$$F(X) = \begin{cases} 1 - e^{-2x}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

Find

i) The density function

ii) The probability that $X > 2$

iii) The probability that $3 < X \leq 4$

- b) The joint probability function of two discrete random variables X and Y is given by $f(x, y) = c(2x + y)$ where x & y assume all integer's such that 4

$0 \leq x \leq 2, 0 \leq y \leq 3$ and $f(x, y) = 0$ otherwise.

i) Find the value of constant c

ii) Find $p(X=2, Y=1)$

iii) Find $p(X \geq 1, Y \leq 2)$

OR

- c) Explain types of absolute measures of dispersion in brief. 4

- d) What is statistical inference? What are its types? 4

3. a) Find: 4

i) the variance

ii) the standard deviation of the sum obtained in tossing a pair of fair dice.

- b) Find the first four moments
 i) about the origin ii) about the mean
 for the random variable X having density function

$$f(x) = \begin{cases} \frac{4x(9-x^2)}{81}, & 0 \leq x \leq 3 \\ 0, & \text{otherwise} \end{cases}$$

OR

- c) What is scatter diagram? What are uses of it?

- d) Find the coefficient of

i) skewness

ii) kurtosis

for the distribution with density function:

$$f(x) = \begin{cases} \lambda e^{-\lambda x} ; & x \geq 0 \\ 0 & ; x < 0 \end{cases}$$

4. a) Find the probability that in 120 tosses of a fair coin

i) Between 40% and 60% will be heads

ii) $\frac{5}{8}$ or more will be heads

- b) In given table the weight of 40 male student's at state university are recorded to the nearest pound.

138	164	150	132	144	125	149	157
146	158	140	147	136	148	152	144
168	126	138	176	163	119	154	165
146	173	142	147	135	153	140	135
161	145	135	142	150	156	145	128

Construct a histogram.

OR

- c) Explain chi-square goodness of fit test.

- d) What is coefficient of correlation? Discuss about Karl-Pearsons coefficient.

5. a) In how many ways 10 objects be split into two groups containing 4 and 6 objects respectively?

- b) Find the probability distribution of number of heads on two tosses of coin.

- c) What is ANOVA test?

- d) Define: population & sample.
