

**POST-GRADUATE DEGREE PROGRAMME****Term End Examination — December, 2024****ECONOMICS****Paper-II : STATISTICS FOR ECONOMICS**

Time : 2 hours ]

[ Full Marks : 50

Weightage of Marks : 80%

**Special credit will be given accuracy and relevance in the answer. Marks will be deducted for spelling, untidy work and illegible handwriting. The weightage for each question has been indicated in the margin.**

**Use of scientific calculator is strictly prohibited.**

1. Answer any *four* of the following questions :  $2\frac{1}{2} \times 4 = 10$

- a) What are the properties of Arithmetic mean ?  
 b) Find out the co-efficient of Range for the following data :

<b>Class Interval</b>	<b>Frequency</b>
30-40	12
40-50	18
50-60	20
60-70	19

- c) Define skewness of a distribution.  
 d) The lines of regression concerning to the variables  $X$  and  $Y$  are given by  $Y = 32 - X$  and  $X = 13 - 0.25 Y$ . Find out the values of their mean ?  
 e) Show that  $P(A^c \cap B) = P(B) - P(A \cap B)$   
 f) Describe the properties of a Normal Curve.

2. Answer any *four* of the following questions :  $5 \times 4 = 20$

- a) For any set of observations, mean absolute deviation about median is minimum i.e.  $\frac{1}{n} \sum |X_i - A|$  is minimum if  $A = \text{median}$  —

Is it True or False ? Justify your answer.

- b) Prove that  $n(X_1^2 + X_2^2 + \dots + X_n^2) \geq (X_1 + X_2 + \dots + X_n)^2$ .

- c) Calculate the values of  $\beta_1$  and  $\beta_2$  from the following data :

<b>Marks :</b>	20 – 30	30 – 40	40 – 50	50 -60	60- 70
<b>No. of Students :</b>	4	7	13	25	4

- d) Two newspapers  $N_1$  and  $N_2$  are published in Kolkata. It is found from a survey that 28% read  $N_1$  and 21% read  $N_2$  and 6% read both. Find the probability that a person randomly selected (i) does not read any of the two newspapers ; (ii) reads only  $N_2$ .
- e) Show that correlation co-efficient is the geometric mean of the two regression co-efficients.
- f) Show that Poisson distribution is a limiting case of Binomial distribution.
3. Answer any *two* of the following questions : 10 × 2 = 20
- a) i) Show that  $AM \geq GM \geq HM$  . 7

- ii) Calculate the median for the following data : 3

<b>Marks</b>	<b>No. of Students</b>
45-50	10
40-45	15
35-40	26
30-35	30
25-30	42
20-25	31
15-20	24
10-15	15
5-10	7

- b) i) From the prices of shares  $X$  and  $Y$  given below, find out which share is more stable by using coefficient of variation. 6

<b>X :</b>	35	54	52	53	56	58	52	50	51	49
<b>Y :</b>	108	105	105	105	106	107	104	103	104	101

- ii) From the given data, find out the standard deviation of the combined data : 4

	<b>Group-A</b>	<b>Group-B</b>
Number	100	50
Mean	60	45
Variance	9	4

- c) The following table gives the age and blood pressure of 10 women :

<b>Age (X) :</b>	56	42	36	47	49	42	60	72	63	55
<b>B . P (Y) :</b>	147	125	118	128	145	140	155	160	149	150

Determine the least square regression equation of  $Y$  on  $X$ . Also estimate the blood pressure of a women of age 45. 8 + 2

- d) i) Show that in case of a normal distribution, mean = median = mode. 6
- ii) If 2% of electric bulbs manufactured by a certain company are defective, find the probability that in a sample of 200 bulbs,
- A) Less than 2 bulbs
- B) More that 3 bulbs are defective ( Given :  $e^{-4} = 0.0183$ ).

2 + 2