STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86
(For candidates admitted from the academic year 2023 – 2024)

B.Com DEGREE EXAMINATION, NOVEMBER 2023
ACCOUNTING AND FINANCE
FIRST SEMESTER

COURSE : ALLIED CORE
PAPER : STATISTICS FOR BUSINESS DECISIONS
SUBJECT CODE : 23AF/AC/SB15
TIME : 3 HOURS **MAX. MARKS: 100**

Q. No.	**SECTION A (5 x 2 = 10 marks)** **Answer all questions:**	CO	KL
1.	Define Correlation.	1	1
2.	A coin was tossed 400 times and the head turned up 216 times. Calculate the Chi-Square Value.	1	1
3.	Convert the following annual trend equation on a monthly basis. $Y = 10.6 + 0.8X + 0.64X^2$	1	1
4.	An auto company decided to introduce a new six-cylinder car whose mean petrol consumption is claimed to be lower than that of the existing auto engine. It was found that the mean petrol consumption for 50 cars was 10 km per litre with standard deviation of 3.5 km per litre. Test for the company at 5% level of significance whether the claim the new car petrol consumption is 9.5 km per litre on the average is acceptable.	1	1
5.	List the components of Time Series.	1	1
Q. No.	**SECTION B (4 x 5 =20 marks)** **Answer any four questions:**	**CO**	**KL**
6.	On the basis of observations made on 39 cotton plants, the total correlation of yield of cotton (X_1), Number of seed vessels (X_2) and height(X_3) are found to be : r_{12} =0.8, r_{13} =0.65, and r_{23}=0.7 Comment on the partial correlation between yield of cotton and the number of seed vessels eliminating the effect of height.	2	2
7.	In a survey of buying habits, 400 women shoppers are chosen at random in a supermarket A located in a certain section of Mumbai city. Their average monthly food expenditure is Rs.250 with standard deviation of Rs.40. For 400 women shoppers chosen at random in supermarket B in another section of the city, the average monthly food expenditure is Rs.220 with standard deviation of Rs.55. Test at 1% level of significance whether the average food expenditure of the two populations of shoppers from which the samples are obtained are equal.	2	2
8.	Four coins were tossed 160 times and the following results were obtained: No. of heads : 0 1 2 3 4 Observed frequencies: 17 52 54 31 6 Under the assumptions that coins are balanced find the expected frequencies of getting 0,1,2,3 or 4 heads and test the goodness of fit.	2	2
9.	Write short note on Indicator Predictors.	2	2

…2

10. Assume a four yearly cycle and calculate the trend by the method of moving averages relating to tea production in India: — CO: 2 — KL: 2

Year	Production	Year	Production
2008	464	2013	540
2009	515	2014	557
2010	518	2015	571
2011	467	2016	586
2012	502	2017	612

11. For the following table: — CO: 2 — KL: 2

i) Fit a straight line trend by the method of least squares

ii) Estimate the product in for 2020

Year	2013	2014	2015	2016	2017	2018	2019
Production (in tonnes)	12	10	14	11	13	15	16

Q. No. **SECTION C (4 x 10 = 40 marks)** **Answer the following:** — **CO** — **KL**

12. a. The following table gives indices of industrial production of registered unemployed. (in lakhs). Calculate the Karl Pearson's Coefficient of Correlation. — CO: 3 — KL: 3

year	2008	2009	2010	2011	2012	2013	2014	2015
Production	100	102	104	107	105	112	103	99
Not Employed	15	12	13	11	12	12	19	26

(OR)

b. The following zero-order correlation coeffecients are given:
r_{12} =0.98,r_{13}=0.44 and r_{23}= 0.54
Calculate multiple correlation coefficient treating first variable as dependent and second and third variable as independent.

13. a. Perform a two way ANOVA on the data given below: — CO: 3 — KL: 3

Plots of land	Treatment A	B	C	D
I	38	40	41	39
II	45	42	49	36
III	40	38	42	42

Use coding method subtracting 40 from the given numbers.

(**OR)**

b.To assess the significance of possible variation in performance in a certain test between the convent schools of a city , a common test was given to a number of students taken at random from the senior fifth class of each of the four schools concerned. The results are given below. Make an analysis of variance of data.

A	B	C	D
8	12	18	13
10	11	12	9
12	9	16	12
8	14	6	16
7	4	8	15

14. a. From the data given below about the treatment of 250 patients suffering from a disease, state whether the new treatment is superior to the conventional treatment. — 4 — 4

Treatment	No. of Patients		
	Favourable	Not favourable	Total
New	140	30	170
Conventional	60	20	80
Total	200	50	250

(Given for degree of freedom =1, chi square 5% =3.84)

(OR)

b. Fit a Regression line Y= a+bX by the method of least squares.
Income (X)Rs. Thousands): 41 65 50 57 96 94 110 30 79 65
Expenditure(Y)Rs.Thousands):44 60 39 51 80 68 84 34 55 48

15. a. Assuming the trend is absent , determine if there is any seasonality in the data given below: — 4 — 4

Year	1st quarter	2nd quarter	3rd quarter	4th quarter
2014	3.7	4.1	3.3	3.5
2015	3.7	3.9	3.6	3.6
2016	4.0	4.1	3.3	3.1
2017	3.3	4.4	4.0	4.0

What are the seasonal indices for various quarters?

(OR)

b. Find the multiple linear regression equation of X_1 on X_2 and X_3 from the data relating to three variables given below:

X_1	4	6	7	9	13	15
X_2	15	12	8	6	4	3
X_3	30	24	20	14	10	4

Q. No.	**SECTION D (2 x 15 = 30 marks)** **Answer any two questions:**	CO	KL
16.	To study the performance of three detergents and three different water temperature , the following Whiteness readings were obtained with specially designed equipment: Perform a two way analysis of variance, using 5% level of significane	5	5

Water temp	Detergent A	Detergent B	Detergent C
Cold	57	55	67
Warm	49	52	68
Hot	54	46	58

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<td>17.</td>
<td>In an anti-malarial campaign in a certain area, quinine was administered to 1624 persons out of a total population of 6496. The number of fever cases is shown below:
Discuss the usefulness of quinine in checking malaria.
<table>
<tr><td>Treatment</td><td>Fever</td><td>No fever</td><td>Total</td></tr>
<tr><td>Quinine</td><td>40</td><td>1584</td><td>1624</td></tr>
<tr><td>No quinine</td><td>440</td><td>4432</td><td>4872</td></tr>
<tr><td>Total</td><td>480</td><td>6016</td><td>6496</td></tr>
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<td>18.</td>
<td>Calculate 5 – yearly and 7 – yearly moving averages for the following data during 2002-2017:

<table>
<tr><td>Year</td><td>No. of failures</td><td>Year</td><td>No. of failures</td></tr>
<tr><td>2002</td><td>23</td><td>2010</td><td>9</td></tr>
<tr><td>2003</td><td>26</td><td>2011</td><td>13</td></tr>
<tr><td>2004</td><td>28</td><td>2012</td><td>11</td></tr>
<tr><td>2005</td><td>32</td><td>2013</td><td>14</td></tr>
<tr><td>2006</td><td>20</td><td>2014</td><td>12</td></tr>
<tr><td>2007</td><td>12</td><td>2015</td><td>9</td></tr>
<tr><td>2008</td><td>12</td><td>2016</td><td>3</td></tr>
<tr><td>2009</td><td>10</td><td>2017</td><td>1</td></tr>
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Also plot the actual and trend values on the graph.</td>
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