M.A. DEGREE EXAMINATION, APRIL 2024
BRANCH III – ECONOMICS
SECOND SEMESTER

COURSE   : MAJOR CORE
PAPER   : RESEARCH METHODS AND ANALYSIS II (THEORY)
SUBJECT CODE : 23EC/PC/RM24
TIME   : 2 HOURS   MAX. MARKS: 60

Q. No.	SECTION A ANSWER ANY TWO QUESTIONS IN 300 WORDS. (10 x 2 = 20)	CO	KL
1	Enumerate on the key properties of a Normal Distribution.	1	1
2	Discuss the method of least squares and its application in statistical analysis.	1	1
3	Elucidate the various types of Non-Linear Regression models.	1	1
	SECTION - B **ANSWER ANY TWO OUT OF THREE QUESTIONS IN 300 WORDS.** (10 x 2 = 20)		
4	What are the various applications of dummy variables within regression analysis?	2	2
5	State the properties of correlation coefficient and explain the different methods of measuring the same.	2	2
6	Discuss the inductive and deductive methods of reasoning.	2	2
	SECTION - C **ANSWER ANY ONE OUT OF TWO QUESTIONS IN 600 WORDS.** (20 x 1 = 20)		
7	Explain the various methodologies used in qualitative research.	3	3
8	Examine the process of hypothesis testing.	3	3

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(For candidates admitted during the academic year 2023 – 2024)

M.A. DEGREE EXAMINATION, APRIL 2024
BRANCH III – ECONOMICS
COURSE **: CORE**
PAPER   **: RESEARCH METHODS AND ANALYSIS II (PRACTICAL)**
SUBJECT CODE : 23EC/PC/RM24
TIME   **: 1 HOUR**   **MAX. MARKS: 40**

Q. No.	SECTION A	CO	KL
	ANSWER ANY TWO OUT OF THREE QUESTIONS. **(10 x 2 = 20)**		
1	A marketing manager for a fitness app believes that the number of hours spent using the app per week (X) positively affects the number of calories burned per week (Y). They have collected data from a random sample of 20 app users. This data is provided in the table below:	4	4

User ID	Hours Spent Using App (X)	Calories Burned (Y)
1	3	1200
2	5	1800
3	2	1000
4	4	1500
5	7	2100
6	1	800
7	6	1900
8	4	1400
9	2	1100
10	5	1700
11	3	1300
12	8	2400
13	1	700
14	7	2000
15	4	1600
16	2	900
17	6	1800
18	3	1250
19	5	1850
20	1	600

Fit a simple linear regression model to predict calories burned (Y) based on hours spent using the app (X).

| 2 | A botanist is studying the effect of different fertilizer types (organic, inorganic, and control) on the growth rate of tomato plants. They planted 10 tomato plants in each group (organic, inorganic, and control) and measured their height (in cm) after a month. The data is provided in the table below: | 4 | 4 |

Group	Height (cm)
Organic	25
Organic	28
Organic	23
Organic	26
Organic	30
Organic	22
Organic	27
Organic	24
Organic	29

Organic	21
Inorganic	32
Inorganic	35
Inorganic	30
Inorganic	31
Inorganic	34
Inorganic	28
Inorganic	33
Inorganic	29
Inorganic	36
Inorganic	30
Control	20
Control	18
Control	19
Control	21
Control	17
Control	22
Control	20
Control	16
Control	18
Control	23

Perform a one-way ANOVA test to determine if there is a significant difference in plant height between the three fertilizer groups.

3.	A research study aimed to investigate the effectiveness of two different teaching methods (Method A and Method B) on student performance in mathematics. The study collected data on the scores of two groups of students taught using each method provided below:	4	4

Method A	Method B
85	80
78	75
90	85
82	79
88	81
77	78
86	83
79	76
83	82
91	88
75	74
89	87
84	81
87	84
80	79
81	80
76	77
85	83
79	85
88	79

Perform an F-test to determine if there is a significant difference in the mean scores between Method A and Method B at a 5% level of significance.

SECTION B

ANSWER ANY ONE OUT OF TWO QUESTIONS.   **(20 x 1 = 20)**

4.	a.) Find the value of the correlation coefficient from the data given in the following table:	5	5

Age (x)	43	21	25	42	57	59
Glucose level (y)	99	65	79	75	87	81

(6 6)

b). A company is interested in analyzing the monthly sales data of its product over the past two years. The data consists of monthly sales figures from January 2022 to December 2023. Using time series analysis techniques, investigate the sales pattern. The dataset is provided below:

Month	Sales (in units)
Jan-22	120
Feb-22	135
Mar-22	150
Apr-22	145
May-22	155
Jun-22	160
Jul-22	175
Aug-22	180
Sep-22	190
Oct-22	200
Nov-22	205
Dec-22	210
Jan-23	215
Feb-23	220
Mar-23	225
Apr-23	230
May-23	235
Jun-23	240
Jul-23	245
Aug-23	250
Sep-23	255
Oct-23	260
Nov-23	265
Dec-23	270

Prepare a time series plot of the monthly sales data.

5	(a) After performing a correlation analysis on the dataset provided, the following results were obtained:	5	5

Correlation Coefficient (r) = 0.997

Coefficient of Determination (r-squared) = 0.994

Interpret the values of the correlation coefficient (r) and the coefficient of determination (r-squared) in the context of the relationship between the number of hours spent studying and the exam scores obtained by the students.

(b) A research study aimed to compare the effectiveness of two different teaching methods (Method A and Method B) on student performance in mathematics. The study collected exam scores from two groups of students taught using each method. The data obtained are as follows:

A	78	82	85	88	90	92	95	98	
B	72	75	80	83	86	89	91	94	97

Perform a Mann-Whitney U test to determine if there is a significant difference in the exam scores between students taught using Method A and Method B at a 5% level of significance.

(The marks column also shows: 6 | 6)

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