

Seat No. : _____

MF-101

March-2019

B.B.A., Sem.-III

CC-206 : Elementary Statistics

Time : 2:30 Hours]

[Max. Marks : 70

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

1. (A) (1) Define mathematical expectation and state its properties. 7
- (2) Three factories A, B, C, 25%, 35% and 40% of total production of ball bearings respectively. Out of this total production 5%, 4% and 2% is defective respectively. One ball bearing is taken at random from this and it has turned out to be defective. What is the probability that it is produced in factory B ? 7

OR

- (1) There are 3 white and 6 black balls in a box. Smita takes 2 balls at random. She gets ₹ 15 for each white ball and losses ₹ 5 for each black ball. Find her expected gain.
 - (2) From a sales force of 150 persons, one will be selected to attend a special sales meeting. If 52 of them are unmarried, 72 are college graduates, 39 are unmarried are college graduates, find the probability that the sales person selected at random will be neither single nor a college graduate.
- (B) Answer the following : (Any Four) 4
- (1) Define sample space.
 - (2) A card is drawn at random from a pack of 52 cards, find the probability of getting a club.
 - (3) If $V(X) = 4$, find $V(3x + 4)$.
 - (4) Define intersection of two event.
 - (5) If A and B are mutually exclusive events then $P(A \cup B) =$ _____.
 - (6) When $P(A) = 0$, the event is impossible. (True/False)

2. (A) (1) Obtain the probability mass function of Binomial distribution and state its properties. 7

(2) The number of accidents in a year attributed to taxi drivers in a city follows Poisson distribution with mean 3. Out of 1,000 taxi drivers, find approximately the number of drivers with (a) no accident in a year (b) more than 3 accidents in a year. ($e^{-3} = 0.0498$) 7

OR

(1) Assuming the probability of a female birth as $\frac{1}{2}$, find the probability that a family of 3 children will have (a) At least one boy (b) At most two boys. 7

(2) There are 12 Indica and 8 Zen cars with a company. From them 5 cars are in repair in a workshop. Find the probabilities that of these cars : (a) there are 3 Indica and 2 Zen, (b) at least 3 Zen cars, (c) all the cars are of same type. 7

(B) Answer the following : (Any Four) 4

- (1) In _____ distribution, Mean = Variance.
- (2) The number of defects in a radio set is an example of Binomial distribution. (True/False)
- (3) Write the probability mass function of Hyper Geometric distribution.
- (4) Write the formula for finding mean of Hyper Geometric Distribution.
- (5) The mean of Poisson distribution is 1.44, its S.D. = _____.
- (6) When $n \rightarrow \infty$ and $P \rightarrow 0$ binomial distribution tends to Poisson distribution.

3. (A) (1) Define regression co-efficient. Give the properties of regression co-efficient. 7

(2) Calculate the co-efficient of correlation by Karl Pearson's method from the following data : 7

x	100	200	300	400	500	600	700
y	30	50	60	80	100	110	130

OR

- (1) Give the difference between correlation and regression. 7
- (2) The following values have been obtained from the measurement of three variables x_1 , x_2 and x_3 . 7

$$\begin{array}{lll} \bar{x}_1 = 6.8 & \bar{x}_2 = 7.0 & \bar{x}_3 = 7.4 \\ S_1 = 1.0 & S_2 = 0.80 & S_3 = 0.90 \\ r_{12} = 0.60 & r_{13} = 0.70 & r_{23} = 0.65 \end{array}$$

Obtain the regression equation of x_1 on x_2 and x_3 .

- (B) Answer the following : (Any **Three**) 3

- (1) Define partial correlation.
- (2) The value of correlation co-efficient is between _____ and _____.
- (3) The two regression co-efficients are 0.6 and 0.2, hence correlation co-efficient is _____.
- (4) Write a formula for $r_{13.2}$.
- (5) For a bivariate sample $n = 16$, $r = 0.8$, find probable error of r .

4. (A) (1) Write a short note on Theory of Runs : 7
- (2) 12 samples each of size 6 are drawn from a production process. Draw \bar{X} and R chart. Also give your interpretations. 7

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
\bar{X}	15	17	15	18	17	16	15	14	13	12	15	13
R	7	3	7	3	2	1	5	7	8	10	2	7

($n = 6$, $A_2 = 0.483$, $D_3 = 0$, $D_4 = 2.004$)

OR

- (1) Bajaj electric company produces electric bulbs. During production samples of 200 produced bulbs were taken every day for 10 successive days and the defective bulbs found were recorded as under :

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8, 3, 0, 10, 5, 4, 6, 3, 2, 2

Draw control chart for fraction defective. (P-Chart)

- (2) For single sampling plan (1000, 50, 2) when $P' = 0.01$, Obtain P_a , ATI, AOQ and ASN. ($e^{-0.5} = 0.6065$)

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(B) Answer the following : (Any **Three**)

3

- (1) Define AQL.
- (2) \bar{X} and R charts are based on _____ distribution.
- (3) Draw an ideal O.C. curve.
- (4) Define consumer's risk.
- (5) In AOQ curve the maximum value of AOQ is called _____.