STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2011-12)

SUBJECT CODE : 11CM/AC/SB44

B.Com./B.Com(CS) DEGREE EXAMINATION APRIL 2013
COMMERCE
CORPORATE SECRETARYSHIP
FOURTH SEMESTER

COURSE : ALLIED – CORE
PAPER : BUSINESS STATISTICS
TIME : 3 HOURS **MAX. MARKS :100**

SECTION – A
ANSWER ALL THE QUESTIONS **(10 × 3 = 30)**

1. What are the various components of time series and explain briefly each one of them.

2. Draw a figure to fit a trend line to the following data by free hand method.

Year	!996	!997	!998	!999	2000	2001	2002
Sales (‘000units)	65	95	85	115	110	120	130

3. Calculate partial correlation coefficients $r_{12.3}$ *and* $r_{23.1}$ using $r_{12}=.82,\ r_{13}=.77, r_{23}=.80$

4. State the limitations of multiple correlation.

5. The following data were calculated from 2 cities as regard the starting stipend paid to new management trainees. Do the data give evidence that the stipend paid in city B is significantly more than city A. Test at a significance level of 1%.

City	Monthly stipend mean	Sample Std. deviation	Sample size
A	Rs.1400	Rs.80	200
B	Rs.1600	Rs.120	175

6. In 600 throws of six faced dice, odd points appeared 360 times .Would you say that the dice is fair at 5% level of significance.

7. Define a Chi-square statistic and state where it is applied.

8. Under what conditions F-test can be applied.

9. What are the assumptions of Analysis of variance?

10. The information in regard to two makes A and B are given below:

	A	B
Sample size	21	16
Mean run life	100	95
Standard deviation	2.5	1.5

The firm wants to know if the variance of two are significantly different by applying F-test at 5% level of significance.

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SECTION – B
ANSWER ANY FIVE QUESTIONS (5 × 8 = 40)

11. Fit a trend line to the following data by the method of semi-average and forecast the sales for the year 2002.Also draw the required figure comparing trend line and the actual data.

Year	1993	1994	1995	1996	1997	1998	1999
Sales of firm (1000 units)	102	105	114	110	108	116	112

12. Use the method of monthly averages to determine the seasonal indices for the following data of production of a commodity bases on years 2006,2007,2008:

Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
2006	12	11	10	14	15	15	16	13	11	10	12	15
2007	15	14	13	16	16	15	17	12	13	12	13	14
2008	16	15	14	16	15	17	16	13	10	10	11	15

13. On the basis of observations made on 35 copies plants the total correlations of yield of cotton X_1, numbers of balls (ie) seed vessels(X_2) and height (X_3) are found to be $r_{12}=0.863,\ r_{13}=0.648, r_{23}=0.709$. Determine the multiple correlation $R_{1.23}$ and the partial correlation $r_{12.3}$ *and* $r_{13.2}$. and interpret your results.

14. Given the following, determine the regression equation of (i) x_1 on x_2 and x_3. (ii) x_2 on x_1 and x_3. $r_{12}=.8,\ \ r_{13}=0.6,\ \ r_{23}=0.5,\ \ \sigma_1=10,\ \sigma_2=8, \sigma_3=5.$

15. An intensive coaching was given to11 students and they were examined twice in a month. The results of these two tests are given below. State whether there has been an improvement in the results of second test over first test at 5% level of significance:

Serial	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Test-1	19	16	23	17	18	20	18	21	20	19	23
Test-2	17	20	23	20	20	23	23	18	19	22	24

16. A certain drug is claimed to be effective in curing colds. In an experiment on 328 people with cold, half of them were given the drug and half them sugar pills. The patients reactions are recorded in the following table. Test the hypothesis that the drug is no better than sugar pills for curing colds.

	Helped	Harmed	No Effects
Drug	104	20	40
Sugar Pills	88	24	52

17. The following table gives the yields on 15 samples plots under different plots under 3 varieties of seeds:

A	B	C
20	18	25
21	20	28
23	17	22
16	15	28
20	25	22

Find out if the average yields of land under different varieties of seed show significant difference at 5% l.o.s.

SECTION –C
ANSWER ANY TWO QUESTIONS (2 × 15= 30)

18. The following are the annual profits, in thousands of rupees, in a certain business:

Year: 1996 1997 1998 1999 2000 2001 2002
profits
(in '000) 60 72 75 65 80 85 95

a) Use the method of Least Squares to fit a straight line to the above data.
b) Also make an estimate of the profit for the year 2004.

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

X_1	11	17	26	28	31	35	41	49	63	69
X_2	2	4	6	5	8	7	10	11	13	14
X_3	2	3	4	5	6	7	9	10	11	13

20. a. Two independent samples of 8 and 7 items gave the following values:

Sample A: 9 11 13 11 15 9 12 14
Sample B: 10 12 10 14 9 8 10
Examine whether the difference between the means of the two samples is significant at 5% level.

b. A survey of 320 families with 5 children each revealed the following distributions:

No of Boys : 5 4 3 2 1 0
No Of Girls : 0 1 2 3 4 5
No Of families: 14 56 110 88 40 12

Is the results consistent with the hypothesis that male and female births are equally probable?

Degree of freedom	.05	.01
4	9.488	13.277
5	11.070	15.086
6	12.592	16.812.

21. a. In a sample of 8 observations, the sum of the squared deviations of items from the mean was 94.5. In another sample of 10 observations, the value was found to be 101.7. Test whether the difference is significant at 5% level.

b. To study the performance of three detergents and 3 different water temperatures following whiteness reading were obtained with specially designed equipment:

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

Perform a two way analysis of variance using 5 % level of significance.

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