STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.
(For candidates admitted during the academic year 2008-09 & thereafter)

SUBJECT CODE : CM/AC/SB44

B.Com. DEGREE EXAMINATION APRIL 2011
COMMERCE
FOURTH SEMESTER

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

SECTION – A

ANSWER ALL QUESTIONS: **(10 x 3 = 30)**

1. Define time series.

2. Solve the following equations and find the value **a** and **b**.
   150 = 5a + b
   650 = 5a + 7b

3. Given y = 250 + 6.6 X
   (Origin 2009, X unit = 1 yr., Y unit = average monthly earnings in rupees)
   Shift the origin formed by 2 years & convert the equation on monthly basis.

4. Given $r_{12} = 0.90$, $r_{13} = 0.65$, $r_{23} = 0.60$. Calculate the value of $r_{23.1}$ and $R_{1.23}$.

5. Define null and alternative hypothesis.

6. Given the following values, $\bar{d} = 1$, n = 5 and S = 4.183 find the t – statistic for the difference between the means of two dependent samples.

7. Give the formula for the chi-square test.

8. A sample 10 observation gave a standard deviation of $\sqrt{28}$. Is this compatible with the hypothesis that the sample is from a normal population with variance 14? (χ^2 for 9 d.f at 5%level = 16.92)

9. In the two-way ANOVA table C = 3 and r = 5, find the error degrees of freedom.

10. Give the final ANOVA of two way classification.

SECTION – B

ANSWER ANY FIVE QUESTIONS: **(5 x 8 = 40)**

11. Fit a straight line trend by the method of least squares and tabulated the trend values and also estimate the likely sales for the year 2006.

Year	2000	2001	2002	2003	2004
Production (thousand tons)	10	20	30	50	40

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12. In a test given to two groups of students drawn from two normal populations, the marks obtained were as follows:

Group A	18	20	36	50	49	36	34	49	41
Group B	29	28	26	35	30	44	46		

Explain at 5% level, whether the two populations have the same variance.

13. Fit an exponential trend equation to the following data of production of sugar in six consecutive years.

Year	1994	1995	1996	1997	1998	1999
Production (in '000 tonnes)	81	89	98	109	120	138

14. Eleven sales executive trainees are assigned selling jobs right after their recruitment. After a fontnight they are withdrawn from their field duties and given a month training for executive sales. Sales executed by them in thousands of rupees before and after the training, in the same period, are listed below.

Sales ('000 Rs.) Before Training	23	20	19	21	18	20	18	17	23	16	19
Sales ('000 Rs.) After Training	24	19	21	18	20	22	20	20	23	20	27

Do these data indicate that the training has contributed to their performance?

15. A certain machine was given to each of the five patients. The results are given below.

Weight before medicine	42	39	48	60	41
Weight after medicine	38	42	48	67	40

Test whether there is any change in weight after the medicine at 5% level of significance. (t for 4d.f at 5% level = 2.78)

16. Weights in tons of 10 shipment are given below :
30, 34, 31, 36, 32, 38, 35, 33, 35, 36
Can we say that the variance of the distribution of weight of all shipments from which the above sample of 10 shipments was drawn is equal to 4 square tons? (chi-square for 9 d.f at 5% level = 16.91)

17. The three samples below have been obtained from normal populations with equal variances. Test the hypothesis at 5% level that the population means are equal. ($F_{(2, 12)}$ at 5% level = 3.88)

8	7	12
10	5	9
7	10	13
14	9	12
11	9	14

SECTION – C

ANSWER ANY TWO QUESTIONS: (2 x 15 = 30)

18. For the following contingency table:
    (a) Construct a table of observed and expected frequencies.
    (b) Calculate the Ch-square statistic.
    (c) State the null and alternate hypothesis.
    (d) Using 0.05 level of significance, derive the analysis:

	Income level		
Attendance	Low	Middle	High
Never	27	48	15
Occasional	25	63	14
Regular	22	74	12

19. Calculate seasonal indices by link relatives method form the data given below :

Year	QUARTERLY DATA			
	I	II	III	IV
2000	45	54	72	60
2001	48	56	63	56
2002	49	63	70	65
2003	52	65	75	72
2004	60	70	83	86

20. Two researchers adopted different sampling techniques while investigating the same group of students falling in difference intelligence level. The results are as follows:

Number of Students in each Level

Researcher	Below average	average	Above average	Genius	Total
X	137	164	152	147	600
Y	32	57	56	35	180
Total	169	221	208	182	780

Would you say that the sampling techniques adopted by the two researchers are significantly different? (χ^2 for 3 d.f = 7.815)

21. The following table gives per hectare yield for three verities of wheat each grown on five plots.

Per hectare yield (in tons)

Plot of the land	Variety of the land		
	A	B	C
1	5	3	10
2	6	2	13
3	8	5	7
4	1	10	13
5	5	0	17

Set up two way ANOVA table and test at 5% level of significance.
($F_{(2, 8)}$ at 5% level =4.46, $F_{(4, 8)}$ at 5% level =6.04)

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