

Seat No. : 1460

DD-101

December-2017

B.B.A., Sem.-III

CC-206 : Elementary Statistics

Time : 3 Hours]

[Max. Marks : 70

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

1. Answer the following questions :

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- (i) Define Sample Space.
- (ii) If $E(X) = 3$, then find $E(5X + 6)$.
- (iii) The Parameters of a Binomial distribution are _____ and _____.
- (iv) Mean and variance of Binomial distribution are equal. (True/False)
- (v) In a Poisson distribution $P(0) =$ _____.
- (vi) Give the probability mass function of hypergeometric distribution.
- (vii) In rank correlation if $\sum d^2 = 0$, $r =$ _____.
- (viii) The value of correlation co-efficient is between _____ and _____.
- (ix) If $b_{12.3} = 0.1705$ and $b_{21.3} = 2.7225$ find $r_{12.3}$.
- (x) On which distribution C-chart is based ?
- (xi) Draw ideal O.C. curve.
- (xii) Which types of charts are more sensitive ?
- (xiii) Define LTPD.
- (xiv) Give formula for calculating AOQ.

2. (A) Define the following terms :

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- (i) Union of two events.
- (ii) Random experiment.
- (iii) Mutually Exclusive events.
- (iv) Independent events.

OR

Define Mathematical expectation and state its properties.

- (B) The probability that a student Aashu Passed Mathematics is $\frac{2}{3}$, the probability that he passed statistics is $\frac{4}{9}$. If the probability of passing atleast one subject is $\frac{4}{5}$, what is the probability that Aashu will pass both the subjects ?

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OR

Three events B_1 , B_2 and B_3 are mutually exclusive and exhaustive. If $P(B_1) = P(B_2) = P(B_3)$ and in context of these events A is defined such that $P(A/B_1) = 0.75$, $P(A/B_2) = 0.84$ and $P(A/B_3) = 0.93$. Find $P(B_1/A)$ and $P(B_3/A)$.

- (C) There are 3 white and 6 black balls in a box. Pimal takes 2 balls at random. He gets ₹ 15 for each white ball and losses ₹ 5 for each black ball. Find his expected gain.

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OR

The probability distribution of the demand \bar{X} for a certain commodity is given below :

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

- (i) Find the expected demand.
(ii) If cost function is $C = 100 + 5X$, then find the expected cost.

3. (A) Give the properties of Binomial distribution.

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OR

For a Poisson variate if $P(1) = P(2)$, then find (i) $P(X = 0)$, (ii) $P(X = 3)$.

$$[e^{-2} = 0.135]$$

- (B) It is known from past experience that in a certain plant there are on the average 4 industrial accidents per month. Find the probability that in a given month there will be less than 4 accidents. $[e^{-4} = 0.0183]$

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OR

There are 50 fishes in a Pool, out of which 10 are Golden. 5 fishes are taken at random from the Pool. What is the probability that 2 fishes are golden out of 5 ?

- (C) 3 Cards are selected from 52 cards. Find the probabilities that,

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

OR

There are 10 Maruti Cars and 7 Fiat Cars with a company. From them 3 cars are in repair in a workshop. Find the probabilities that of these cars :

- (i) There are 5 Maruti Cars and 2 Fiat cars.
- (ii) All the cars are of the same type.

4. (A) Define the following terms :

- (i) Correlation
- (ii) Regression
- (iii) Probable Error
- (iv) Partial Correlation

OR

Give the properties of regression co-efficient.

(B) Find Karl Pearson's correlation co-efficient from the following data :

X	36	23	27	28	28	29	30	31	33	35
Y	29	18	20	22	27	21	29	27	29	28

OR

The equation of two regression lines are $4x - y + 40 = 0$ and $15x - 2y - 95 = 0$. The standard deviation of y is 12. Find (i) means of x and y , (ii) regression co-efficient of y on x , (iii) S.D. of x .

(C) Calculate Rank Correlation co-efficient for the following data :

X	49	69	39	49	29
Y	59	59	59	49	39

OR

If $\bar{X}_1 = 40$, $\bar{X}_2 = 50$, $\bar{X}_3 = 20$, $S_1 = 3$, $S_2 = 4$, $S_3 = 2$, $r_{12} = 0.4$, $r_{23} = 0.5$, $r_{31} = 0.25$, then find equation of X_3 on X_1 and X_2 .

5. (A) Write short note on theory of runs.

OR

Discuss the causes of variations in a production process.

(B) From the following data, draw \bar{X} and R charts and indicate whether the production process is under control or not.

Sample No.	1	2	3	4	5	6	7	8	9	10
\bar{X}	25	27	30	35	20	15	18	20	22	29
R	3	5	3	2	8	7	5	2	10	3

[$A_2 = 0.308$, $D_3 = 0.223$, $D_4 = 1.777$]

OR

From the following data obtain control limits for suitable control chart :

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
No. of defects	4	8	2	1	6	6	8	7	5	2	9	3

(C) Define the following terms :

- (i) Acceptance sampling
- (ii) AQL
- (iii) ASN
- (iv) Producer's Risk
- (v) ATI

OR

For a single sampling plan (1500, 100, 2) AQL = 0.03 and LTPD = 0.07, find
Producer's risk and Consumer's risk.

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