GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Third Semester) Examinations, December – 2023

22BCMBS23001/22BCDBS23001/21BCMBS23001/22BCDBS23001

Applied Statistics

(CSE(AIML), CSE(DS))

Time: 3 hrs   Maximum: 70 Marks

Answer all questions
(The figures in the right hand margin indicate marks)

PART – A   (2 x 5 = 10 Marks)

Q.1. Answer *ALL* questions

		CO #	Blooms Level
a.	What is frequency polygon?	CO2	K1
b.	Define cumulative frequency distribution.	CO2	K1
c.	The distributions X and Y with total number of observations 36, 64 and mean 4, 3 respectively are combined. What is the Mean of the resulting distributions X+Y?	CO2	K2
d.	What is the formula of standard error of difference of two independent sample proportion?	CO2	K2
e.	What is value of $z_{\frac{\alpha}{2}}$ for α=0.01?	CO2	K1

PART – B   (15 x 4 = 60 Marks)

Answer *ALL* questions

		Marks	CO #	Blooms Level
2. a.	In 1995 out of total 2000 workers in a factory, 1550 were members of a trade union. The number of women workers employed was 250, out of which 200 did not belong to any trade union. In 2000, the number of union workers was 1725 of which 1600 were men. The number of non – union workers was 380, among which 155 were women.	7	CO2	K3
b.	Draw the stem and leaf diagram of given observations: 44, 46, 47, 49, 63, 64, 66, 68, 72, 72, 75, 76, 81, 84, 88, -23.678, -12.45, -3.4, 4.43, 5.5, 5.678, 16.87, 24.7, 56.8	8	CO3	K2

(OR)

		Marks	CO #	Blooms Level
c.	Draw the box plot of the following data: 70, 33, 50, 65, 30, 55, 65, 52, 53, 42, 39, and 35.	7	CO3	K4
d.	Draw the histogram for the following frequency distributions:		CO3	K2

Variable	10 – 15	15 – 20	20 – 25	25 – 30	30 – 40	40 – 60	60 – 80
Frequency	7	19	27	15	12	12	8

3.a. Find the Weighted Arithmetic Mean of the following data. The following are the percentage of marks in an examination.   7   CO3   K3

Subject	Marks (X_i)	Weight (W_i)
English	60	1
Hindi	75	2
Math	63	1
Physics	59	3
Chemistry	55	3

b. Plot a Scatter Plot for the following are the heights and weight of 10 students of a class.   8   CO2   K3

Height	62	72	68	58	65	70	66	63	60	72
Weight	50	65	63	50	54	60	61	55	54	65

(OR)

c. Find the mode for the frequency distribution.   7   CO3   K3

Weight (in kg)	93 – 97	98 – 102	103 – 107	108 – 112	113 – 117	118 – 122	123 – 127	128 – 132
No. of students	3	5	12	17	14	6	3	1

d. Calculate two Line of Regression Equations   8   CO3   K4

Sales (X_i)	91	97	108	121	67	124	51	73	111	57
Purchases (Y_i)	71	75	69	97	70	91	39	61	80	47

4.a. Let t_1 and t_2 be two unbiased estimators of θ. Show that estimator $t = at_1 + (1 - a)t_2$ is an unbiased estimator of θ.   7   CO3   K4

b. If $X_1, X_2,$ and X_3 constitute a random sample of size 3 from normal population with mean μ and variance σ^2. Find the most efficient estimator among the three statistics $t_1 = \frac{X_1 + X_2 + X_3}{3}$, $t_2 = \frac{X_1 + 2X_2 + X_3}{4}$ and $t_3 = X_1 + \frac{X_2 + X_3}{2}$.   8   CO3   K3

(OR)

c. Let $X_1, X_2, X_3, \ldots X_n$ be a random sample from a population with population density function $f(X, \theta) = \theta X^{\theta-1}; 0 < X < 1, \theta > 0$. Find the sufficient estimator for θ.   7   CO3   K4

d. A research worker wishes to estimate the mean of population by using sufficiently large sample. The probability is 0.95 that the sample mean will not differ from the true mean by more than 25% of the standard deviation.   8   CO3   K4

How large a sample should be taken?

5.a. A coin is tossed 900 times and had appeared 490 times. Does this result support the hypothesis that a coin is unbiased? Use 5% level of significance.   7   CO3   K4

b. In big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers?   8   CO3   K3

(OR)

c. Following information is related to 2 places A and B test. Whether there is any significance between their mean wages. Use $\alpha=5\%$.   7   CO3   K4

	A	B
Mean Wages	47	49
Standard Deviation	28	40
No. of Workers	1000	1500

d. A stenographer claims that she can take decision at the rate of 120 wpm. Can we reject her claim on the basis of 100 trails in which she demonstrate a mean of words with standard deviation of $\alpha=5\%$?   8   CO3   K4

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