VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF ADVANCED SCIENCES
DEPARTMENT OF MATHEMATICS
Continuous Assessment Test – I – November 2022

FALL SEMESTER 2022-23

D1

Programme Name & Branch: MCA

Course Code: MAT 5007

Course Name: Applied Statistical Methods

Time Duration: 90 Minutes

Max. Marks: 50

Answer All the Questions (10 × 5 = 50)

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1. Find mean and median for the following frequency distribution:

Age group (in years)	No of Members
20 – 25	30
25 – 30	160
30 – 35	210
35 – 40	180
40 – 45	145
45 – 50	105
50 – 55	70
55 – 60	60
60 – 65	40

Mean = 39.425

Median = 37.78.

2. Scores of two cricket players for 10 matches are as follows. Find which cricketer can be considered as more consistent player.

CV = $\frac{\sigma}{\text{Mean}} \times 100$.

Player A	74	75	78	72	77	79	78	81	76	72
Player B	86	84	80	88	89	85	86	82	82	79

P(A) = 3.700
P(B) = 3.738

3. Calculate the Pearson's Coefficient of Skewness (from Mode and Median) for the following data:

$\frac{3(\text{Mean} - \text{Median})}{\sigma}$ −9.97

Class size	Frequency
0 – 20	8
20 – 40	12
40 – 60	30
60 – 80	14
80 – 100	6

4. Calculate Karl Pearson's Correlation Coefficient for the following data and interpret your result:

$r = \frac{\frac{\Sigma xy}{n} - \bar{x}\bar{y}}{\sigma_x \sigma_y}$ 0.918

X	60	34	40	50	45	41	22	43
Y	75	32	34	40	45	33	12	30

5. Find the regression lines of Sales on Advertising Expenditure and Advertising Expenditure on Sales for the following data:

$x - \bar{x} = \frac{\sigma_x}{\sigma_y}(y - \bar{y})$

Sales (X) (Rs. Crores)	14	16	18	20	24	30	32
Adv. Expendiure (Y) (Rs. Lakhs)	52	62	65	70	76	80	78

(i) Estimate the sales for the advertising expenditure of Rs.100 Lakhs (16)

(ii) Estimate the advertising expenditure for the sales of Rs.47 Crores.

12.2-2

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Mode = 2Mean − 2Median
Mode − Median = 3Mean

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Vellore – 632014, Tamil Nadu, India
DEPARTMENT OF MATHEMATICS
SCHOOL OF ADVANCED SCIENCES
FALL SEMESTER 2022-2023

CONTINUOUS ASSESSMENT TEST – II

Programme Name & Branch : MCA
Course Code : MAT5007
Course Name : Applied Statistical Methods
Slot :D1
Duration : 90 minutes **Max. Marks : 50**

General instruction(s): Answer all the questions, Statistical tables are permitted

Q. No	Question	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)
1.	Suppose that a short quiz consists of 6 multiple choice questions. Each question has four possible answers of which only one in correct. A student guesses on every question. Find the probability that a student will answer (i) Five or more questions correctly (ii) All questions correctly (iii) At most 1 question correctly (iv) Between 4 and 5 questions correctly.	10	CO3	BL3
2.	The annual salaries of employees in a large company are approximately normally distributed with a mean of Rs.50,000 and a standard deviation of Rs,20,000. (i) What percent of people earn less than Rs.40,000? (ii) What percent people earn between Rs.45,000 and Rs.65,000? (iii) What percent of people earn more than Rs.70,000?	10	CO3	BL3
3.	Given the following probability distribution of X . x: -2, -1, 0, 1, 2, 3 p(x): 1/10, k, 2/10, 2k, 3/10, 3k Compute (i) Value of k. (ii) E(x) (iii) $E(x^2)$ (iv) E(10x ±100) (v) Var (6x ±100).	10	CO3	BL5

4.	A company wants to improve the quality of products by reducing defects and monitoring the efficiency of assembly lines. In assembly line A, there were 18 defects reported out of 200 samples while in line B, 25 defects out of 600 samples were noted. Is there a difference in the procedures at a 5% LOS.	10	CO4	BL4
5.	An online medicine shop claims that the mean delivery time for medicines is less than 120 minutes with a standard deviation of 30 minutes. Is there enough evidence to support this claim at 5% LOS if 49 orders were examined with a mean of 100 minutes?	10	CO4	BL4

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Final Assessment Test – Jan/Feb 2023

Course: MAT5007 - Applied Statistical Methods
Class NBR(s): 5824 / 5838 / 5923 Slot: D1
Time: Three Hours Max. Marks: 100

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION, IS TREATED AS EXAM MALPRACTICE

General Instructions: Use of statistical table is permitted.

Answer any TEN Questions
(10 X 10 = 100 Marks)

1. Calculate mean. Median and mode of the following data

x	0-10	10-20	20-30	30-40	40-50	50-60	60-70
f	10	20	35	40	25	25	15

2. Calculate the mean deviation and its coefficient from the following data

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
frequency	5	8	12	15	20	14	12	6

3. Calculate Karl-Pearson's coefficient of correlation from the advertisement cost and sales for the following data:

Advertisement Cost	39	65	62	90	82	75	25	98	36	78
Sales(in rupees)	47	53	58	86	62	68	60	91	51	84

4. From the following data, find
   (i) The two regression equations
   (ii) The coefficient of correlation between the marks in Economics and Statistics
   (iii) The most likely marks in statistics when marks in Economics are 30

Marks in Economics	25	28	35	32	31	36	29	38	34	32
Marks in Statistics	43	46	49	41	36	32	31	30	33	39

5. The number of monthly breakdowns of a computer is a Random Variable having a Poisson distribution with mean equal to 1.8. Find the probability that this computer will function for a month
   (i) without a breakdown
   (ii) with only one breakdown and
   (iii) with at least one breakdown.

6. The weekly wages of 1000 workmen are normally distributed around a mean of Rs.70 with a S.D. of Rs.5. Estimate the number of workers whose weekly wages will be
   (i) between Rs.69 and Rs.72.
   (ii) less than Rs.69
   (iii) more than Rs.72

7. Before an increase in excise duty on tea, 800 persons out of a sample of 1000 persons were found to be tea drinkers. After an increase in duty, 800 people were tea drinkers in a sample of 1200 people. Using standard error of proportion, state whether there is a significant decrease in the consumption of tea after the increase in excise duty.

8. The mean yield of wheat from a district A was 210 pounds with S.D. 10 pounds per acre from a sample of 100 plots. In another district the mean yield was 220 pounds with S.D. 12 pounds from a sample of 150 plots. Assuming that the S.D. of yield in the entire state was 11 pounds, test whether there is any significant difference between the mean yield of crops in the two districts.

9. The average number of articles produced by two machines per day are 200 and 250 with standard deviations 20 and 25 respectively on the basis of records of 25 days production. Can you regard both the machines equally efficient at 1% level of significance.

10. In a certain sample of 2000 families, 1400 families are consumers of tea. Out of 1800 Hindu families, 1236 families consume tea. Use Chi–square test and state whether there is any significant difference between consumption of tea among Hindu and Non- Hindu families.

11. Out of 800 families with four children each, how many families would be expected to have (i) two boys and two girls (ii) atleast one boy (iii) atmost two girls. Assume equal probabilities for boys and girls.

12. Four doctors each test four treatments for a certain disease and observe the number of days each patient takes to recover. The results are follows (recovery time in days)

	Treatment			
Doctor	1	2	3	4
A	10	14	19	20
B	11	15	17	21
C	9	12	16	19
D	8	13	17	20

Discuss the difference between (i) doctors and (ii) treatments.

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