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

B.Com./B.Com(CS) DEGREE EXAMINATION APRIL 2014
FOURTH SEMESTER

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

SECTION – A
ANSWER ALL THE QUESTIONS $(10 \times 3 = 30)$

1. Name the various methods that can be used for determining trend.
2. Given the trend equation $Y = 280 - 1.8X$, (origin June30,1991: Y unit =annual monthly average).   Convert this equation into monthly terms and shift the origin half a month forward.
3. Calculate partial correlation coefficients $r_{12.3}$ and $r_{23.1}$ using $r_{12} = 0.86$, $r_{13} = 0.65$, $r_{23} = 0.72$
4. Define the coefficient of multiple correlation for three variables.
5. Define type I and type II error.
6. In a hospital 480 females and 520 male babies were born in a week. Do these figures confirm the hypothesis that male and female are in equal number?
7. What is Chi-square test of independence?
8. Define Variance Ratio test?.
9. In a sample of 8 observations, the sum of squared deviations of items from the mean was 84.4. In another sample of 10 observations, the value was found to be 102.6.Test whether the difference is significant at 5% level.
10. A company manufacturing electric light bulbs claim that the average life of its bulbs is 1600 hours. The average life and standard deviation of a random sample of100 such bulbs were 1570 hours and 120 hours respectively. Should we accept the claim of the company?

SECTION – B
ANSWER ANY FIVE QUESTIONS $(5 \times 8 = 40)$

11. Fit a straight line trend by the method of least squares to the following data. Assuming the rate of change continues. What would be the predicated earning for the year 1998?

Year	1989	1990	1991	1992	1993	1994	1995
Earning (Rs lakhs)	38	40	65	72	69	87	95

12. Assuming that trend is absent , determine if there is any seasonality in the data given below:

Year	First Quarter	Second Quarter	Third Quarter	FourthQuarter
1996	3.7	4.1	3.3	3.5
1997	3.7	3.9	3.6	3.6
1998	4.0	4.1	3.3	3.1
1999	3.3	4.4	4.0	4.0

What are the seasonal indices for various quarters?

13. In a trivariate distribution, $\sigma_1 = 2, \sigma_2 = \sigma_3 = 3$, $r_{12} = 0.7$, $r_{31} = r_{23} = 0.5$. Determine $b_{12.3}$ and $b_{13.2}$.

14. Calculate $R_{1.23}$, $R_{3.12}$ and $R_{2.13}$ for the following data: $\overline{X_1} = 6.8, \overline{X_2} = 7.0, \overline{X_3} = 7.4, S_1 = 1.0$. $S_2 = 0.8, S_3 = 9..$ $r_{12} = 0.6$, $r_{13} = 0.7$, $r_{23} = 0.65$.

15. Two types of drugs were used on 5 and 7 patients for reducing their weight. Drug A was imported and drug B indigenous. The decrease in weight after using the drug for six months was as follows:

Drug A	10	12	13	11	14		
Drug B	8	9	12	14	15	10	9

Is there a significant difference in the efficiency in the drugs? If not which drug should be used.

16. 1000 families were selected at random in a city to test the belief that high income families usually send their children to public schools and low income families often send their children to government schools. The following results are obtained.

Income	Public School	Govt. School	Total
Low	370	430	800
High	130	70	200
Total	500	500	1000

Test whether income and type of schooling are independent.

17. Perform a two-way Anova on the data given below:

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

Test the significance in the treatment and plot of land.

SECTION –C

ANSWER ANY TWO QUESTIONS (2 × 15= 30)

18. The following data relate to the number of passenger cars in (millions) sold from 2002 to 2009.

Year	2002	2003	2004	2005	2006	2007	2008	2009
Number	6.7	5.3	4.3	6.1	5.6	7.9	5.8	6.1

   a) Fit a straight line trend to the data through 2007 only.
   b) Use this result in (a) to estimate production in2009 and compare with actual production.

19. The table shows the corresponding values of three varieties X_1, X_2 and X_3. Find the least square regression equation of X_3 on X_1 and X_2. Estimate X_3, when $X_1=10$ and $X_2=6$.

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

20. Four coins were tossed 160 times and the following results are obtained:

No of Heads	0	1	2	3	4
Observed frequencies	17	52	54	31	6

   Under the assumptions that the coins are balanced . Find the expected frequencies of getting 0,1,2,3,or 4 heads and test the goodness of fit.

21. a. Intelligence test on two groups of boys and girls gave the following results:

	mean	s.d	total
Girls	75	15	150
Boys	70	20	250

   Is there a significant difference in the mean scores obtained by boys and girls?

   b. The mean produce of wheat of a sample of 100 fields is 200 kgs per acre with a standard deviation of 10 kgs. Another sample of 150 fields gives the mean at 229 with a standard deviation of 12 kgs. Assuming the standard deviation of the mean field at 1kg of the universe. Find at 1% level if the two results are consistent.

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