



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**M.C.A. DEGREE EXAMINATION – COMPUTER APPLICATIONS**

**SECOND SEMESTER – APRIL 2016**

**CA 2803 - STATISTICAL METHODS FOR COMPUTER APPLICATIONS**

Date: 16-04-2016  
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

**PART A**

**Answer ALL Questions**

**10 X 2 = 20**

1. What is standard deviation?
2. Write the properties of regression coefficient.
3. What are axioms of probability?
4. Define probability mass function
5. Write four applications of Poisson distribution.
6. State True or False the following:
  - i. For a Poisson distribution mean, median and mode are equal.
  - ii. For a Binomial distribution, always  $p = \frac{1}{2}$
7. Give the procedure for testing the hypothesis
8. Mention various types of sampling.
9. What methods are used to find cyclic variations?
10. What is the purpose of analysis of variance?

**PART B**

**Answer ALL Questions**

**5 X 8 = 40**

11a. Find the arithmetic mean, median and mode from the following data:

Age	15 – 20	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45
No. of People	4	20	38	24	10	9

**(or)**

11b. Find the equation of regression Y on X from the following data:

X	6	2	10	4	8
Y	9	11	5	8	7

Predict the value of y when x = 15. Also find coefficient of correlation.

12a. State and prove Baye's Theorem.

**(or)**

12b. A die is thrown 20 times and its probability mass function is given as follows

X	1	2	3	4	5	6
P(x)	3/20	2/20	4/20	4/20	3/20	4/20

- i Find  $P(X \leq 4)$
- ii.  $P(2 < X < 6)$
- iii.  $P(X > 4)$
- iv. Show that it is probability mass function

13a. i. Define normal distribution. **(3 marks)**

ii. The mean height of 600 students in a school is 50 kg. and standard deviation is 6 kg. Assuming that weights are normally distributed, find how many students weigh (a) between 44.5 and 54.5 (b) less than 42.5 kg. (c) greater than 56.5 kg.

**(5 marks)**

**(or)**

13b. i. Define Binomial distribution. **(3 marks)**

ii. Assuming that half the population is vegetarian so that the chance of an individual being a vegetarian is half and assuming that 100 vegetarians can take a sample of 10 individuals to see whether they are vegetarians, how many investigators report that three people or less were vegetarians? **(5 marks)**

14a. A random sample of size 10 drawn from a normal population has a mean 48. Test the hypothesis that the population mean is 50, its variance being given to be 4. (Value of z at 1% level = 2.58).

**(or)**

14b. A manufacturer claims that at least 95% of the equipment which he supplied to a factory meets the specification. An example of a sample of 200 pieces of equipment revealed that 18 were defective. Test this claim at a significance level of 5%. (value of z at 5% level = 1.64)

15a. i. Define time series. **(3marks)**

ii The table below shows the production (metric ton) for a state for the year period 2000 – 2010 Construct (a) a 5-year moving average and (b) a 4-year moving average. **(5marks)**

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production	68	62	61	63	65	68	63	67	66	64

**(or)**

15b. i. Explain semiaverages method. **(3marks)**

ii. Using the method of semiaverages, obtain the trend values for the sales data (in thousands) given in the table given below: **(5marks)**

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purchase	19.0	20.6	20.1	20.7	21.5	24.7	23.8	24.5	23.3	21.6

**PART C**

**Answer any TWO Questions**

**2 X 20 = 40**

16a. . Find the correlation coefficient between the income and expenditure of a labourer from the following data.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July
Income	146	154	156	156	158	160	162
Expenditure	136	140	144	154	142	158	154

16b. A husband and wife applied for interview for two vacancies of the same post. The probability of husband selection is  $1/7$  and that of wife  $1/5$ . What is the probability that

- i. both of them will be selected.
- ii. only one will be selected.
- iii. no one will be selected.

17a. i. Prove  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$  **(4 marks)**

ii. A continuous random variable X has the pdf given by  $f(x) = Ax^2$  in the interval  $0 \leq x \leq 1$ , Find  $P(.2 < x < .5)$ ,  $P(x > .75)$  and also find A. **(6 marks)**

17b. i. Define the following: sample space, independent events. **(4 marks)**

ii. In an office between 4 and 5 p.m., the average number of incoming phone calls Per minute is 1.8. find the probability that during one particular minute, there will be no phone call at all and exactly 2 calls. **(6 marks)**

18a. Two independent random samples drawn from two normal populations are:

Sample I: 5, 7, 8, 12, 13, 10, 15

Sample II: 10, 15, 8, 3, 4, 7, 8

Is there a significance difference between population variances at 1% level ?  
(  $F_{6,6}$  at 5% = 4.28)

18b. The lifetimes in hours of samples from three different types of T.V. picture tubes produced by a company is given below. Determine whether there is a difference between the three types at 5% level of significance.  $F(2,9) = 4.26$ .

Sample-1	407	411	409	-	-
Sample-2	404	406	408	405	402
Sample-3	410	408	406	408	-

Carry out the analysis of variance.

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