016303

December 2023

B.Tech. ((CE) DS) - III SEMESTER

Statistics–I (BSC-DS-302)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*

2. *Answer any four questions from Part-B in detail.*

3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) How we classify various measures of dispersion. (1.5)

(b) Define skewness and why we study it? (1.5)

(c) Write down the limitations of classical probability. (1.5)

(d) Explain index number with suitable example. (1.5)

(e) What is the relation between standard deviation and root mean square deviation? (1.5)

(f) Define Leptokutic and Platykutic curve. (1.5)

(g) What is random variable and its various types. (1.5)

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7. (a) An insurance company insured 2000 scooter drivers, 4000 car drivers and 6000 truck drivers. The probability of accident is 0.01, 0.03 and 0.15 respectively. One of the insured person meets an accident. What is the probability that he is a scooter driver? (8)

(b) A continuous random variable X has a p.d.f.

$$f(x) = 3x^2; \quad 0 \le x \le 1$$

Find a and b such that $P(X \le a) = P(X > a)$ and $P(x > b) = 0.05$. (7)

(h) Explain independent events with appropriate example. (1.5)

(i) Which particular index does satisfy the requirement of time reversal and factor reversal tests? (1.5)

(j) Explain simple, partial and multiple correlation. (1.5)

PART-B

2. (a) Define Statistics. Discuss its functions, importance and limitations. Explain its use in various fields. (8)

(b) What are qualitative and quantitative variables? Discuss all levels of measurement in detail. (7)

3. (a) For a distribution, the mean is 10, variance is 16, γ coefficient γ_1 is $+1$ and Pearson coefficient β_2 is 4. Obtain the first four moments about the origin. Comment upon the nature of distribution. (8)

(b) Show that if a range of six times the standard deviation covers at least 18 class intervals, Sheppard's correction will make a difference of less than 0.5 per cent in the uncorrected value of the standard deviation. (7)

4. (a) Obtain the equations of two lines of regression for the following data. Also obtain the estimate of X for Y = 70 :

X	65	66	67	67	68	68	69	70	72
Y	67	68	65	68	72	72	69	71	

(8)

(b) Fit an exponential curve of the form $Y = ab^x$ for the following data : (7)

X	1	2	3	4	5	6	7	8
Y	1	1.2	1.8	2.5	3.6	4.7	6.6	9.1

5. (a) Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y) :

X	65	66	67	67	68	68	69	70	72
Y	67	68	65	68	72	72	69	71	

(8)

(b) Prove that Correlation coefficient is independent of change of origin and scale. (7)

6. (a) How we construct index numbers? Discuss in detail the various methods with their advantages and disadvantages. (8)

(b) Compute Index number from the following data :

Commodity	Base year		Current year	
	Quantity	Price	Quantity	Price
A	12	10	15	12
B	15	7	20	5
C	24	5	20	9
D	5	16	5	14

(7)