

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

P. Pages : 2

Time : Two Hours



GUG/S/25/16145

Max. Marks : 40

1. a) A and B play 12 games of chess of which 6 are won by A, 4 are won by B and 2 end in a draw they agree to play a tournament consisting of 3 games. Find the probability that
- i) A win all 3 games
 - ii) A and B win alternately
 - iii) B wins atleast 1 game.

4

- b) A and B play a game in which they alternately toss a pair of dice the one who is first to get a total of 7 wins the game. Find the probability that (i) the one who tosses first will win the game. (ii) the one who tosses second will win the game.

4

OR

- c) In a game of poker 5 cards are drawn from a pack of 52 well shuffled cards. Find the probability that (i) 4 are aces (ii) 3 are tens and 2 are jacks (iii) atleast one ace.

4

- d) Determine the probability of three 6's in 5 tosses of a fair die.

4

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 variable X and Y is given by $F(x, y) = C(2x + y)$ where X & Y can assume all integers such that $0 \leq x \leq 2, 0 \leq y \leq 3$. and $F(x, y) = 0$ otherwise. Find the marginal probability functions (a) of X and (b) of Y.

4

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: (i) the variance,
(ii) the standard deviation of the sum obtained in tossing a pair of fair dice.

4

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

4

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

OR

- c) Find the coefficient of 4
(i) skewness, (ii) kurtosis for the distribution with density function:

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

- d) What is Scatter diagram? What are uses of it? 4

4. a) Find the probability that in 120 tosses of a fair coin 4
(i) between 40% and 60% will be heads
(ii) $\frac{5}{8}$ or more will be heads.

- b) In given table the weights of 40 male students at state university are recorded to the nearest pound. 4

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

OR

- c) Explain Chi-Square goodness of Fit test. 4

- d) What is coefficient of correlation? Discuss about Karl-Pearson's coefficient. 4

5. a) Find the number of different permutation of the word "MISSISSIPPI". 2
b) Find the probability distribution of boys and girls in families with 3 children assuming equal probabilities for boys & girls. 2
c) What is ANOVA test? 2
d) Define: Population and sample. 2
