



GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Third Semester - Regular) Examinations, December – 2022

21BCMBS23001 – Applied Statistics

[CSE(AIML) and 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* the questions

	CO #	Blooms Level
a. What is the difference between primary data and secondary data?	CO1	K1
b. What is skewness?	CO2	K1
c. Define covariance.	CO2	K1
d. Define point estimator, what are the criteria for a good estimator?	CO3	K1
e. What is a sampling distribution?	CO4	K1

PART – B

(15 x 4 = 60 Marks)

Answer *All* the questions

	Marks	CO #	Blooms Level																				
2. a. In 1990, out of a total of 2,000 students in a college 1,400 were for Graduation and the rest for Post-Graduation (P.G.). Out of 1,400 Graduate students, 100 were girls. However, in all, there were 600 girls in the college. In 1995, the number of graduate students increased to 1,700, out of which 250 were girls, but the number of P.G. students fell to 500 of which only 50 were boys. In 2000, out of 800 girls, 650 were for Graduation, whereas the total number of graduates was 2,200. The number of boys and girls in P.G. classes was equal. Represents the above information in tabular form. Also, calculate the percentage increase in the number of graduate students in 2000 as compared to 1990.	8	CO1	K2																				
b. Draw the stem and leaf diagram of the given observations: 4.7, -30, 2.38, 13.7, 9.38, -11.324, -7.523, 18.198, 17.527, 32.55, 21, 17, 14, 28.382, 17.98.	7	CO1	K1																				
(OR)																							
c. Draw the histogram for the following frequency distributions:	8	CO1	K1																				
<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">Marks (less than)</td> <td style="padding: 5px;">10</td> <td style="padding: 5px;">20</td> <td style="padding: 5px;">30</td> <td style="padding: 5px;">40</td> <td style="padding: 5px;">50</td> <td style="padding: 5px;">60</td> <td style="padding: 5px;">70</td> <td style="padding: 5px;">80</td> <td style="padding: 5px;">90</td> </tr> <tr> <td style="padding: 5px;">No. of Students</td> <td style="padding: 5px;">4</td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">24</td> <td style="padding: 5px;">46</td> <td style="padding: 5px;">67</td> <td style="padding: 5px;">86</td> <td style="padding: 5px;">96</td> <td style="padding: 5px;">99</td> <td style="padding: 5px;">100</td> </tr> </table>	Marks (less than)	10	20	30	40	50	60	70	80	90	No. of Students	4	6	24	46	67	86	96	99	100			
Marks (less than)	10	20	30	40	50	60	70	80	90														
No. of Students	4	6	24	46	67	86	96	99	100														
d. Draw the box plot of the following data: 53, 42, 39, 35, 18, 63, 65, 52, 46, 43, 76, 87, 32, 30, 65, 43, 27.	7	CO1	K2																				
3. a. Show that the Weighted Arithmetic Mean of the first 'n' natural number whose weights are equal to the corresponding number is equal to $(2n+1)/3$.	8	CO2	K2																				
b. Find the missing frequencies. The given mean is 1.46 for the following frequency distribution	7	CO2	K3																				

No. of accidents	0	1	2	3	4	5	Total
Frequency (No. of Days)	46	?	?	25	10	5	200

(OR)

- c. Find the mode for the frequency distribution.

8 CO2 K2

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 the Line of Regression Equation

7 CO2 K3

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 $x_1, x_2, x_3, \dots, x_n$ be a random sample from a population with probability density function $f(x, \theta) = \theta x^{\theta-1}; 0 < x < 1; \theta > 0$. Find the sufficient estimator for θ and compute θ for the given observation 70, 33, 50, 65, 30, 55, 65, 52.

8 CO3 K3

- b. Let x_1, x_2, \dots, x_n be a random sample from the normal distribution $N(\mu, \sigma^2)$ population. Find the MLE of σ^2 .

7 CO3 K2

(OR)

- c. A research worker wishes to estimate the mean of the population by using a 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. How large a sample should be taken?

8 CO3 K3

- d. A random sample of 100 articles selected from a batch of 2,000 articles shows that the average diameter of the articles is 0.354 with a standard deviation of 0.048. Find a 95% confidence interval for the average of this batch of 2,000 articles.

7 CO3 K2

5. a. A weighing machine without any display was used by an average of 320 persons a day with a standard deviation of 50 persons. When an attractive display was used on the machine, the average for 100 days increased by 15 persons. Can we say that the display did not help much? Use a level of significance of 0.05.

8 CO4 K2

- b. In a 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?

7 CO4 K2

(OR)

- c. A radio shop sells, on average 200 radios per day with a standard deviation of 50 radios. After an extensive advertising campaign, the management will compute the average sales for the next 25 days to see whether an improvement has occurred. Assume that the daily sales of radio are normally distributed. Test the hypothesis at a 5 % level of significance if the sample average is 216.

8 CO4 K2

- d. The company has a head office in Kolkata and a branch in Mumbai. The personal director wants to know if the workers at the two places would like the introduction of a new plan work and a survey has been conducted for this purpose. Out of a sample of 500 workers at Kolkata 62% favor the new plan. At Mumbai out of 400 workers, 41% were against the new plan. Is there any significant difference between the two groups in their attitude towards the new plan at the 5% level?

7 CO4 K2

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