

**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 2012**  
**COMMERCE**  
**FOURTH SEMESTER**

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

**SECTION – A**

**ANSWER ALL QUESTIONS IN NOT MORE THAN 50 WORDS. 10 X 3 = 30**

- 1) Distinguish between Cyclical and Seasonal Variation.
- 2) What is the concept of multiple regression?
- 3) Differentiate between Type I and Type II errors.
- 4) State the conditions to be fulfilled for applying the chi-square test.
- 5) What is ANOVA?

- 6) Calculate 3 yearly moving average for the following data:

Year	2000	2001	2002	2003	2004	2005	2006	2007
Values	3	5	6	10	12	14	15	16

- 7) A sample size of 400 was drawn and the sample mean was found to be 99. Test whether this sample could have come from a normal population with mean 100 and standard deviation 8 at 5% level of significance.
- 8) The standard deviations calculated from two random samples of sizes 9 and 13 are 2.1 and 1.8 respectively. May the samples be regarded as drawn from the normal populations with the same standard deviation? The value of F from the table with degrees of freedom 8 and 12 is 2.85.
- 9) Briefly explain the uses of Chi- Square test.
- 10) A simple correlation coefficient between yield ( $x_1$ ), temperature ( $x_2$ ) and rainfall ( $x_3$ ) are given by  $r_{12} = 0.6$ ,  $r_{13} = 0.5$  and  $r_{23} = 0.8$ . Find the multiple correlations  $R_{123}$ .

## SECTION – B

ANSWER ANY FIVE QUESTIONS:

(5 x 8 = 40)

- 11) Fit a straight line trend by the method of least squares to the following data and also forecast the earnings for the year 2014

Year	2002	2003	2004	2005	2006	2007	2008
Earnings(Rs.Lakhs)	15	14	18	20	17	24	27

- 12) Is it possible to get the following from a set of experimental data?  
 $R_{12} = 0.06$ ,  $r_{23} = 0.8$  and  $r_{31} = -0.5$
- 13) Given  $r_{12} = 0.28$ ,  $r_{23} = 0.49$ ,  $r_{31} = 0.51$ ;  $\sigma_1 = 2.7$ ,  $\sigma_2 = 2.4$ ,  $\sigma_3 = 2.7$ , Find the regression equation of  $X_3$  on  $X_1$  and  $X_2$ .

- 14) Two salesmen A and B are working in a certain district. From a sample survey conducted by the Head Office, the following results were obtained. State whether there is any significant difference in the average sales between the two salesmen? (Give,  $t_{0.05, 36}$  d.f = 1.96)

	Salesman A	Salesman B
No of Sales	20	18
Average Sales (Rs)	170	205
Standard Deviation ( Rs)	20	25

- 15) The mean yield of wheat from a district A was 210kgs. With standard deviation 10 kgs per acre form a sample of 100 plots. In another district B, the mean yield was 220 kgs with standard deviation 12kgs from a sample of 150 plots. Assuming that the standard deviation of the yield in the entire state was 11 kgs, test whether there is any significant difference between the mean yields of crops in the two districts.
- 16) In an industry, 200 workers, employed for a specific job, were classified according to their performance and training received / not received to test independence of a specific training and performance. The data is summarized as follows:

	Performance		Total
	Good	Not Good	
Trained	100	50	150
Untrained	20	30	50
Total	120	80	200

Use chi-Square test of independence at 5% level of significance and write your conclusion. (Data from Chi – Square table; (1 d.f, 5%) = 3.84)

- 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: (Table Value for  $F_{0.05}$ , for (2,12) d.f = 3.8)

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) Calculate seasonal indices by the Ratio –to-Moving average method from the following data.

Quarter	Wheat Prices ( Rs.per Quintal)		
	2008	2009	2010
I	75	86	90
II	60	65	72
III	54	63	66
IV	59	80	85

- 19) The following data represent the number of units of a product produced by 3 different workers using 3 different types of machines.

Workers	Machines		
	A	B	C
X	8	32	20
Y	28	36	38
Z	6	28	14

Test (i) whether the mean productivity is the same for the different machine types, and (ii) whether the three workers differ with respect to mean productivity.

(Table Value:  $F_{0.05, (2,4)} = 6.95$ )

- 20) Given the following data:

$X_1$	3	5	6	8	12	14
$X_2$	16	10	7	4	3	2
$X_3$	90	72	54	42	30	12

Compute the coefficient of linear multiple correlation of  $X_3$  on  $X_1$  and  $X_2$ .

- 21) A salesman is expected to affect an average sale of Rs.3500. A sample test revealed that a particular sales man had made the following sales: Rs.3500; Rs.2500; Rs.5200; Rs.3000 and Rs.2000. Using 0.05 level of significance, conclude whether his work is below standard or not. ( $t_{0.05, 5 \text{ d.f}} = 2.015$ )

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