

Seat No. : 497

DE-102

December-2023

B.B.A., Sem.-III

CC-206 : Elementary Statistics

Time : 2½ Hours]

[Max. Marks : 70

- Instructions :** (1) Graph paper will be supplied.
(2) Use of simple calculator is allowed.

1. ~~(A)~~ The probability that a student Aasha passed Mathematics is $\frac{2}{3}$, the probability that she passed Statistics is $\frac{4}{9}$. If the probability of passing atleast one subject is $\frac{4}{5}$, what is the probability that Aasha will pass both the subjects ? 7

1. ~~(B)~~ Define Mathematical expectation and state its properties. 7

OR

1. (A) Box I has 5 black and 5 white balls. Box II has 6 black and 4 white balls. One box is selected at random and from it one ball is drawn. Find the probability that the selected ball is of black colour. 7

1. (B) The probability distribution of a random variable X is given below. Find E(X) and V(X): 7

X :	8	12	16	20	24
P(X) :	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{12}$

2. ~~(A)~~ Write the properties of Binomial Distribution and Poisson Distribution. 7
2. ~~(B)~~ 100 electric bulbs are found to be defective in a lot of 5000 bulbs. Find the probability that at the most 3 bulbs are defective in a box of 100 bulbs. [$e^{-2} = 0.1353$] 7

OR

2. (A) For a binomial variate $n = 8$ and $16 P(X = 2) = P(X = 6)$. Find the probability of success. 7

2. (B) 3 cards are selected from 52 cards. Find the probabilities that : 7

- (i) all 3 cards are of club.
(ii) all 3 cards are queen.

3. (A) Define Regression coefficients and state their properties. 7

3. (B) Find Karl-Pearson's coefficient of correlation. 7

x	150	160	162	165	167	164	163	160	165	154
y	157	159	160	167	166	164	162	165	165	165

OR

3. (A) Write notes on : 7

- (i) Multiple Correlation Coefficient
(ii) Partial Correlation Coefficient

3. (B) Find the regression equation of Y on X and X on Y from the following information : 7

X	28	41	40	38	35	33	46	32	36	33
Y	30	34	31	34	30	26	28	31	26	31

4. (A) Draw $\bar{X}$ and R chart and decide whether production process is under control or not. 7

$\bar{X}$	40	42	41	40	42	43	40	40	42	45
R	3	2	5	2	1	4	3	2	5	4

$[n = 5, A_2 = 0.58, D_3 = 0, D_4 = 2.11]$

4. (B) For SSP (1500, 100, 2) find producer's risk and consumer's risk when it is given that AQL = 3% and LTPD = 6%. 7

$[e^{-3} = 0.0498, e^{-7} = 0.000912]$

OR

4. (A) Write short note on theory of runs. 7

4. (B) Draw an appropriate chart for the following data. State whether the situation is under control or not with the reason. 7

Observed items	150	150	150	150	150	150	150	150	150	150
No. of defective item	8	12	14	18	6	10	15	13	11	16

5 Give the following answer : (attempt any 7 out of 12) 14

(i) The parameters of a binomial distribution are _____ and _____.

- (a) ~~n, p~~ (b) m, pn (c) np, n (d) None

(ii) If $E(X) = 3$, then $E(3x + 9) =$ _____.

- (a) 20 (b) ~~18~~ (c) 9 (d) None

(iii) The Poisson Distribution is a distribution of _____ variable.

- (a) Random (b) Continuous (c) ~~Discrete~~ (d) None

(iv) What is the other name of classical definition of probability ?

- (a) Axiomatic (b) Statistical (c) ~~Mathematical~~ (d) None

(v) Mean and variance of binomial distribution are equal.

- (a) True (b) ~~False~~

(vi) The value of correlation coefficient is between _____ and _____.

- (a) ~~-1 & 1~~ (b) 1 & 1 (c) 0 & 1 (d) None

(vii) On which distribution C-chart is based ?

- (a) Normal (b) ~~Poisson~~ (c) Binomial (d) None

(viii) If $P_a = 0.92$, what is Producer's risk ? $\alpha = 1 - P_a$ $\alpha = 0.08$

- (a) 0.92 (b) 1 (c) ~~0.08~~ (d) None

(ix) Which chart is used for controlling number of defects in a TV set ?

- (a) ~~C~~ (b) np (c) p (d) None

(x) From the following who has given the binomial distribution for the first time ?

(a) Jack Bernoulli

☒ (b) James Bernoulli

(c) Fisher

(d) None

(xi) $\bar{X}$ -chart is used for controlling on which variable characteristic ?

☒ (a) Average

(b) Dispersion

(c) Function defective

(d) None

(xii) If $b_{12.3} = 0.1705$ and $b_{21.3} = 2.7225$, find $r_{12.3}$.

(a) 0.5

(b) 1.5

☒ (c) 0.6813

(d) None