

Seat No. : 2001

NK-101

December-2015

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 only allowed.

1. Answer the following questions :

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- (i) A card is drawn at random from a pack of 52 cards. Find the probabilities of getting a queen.
- (ii) Define Sample Space.
- (iii) If $E(X) = 5$, then find $E(4x + 3)$.
- (iv) The Binomial distribution is a distribution of _____ variable.
- (v) Give the probability mass function of Poisson distribution.
- (vi) When $(m + n)$ is small, hyper geometric distribution tends to binomial distribution. (True or False).
- (vii) If $b_{yx} = -0.80$ and $b_{xy} = -0.65$, find r .
- (viii) The correlation coefficient r is independent of change of _____ and _____.
- (ix) Write a formula for $r_{13.2}$.
- (x) Define Partial Correlation.
- (xi) On which distribution C-chart is based ?
- (xii) The upper control limit of \bar{X} -chart is _____.
- (xiii) Define LTPD.
- (xiv) Give formula for calculating ATI.

2. (a) Define the following terms :

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- (i) Event
- (ii) Intersection of two events
- (iii) Mutually exclusive events
- (iv) Complementary event

OR

(a) A man can hit a target 3 out of 4 trails, another man can hit the target 2 out of 3 trials. If they hit simultaneously, what is the probability that the target will be hit ?

(b) If A, B, C are three mutually exclusive and exhaustive events and $2P(A) = 3P(B) = 4P(C)$, find $P(B \cup C)$.

OR

(b) The odds that A speaks the truth is 3 : 2 and the odds that B speaks the truth is 5 : 3. In what percentage of cases are they likely to contradict each other on an identical point ?

(c) The probability distribution of a random variable X is given below. Find $E(X)$ and $V(X)$:

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

OR

(c) In a lottery of 10,000 tickets only one ticket bears a prize of ₹ 5,000. The price of a ticket is ₹ 100. Smita has one ticket of this lottery. Find her expectation.

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

OR

(a) 6 persons are of the same age and health. The probability that each person will live for 40 years is $\frac{3}{4}$. Find the probability that in 40 years :

(i) No one had died

(ii) At least 2 are died

(b) For Poisson variate X, if $P(X = 3) = P(X = 4)$ then find $P(X = 0)$. [$e^{-4} = 0.0183$]

OR

(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. [$e^{-2} = 0.1353$]

(c) State the probability mass function of hyper geometric distribution and give its properties.

OR

- (c) There are 30 screws in a packet of which five are defective. If 10 screws are taken at random from the packet, find the probability that none of them is defective. Also find mean of the defective screws.

4. (a) Define the following terms :
- Correlation
 - Correlation coefficient
 - Regression
 - Multiple Correlation

OR

- (a) Find the coefficient of correlation from the following data :

x	1	2	3	4	5
y	6	8	11	8	12

- (b) Give the properties of regression coefficient.

OR

- (b) The following table gives the ages and blood pressure of 10 women :

Age (X)	56	42	36	47	49	42	60	72	63	55
Blood Pressure (Y)	147	125	118	128	145	140	155	160	149	150

Determine the least square regression equation of Y on X.

- (c) If $r_{12} = 0.9$, $r_{13} = 0.8$ and $r_{23} = 0.6$, find $R_{1.23}$ and $r_{12.3}$.

OR

- (c) From the following data :

$$\bar{X}_1 = 6.8 \quad \bar{X}_2 = 7 \quad \bar{X}_3 = 74$$

$$S_1 = 1 \quad S_2 = 0.8 \quad S_3 = 9$$

$$r_{12} = 0.6 \quad r_{13} = 0.7 \quad r_{23} = 0.65$$

Find Regression plane of X_3 on X_1 and X_2 .

5. (a) Write short note on Theory of Runs.

OR

- (a) The following data give the number of defects in radio sets :

Radio set	1	2	3	4	5	6	7	8	9	10	11	12
Number of defects	4	8	2	1	6	6	8	7	5	2	9	3

Draw suitable control chart and give your comments.

(b) Draw \bar{X} and R charts and state your conclusions :

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\bar{X}	33	45	36	40	45	36	50	46	43	46
R	5	6	7	5	7	4	6	8	4	8

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

OR

(b) An inspection of 10 samples of size 400 each from 10 lots revealed the following number of defective units :

17, 15, 14, 26, 9, 4, 19, 12, 9, 15

Calculate control limits for the number of defective units. State whether the process is under control or not.

(c) Define the following terms :

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

OR

In a lot 400 units are defective and the sampling plan is $N = 10,000, n = 100, C = 2$. Determine probability of accepting the lot and AOQ. [Take $e^{-4} = 0.0183$]