2021

Time : 3 hours

Full Marks : 50

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

*Answer from **all** the Groups as directed.*

Group – A
(Objective Type Questions)

1. [A] Fill in the blanks : 1×5 = 5

(a) The length of the class-intervals of the following frequency distribution is _____.

Class-interval	f
0 – 9	3
10 – 19	8
20 – 29	13
30 – 39	10
40 – 49	3

(b) In a symmetrical distribution, mean, mode and median are _____.

(c) The product-moment correlation coefficient is independent of the change of origin and _____.

(d) The probability of an event should not exceed _____.

(e) Poisson distribution is a limiting case of _____ distribution.

[B] Four alternative answers for each question are given. Point out the correct one : $1 \times 5 = 5$

(f) The variance of a random variable x is 9. The variance of 9x is :

(i) 81

(ii) 729

(iii) $9x^2$

(iv) None of these

(g) In a symmetrical distribution :

(i) mean – mode = 3 (mean – median)

(ii) mean – mode > 3 (mean – median)

(iii) mean – mode < 3 (mean – median)

(iv) None of these

(h) $b_{xy} \cdot b_{yx}$ is equal to :

(i) r

(ii) r^2

(iii) $\sqrt{r}$

(iv) None of these

(i) The probability of an event lies between :

(i) – 1 and + 1

(ii) – 1 and 0

(iii) 0 and 1

(iv) None of these

(j) In case of Poisson distribution :

(i) mean = variance

(ii) mean > variance

(iii) mean < variance

(iv) None of these

Group – B

(Short-answer Type Questions)

Answer any **four** questions of the following : $3 \times 4 = 12$

2. Explain dispersion with the help of an example.

3. Explain Kurtosis.

4. Obtain the limits of the Karl Pearson's coefficient of correlation.

5. Find the moment generating function of Poisson distribution.

6. Show that :

$$E(x + y) = E(x) + E(y)$$

7. Define independent events and compound events.

Group – C

(Long-answer Type Questions)

Answer any **four** questions of the following : $7 \times 4 = 28$

8. Describe measures of dispersion with their relative merits and demerits.

9. Obtain the arithmetic mean, standard deviation and coefficient of variation of the first n natural numbers.

10. Given the following :

x	y
15	12
22	9
26	13
27	20
25	16

Calculate product-moment coefficient of correlation.

11. Define Probability of an event. Show that for any two events A and B.

$P(A \cap B) = P(A)\, P(B \mid A)$

$= P(B)\, P(A \mid B)$

What happens when A and B are independent ?

12. Obtain the moment generating function, mean and variance of the binomial distribution.

13. Write notes on any **two** of the following :

(a) Skewness

(b) Regression lines

(c) Normal distribution