

2019

M.COM.

2nd Semester Examination

BASIC STATISTICS

PAPER – COM-204(CBCS)

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their

own words as far as practicable.

Illustrate the answers wherever necessary.

Unit – I (Marks : 20)

1. Answer any **TWO** questions of the following: 2 X 2

- (a) Explain with illustration a continuous variable and a discrete variable.
- (b) Find the class boundaries, if the class limits are are $9 - 10\frac{3}{4}$; $11 - 12\frac{3}{4}$; $13 - 14\frac{3}{4}$;
..... the measurements being made nearest to $\frac{3}{4}$ of an unit.
- (c) State any two properties of correlation coefficient (r).
- (d) What are the different measures of variability of observations?

2. Answer any **TWO** questions of the following: 4 X 2

- (a) The mean and standard deviation of 20 items is found to be 10 and 2 respectively. At the time of checking it was found that one item 8 was incorrect. Calculate the mean and standard deviation, if (i) the wrong item is omitted and (ii) it is replaced by 12.
- (b) Show that if \bar{x} is the arithmetic mean of the quantities x_1, x_2, \dots, x_n then $\sum_{i=1}^n (x_i - \bar{x}) = 0$.
- (c) The median, mean and coefficient of skewness for a certain distribution are 80, 86 and 0.42 respectively. Calculate the coefficient of variation.
- (d) Calculate the coefficient of correlation from the following results:

$$\sum_{i=1}^{10} X = 125; \sum_{i=1}^{10} Y = 80; \sum_{i=1}^{10} X^2 = 1585; \sum_{i=1}^{10} Y^2 = 650; \sum_{i=1}^{10} XY = 1007$$

3. Answer any one question of the following: 8 X 1

(a) (i) From the following data, calculate first quartile and 4th decile:

X	0-5	5-10	10-15	15-25	25-35	35-60	60-80
Freq.	12	30	51	84	66	50	7

(ii) The arithmetic mean calculated from the following distribution is known to be 67.45 inches. Find the value of f_3 .

Height (inches)	60-62	63-65	66-68	69-71	72-74
Frequency	15	54	f_3	81	24

4 + 4

(b) (i) The scores of two batsmen, A and B, in ten innings during a certain season, are as under:

A	32	28	47	63	71	39	10	60	96	14
B	19	31	48	53	67	90	10	62	40	80

Find which of the batsman is more consistent in scoring.

(ii) The following results were obtained from records of age (x) and systolic blood pressure (y) of a group of 10 women:

4 + 4

	x	Y
Mean	52	142
Variance	130	165

$$\sum(x - \bar{x})(y - \bar{y}) = 1220$$

Find the appropriate regression equation and use it to estimate the blood pressure of a woman whose age is 45.

Unit – II (Marks :20)

4. Answer any **TWO** questions of the following:

2 X 2

- In a Poisson distribution, the probability of zero success is 15%. Find its mean and standard deviation.
- State whether the following statement is true. (Give reason)
The mean of binomial distribution is 30 and its variance is 16.
- Define 'sample space'.
- What is critical region?

5. Answer any **TWO** questions of the following:

4 X 2

- A local politician claims that the assessed value of houses, for house property tax purposes by the Municipal Corporation of Delhi, is not correct in 90% of the cases. Assuming this claim to be true, what is the probability that out of a sample of 4 houses selected at random (i) at least one will be found to be correctly assessed? (ii) at least one will be found to be wrong assessed?
- Proof that under certain conditions Poisson distribution can be used as an approximation to the binomial distribution.
- Write down the steps of testing of hypothesis.
- Two urns contain 8 white and 7 black balls, and 5 white and 5 black balls respectively. If one ball is transferred from the first urn to the second and then one ball is drawn from the second urn, then find the probability that the ball drawn from the second urn is a white ball.

6. Answer any **ONE** question of the following:

8 X 1

a) i) State the Bayes' theorem of inverse probability.

ii) In its factory Amul Company produces Epic Ice-cream using 4 identical machines. The chances of a defective production from Machine- 1, Machine- 2, Machine- 3 and Machine- 4 are 2%, 5%, 1% and 3% respectively. From the day end production lot, if one ice-cream is taken at random and found to be defective, then find the probability that the particular ice-cream was produced in Machine-2. 2+6

b) i) A car hire firm has two cars, which it hires out day by day. The number of demands for a car on each day is distributed as a Poisson distribution with mean 1.5. Calculate the proportion of days on which no car is used and the proportion of days on which some demand is refused. (Given $e^{-1} = 0.3679$, $e^{-1.5} = 0.2231$ and $e^{-3} = 0.0498$)

ii) Time taken by a construction company to construct a flyover is a normal variate with mean 400 labour days and standard deviation of 100 labour days. If the company promises to construct the flyover in 450 days or less and agrees to pay a penalty of Rs. 10,000 for each labour days spent in excess of 450, what is the probability that:

- the company pays a penalty of at least Rs. 2,00,000?
- the company take at most 500 days to complete the flyover?

4+4

[Internal Assessment 10 marks]