LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECONDSEMESTER – APRIL 2017

16PCA2MC01- STATISTICAL METHODS FOR COMPUTER APPLICATIONS

Date: 19-04-2017 Dept. No. Max. : 100 Marks
Time: 01:00-04:00

PART A

Answer ALL Questions **(10 X 2 = 20 Marks)**

1. Define Arithmetic mean.
2. The built-in functions in R which are used for correlation is _________ and binomial probability is ____
3. Define conditional probability.
4. What is probability density function?
5. Comment on the following: " The mean of a binomial distribution is 5 and its variance is 9"
6. For a certain normal distribution, If mean= 1200 and s.d = 400 then the standard normal variate z for x = 800 is ________ and x = 1400 is ______
7. Mention the types of probability sampling techniques.
8. List the advantages of standard error.
9. What is moving average?
10. Define Analysis of Variance.

PART B

Answer ALL Questions **(5 X 8 = 40 Marks)**

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	18	40	22	12	9

(or)

11b. Write a R program to find first quartile, median, and third quartile for the following frequency distribution of daily emission (in tons) of sulfur oxide from an industrial plant:

Midx	6.95	10.95	14.95	18.95	22.95	26.95	30.95
Frequency	3	10	14	25	17	9	2

12a. A manufacturing firm produces steel pipes in three plants with daily production volumes of 500, 1000 and 2000 units respectively. According to past experience, it is known that the fractions of defective outputs produced by the three plants are respectively, 0.005, 0.008 and 0.010. If a pipe is selected from days total production and found to be defective, what is the
probability that it came from the (i) first plant (ii) the second plant ?

(or)

12b. A random variable x has the probability density function (pdf) given by $f(x) = 1/4 \quad -2 \leq x \leq 2$,

obtain (i) $P(-1 < X < 2)$ (ii) $P(X > 1)$ (iii) $P(X < 0)$ (iv) Verify that it is pdf.

13a. 20 wrist watches in a box of 100 are defective. If 10watches are selected at random, find the probability that (i) 10 are defective (ii) 10 are good (iii) at least one watch is defective (iv) at most 3 are defective.

(or)

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

ii. The life of army shoes is normally distributed with mean 8 months and standard deviation 2 months. If 5000 shoe pairs are issued, i. how many would be expected to need replacement within 12 months. ii. how many are between 10 months and 12 months. (5 marks)

14a. A random sample of 10 tins of oils filled in by an automatic machine gave the following weights in kg: 2.05, 2.01, 2.04, 1.98, 1.96, 2.01, 1.97, 1.99, 2.04, 2.02. Can we accept, at 5% level of significance , the claim that the average weight of the tin is 2kg.? ($\mathbf{t_{0.025, 9\,d.f.}} = 2.26$)

(or)

14b. i. Give the procedure for testing of hypothesis. (3 marks)

ii. A manufacturer claims that at least 95% of the equipment which he supplied to a factory conformed to specifications. A sample of 200 pieces of equipment revealed that 18 were defective. Test this claim at a significance level of 1%. ($\mathbf{Z_{0.01}} = 2.33$). (5 marks)

15a. Draw a trend line by the method of semi-averages for the following data:

Year	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Sales ('000)	100	105	109	96	102	108	112	114	110	104

(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.(5marks)

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sales	19.0	20.6	20.9	20.7	21.5	23.6	24.7	23.8	24.8	23.3

PART C

Answer any TWO Questions **(2 X 10 = 20 Marks)**

16a. . Find the correlation coefficient between the income and expenditure of a labourer from the following data. (10 marks)

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. Explain the methods which are used to input data in R language.**(10 marks)**

17a. i. State and prove Baye's theorem**(6 marks)**

ii. A random variable X has the following probability mass function :

x	0	1	2	3
P(x)	1/3	1 /2	0	1/6

Find i. $p(X \leq 1)$ ii. $p(X > 2)$ iii. $p(0 < X < 2)$ iv. verify that it is a pmf.**(4 marks)**

17b. i. Write four applications of Poisson distribution.**(4 marks)**

ii. A car hire firm has 2 cars which it hires out day by day. The number of demands is distributed as *Poisson* distribution with mean = 1.5. Calculate the proportion of days on which

i. neither car is used. ii. some demands are refused. ($e^{-1.5} = 0.2231$).**(6 marks)**

18a. Time taken by workers in performing a job are given below:

Method I	20	16	26	27	23	22	
Method II	27	33	42	35	32	34	38

Test whether there is any significant difference between the variances of time distribution. (**$F_{6,5}$**@5% = 4.28).**(10 marks)**

18b. The following table gives the yields of 15 samples of plot under three varieties of seed:

A	20	21	23	16	20
B	18	20	17	15	25
C	25	28	22	28	32

Test using analysis of variance whether there is a significant difference in the average yield of seeds. (**$F_{2,12}$**@5% = 3.88)**(10 marks)**

$$$$$$$$