LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECONDSEMESTER – APRIL 2018

CA 2803- STATISTICAL METHODS FOR COMPUTER APPLICATIONS

Date: 17-04-2018 Dept. No. Max. : 100 Marks
Time: 01:00-04:00

PART A

Answer ALL Questions (10 X 2 = 20 Marks)

1. Define median.
2. Write properties of correlation.
3. In a random experiment, two dice are thrown. Give its sample space.
4. State True or False the following:
   i. For two events A and B, $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
   ii. For a moderately skewed distribution, mean – mode = 3(mean + median)
5. Mention four properties of Normal distribution
6. Give any four applications of Poisson distribution.
7. What are null and alternative hypotheses?
8. What is standard error?
9. What is the purpose of analysis of variance?
10. What are the components of time series?

PART B

Answer ALL Questions (5 X 8 = 40 Marks)

11a. Find arithmetic mean and median for the following data:

Age	15-20	20-25	25-30	30-35	35-40	40-45
No. of people	6	22	37	21	9	5

(or)

11b. Find the correlation coefficient between the income and expenditure, in hundreds of rupees, of a labourer from the following data.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July
Income	46	54	56	56	58	60	62
Expenditure	36	40	44	54	42	58	54

12a.i. State Baye's Theorem (3 marks)

ii A bag contains 3 white balls and 2 red balls. Two balls are taken at random. What is the probability that one ball is white and one ball is red? (5 marks)

(or)

12b.i. Define Probability Mass Function. (3 marks)

ii A die is thrown 20 times and its probability mass function is given below:

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

a. Find $P(x \leq 3)$ b. $P(1 < x < 4)$ c. $P(x > 3)$ d. Verify that it is probability mass function. (5 marks)

13a.i. Define binomial distribution (3 marks)

ii In a random experiment, 6 coins are tossed simultaneously. What is the probability that

a. Getting 3 heads b. getting more than 4 heads. (5 marks)

(or)

13b.i. Define Poisson distribution (3 marks)

ii A car rental company has 2 cars which it hires out day by day. The number of demands for a car for a day is distributed as Poisson distribution with mean = 1.5. calculate proportion of days on which

a. No car is used b. Some demand are refused. (5 marks)

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

(or)

14b. Two independent random samples of sizes 10 and 15 from two independent normal populations having variances 4 and 9 were found to have means 48 and 46 respectively. Test at 5% significance level whether the two population means may be taken to be equal.

15a. Using the method of semiaverages, obtain the trend values for the purchase data (in thousands) given in the following table:

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purchase	17.8	18.6	18.8	19.5	20.2	19.7	22.3	23.4	22.6	22.5

(or)

15b. The table below shows sales in rupees(thousands) in a departmental store from the year 2001 to 2010. Construct (a) a 5-year moving average and (b) a 4-year moving average.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sales	19.2	20.4	20.9	20.7	21.3	23.2	24.7	23.1	24.6	23.5

PART C

Answer any TWO Questions (2 X 20=40 marks)

16a. Define the following: i. standard deviation ii. Coefficient of variation iii. Quartile deviation. (10 marks)

16b. Find standard deviation, coefficient of variation and quartile deviation for the following frequency distribution (10 marks)

Wages/day(Rs.)	150-160	160-170	170-180	180-190	190-200	200-210	210-220
No. of workers	15	40	50	60	45	40	15

17a. In a bolt manufacturing factory, machines A, B, and C manufacture respectively 20%, 30%, and 50% of the total. Of their output 5%, 4%, and 2% are defective bolts. A bolt is drawn at random and found to be defective. What is the probability that it was manufactured by machine A? and it was manufactured by machine B?. (10 marks)

17b .i. Define Normal distribution (3 marks)

ii For a set of 1000 observations known to be normally distributed, the mean is 534 cm. and standard deviation 13.5 cm. how many observations are likely to exceed 561 cm? How many will lie between 520.5 cm. and 547.5 cm.? (7 marks)

18a. An operator claims that he produces 40 articles in an hour. A sample of 10 random hours show that 43, 45, 38, 37, 41, 42, 44, 39, 43, and 38. Is the claim of the operator reasonable at 5% level of significance? (10 marks)

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. (10marks)