

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086.  
(For candidates admitted during the academic year 2004-2005 & thereafter)

SUBJECT CODE : CM/AO/AS43

**B.Com. DEGREE EXAMINATION APRIL 2007**  
COMMERCE  
FOURTH SEMESTER

COURSE : **ALLIED – OPTIONAL**  
PAPER : **APPLIED STATISTICS**  
TIME : **3 HOURS** **MAX. MARKS : 100**

**SECTION - A**

ANSWER ALL QUESTIONS: ( 10 x 3 = 30 )

1. Given the following trend equation:  
 $Y = 260 - 1.8x$ , origin – June 30, 2003, Y unit = annual monthly averages.  
Convert this equation into monthly terms and shift the origin half a month forward.
2. What is time series? What is the need for analysis of time series?
3. Define a Poisson distribution. What is its mean.
4. A coin is tossed 6 times. What is the probability of obtaining 5 or more heads?
5. Explain (i) null hypothesis (ii) alternative hypothesis.
6. Define a Chi-square test. To what population can this test be applied.
7. Two samples are drawn from two normal population. From the following data test whether the samples have the same variance at 5% level.

	Size	Mean	Variance
Sample 1 :	10	75	90
Sample 2 :	8	77	133

Use F test at 5% level for (9,7) degree of freedom is 3.68.
8. What is 'Analysis of Variance' and what is the significance of its study?
9. A random sample of size 16 has 53 as mean. The sum of the square of the deviation taken from mean is 135. Can this sample be regarded as taken from the population having 56 as mean. [Tabulated  $t_{0.05} = 2.17$  for 15 d.f].
10. The mean life time of a sample of 400 fluorescent light bulbs produced by a company is found to be 1570 hours with a standard deviation of 150 hours. To the hypothesis that the mean life time of the bulbs produced by the company is 1600 hours, test the hypothesis at 1% level of significance.

**SECTION - B**

ANSWER ANY FIVE QUESTIONS:

( 5 x 8 = 40 )

11. In a sample of 400 population from a village 230 are found to be eaters of vegetarian items and the rest non-vegetarian items. Can we assume that both vegetarian and non-vegetarian food are equally popular.
12. The weekly wages of 1000 workers are normally distributed around a mean of Rs.70 and with standard deviation of Rs.5/-. Estimate the number of workers whose weekly wages will be  
(a) between Rs.70 and Rs.72. (b) more than 75/-.
13. Out of 8000 graduates in a town. 800 are females; out of 1600 graduates employees 120 are female. Use  $X^2$  to determine if any distinction is made in appointment on the basis of sex. value of  $X^2$  for 5% level for one degree of freedom is 3.84.
14. A college conducted both day and evening classes intended to be identical. A sample of 100 day students yield examination results as mean 72.4 and standard deviation 14.8. A sample of 200 evening students yield examination results as mean 73.9 and standard deviation 17.9. Are the two means statistically equally at 1% level?
15. Fit a trend line to the following data by the method of semi-averages.

Year	1997	1998	1999	2000	2001	2002	2003
Sales in (thousand units)	102	105	114	110	108	116	112

16. What does SPSS stand for? How will you get the data on the Data Editor? List the main menu available on the Data Editor.
17. Write short notes on :  
(i) Properties of normal distribution.  
(ii) Uses and limitation of  $X^2$ -test.

**SECTION - C**

ANSWER ANY TWO QUESTIONS:

( 2 x 15 = 30 )

18. Fit a straight line trend for the following series. Estimate the value for 2004:

Year	1997	1998	1999	2000	2001	2002	2003
Production for steel ( in tonnes)	60	72	75	65	80	85	95

19. a) The following table gives the number of days in a 50 day period during which automobile accidents occurred in a certain part of a city. Fit a poisson distribution to the data.

No. of accidents	0	1	2	3	4
No. of days	19	18	8	4	1

- b) A box contains 100 transistors, 20 of which are defective, 10 are selected for inspection. What is the probability (i) all 10 are defective (ii) at the most 3 are defective.
20. A controlled experiment was conducted to test the effectiveness of a new drug. Under this experiment 300 patients were tested with new drug and 200 were not treated with the drug. The results of the experiment are given below:

Details	Cured	Condition worsened	No effect	Total
Treated with drug	200	40	60	300
Not treated with drug	120	30	50	200
Total	320	70	110	500

Comment on the effectiveness of the drug.

21. a) A random sample of 11 pairs of observations from a normal population gives the correlation coefficient to be 0.5. Is it likely that the variables in the population are uncorrelated at 5% level of significance.
- b) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.

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