

JKXADX

TIME : 2 hours

MARKS : 50

- N. B.** 1) All questions are compulsory
2) Figures to the right indicate marks.

Q. 1 (a) Two cards are drawn at random from a pack of 52 cards, Find the probability that they are of the (5)

- i) Same suit
- ii) Same denomination.
- iii) One face card.

Q. 1 (b) Find K for the following (5)

Given P (x) can be regarded as a probability distribution function. Hence find

- i) Expected value of X
- ii) Variance of X

$$X : -3 \quad 2 \quad 5$$

$$P(x) : \frac{K-4}{5} \quad \frac{2}{K} \quad \frac{11-K}{5K}$$

Q. 1 (c) A binomial distribution has mean 6 and variance 3. find n and p. Hence find P [x =2] (4)

OR

Q. 1 (p) There are 3 economists, 4 engineers, 2 statisticians and 1 actuary. A Committee of 4 from among them is to be formed. Find the probability that the committee.

- i) Consists of one professional of each kind. (4)
- ii) has one engineer and one economists.

Q. 1 (q) Define (5)

- i) Joint probability mass function.
- ii) Marginal probability mass function.
- iii) Conditional probability mass function.

Q. 1 (r) A uniform die is thrown. Let. X : number on the uppermost face of the die, Find the probability distribution of X. Also find E (X) (5)

Q. 2 (a) Explain the following terms with example. (6)

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Q. 2 (b) A survey conducted by a sociologist in an urban area revealed the following. (6)

Probability that bride - groom looking out for a bride gives top priority to
(i) beauty is 0.54 (ii) intelligence is 0.46 and (iii) beauty and intelligence both is 0.38

Find the chance that one such man gives the top priority to
(i) beauty alone (ii) intelligence alone (iii) beauty or intelligence but not both.
(iv) none of the two.

OR

Q. 2 (p) State and Explain Bayes Theorem. (6)

Q. 2 (q) A bag contains 4 white and 5 black balls. Two balls are drawn at random without replacement from the bag. What is the probability that both of them are white? What is the probability that one is white and other is black? (6)

Q. 3 (a) Define raw and central moments of a random variable state the relationship between raw and central moments for first four moments. (6)

Q. 3 (b) Calculate Cov (X, Y) for the following joint probability distribution function. (6)

$$P(X, Y) = \frac{x+y}{36}; \quad X = 1, 2, 3, \quad Y = 1, 2, 3$$

= 0 otherwise

OR

Q. 3 (p) Define the following terms Give examples of each. (6)

(i) Discrete random Variable

(ii) Probability distribution function of a discrete random variate.

(iii) Cumulative probability distribution function of a discrete random variable.

Q. 3 (q) X and Y are two stochastically independent random variables with means 7 and 4 and variances 9 and 4 respectively. (6)

Find (i) E (X + Y) (ii) V (X + Y) (iii) E (3X + 2) (iv) V (X - Y) (v) V (2X + 3Y)

Q. 4 (a) Define Discrete uniform distribution. Derive its mean and variance. (6)

Q. 4 (b) A punch card operator makes an error to produce on an average four erroneous cards in an hour's output. What is the chance that a sample of cards punched by the operator during fifteen minutes would contain. (6)

(i) Two or more errorsome cards?

(ii) Not more than two errorsome cards?

Given $e^{-1} = 0.3679$, $e^{-15} = 0.2231$

OR

Q. 4 (p) Define Poisson Distribution. State the properties of Poisson distribution. (6)

Q. 4 (q) A company that insures rings against loss estimates, that 30% of its customers it insures will loose a ring during the contact period. (6)

On a certain day, five customers come for insuring their rings find the chance that

- (i) exactly two of them
- (ii) none of them.
- (iii) majority of them shall lose their ring during the contract period.

