LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A. DEGREE EXAMINATION – COMPUTER APPLICATIONS

SECONDSEMESTER – APRIL 2018

17/16PCA2MC01- 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 Standard Deviation
2. In R, to transpose a matrix x _____ function is used and for inverse _____ function is used
3. Define probability.
4. What is mathematical expectation?
5. Write any four applications of Poisson distribution.
6. Comment on the following: " The mean of a binomial distribution is 5 and its variance is 9"
7. What are Type I and Type II errors?
8. Define the terms: i. Parameter   ii. Statistic
9. What is moving average?
10. What is the purpose of analysis of variance?

PART B

Answer ALL Questions   (5 X 8 = 40 Marks)

11a. . The table below gives the distribution of the sample of 50 people according to weight. Calculate the percentiles P_6 and P_{37}

Weight(kg.)	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90	90-95
Frequency	2	3	5	7	9	11	7	2	3	1

(or)

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

Class interval	6-10	10-14	14-18	18-22	22-26	26-30	30-34
Frequency	3	10	14	25	17	9	2

12a. A factory has three units, A, B, and C. Unit A produces 25% of its product, unit B produces 25% and unit C produces 50%. If the percentages of defective items produced by three units A, B and C are respectively 10%,20%, and 3% and an item selected is found to be defective. What is the probability that it is produced by the unit C ?

(or)

12b. A random variable X has the pdf given by f(x) = 6x(1-x), 0≤x≤1.
    Find i. P($x \le .5$) ii. P(.2 <x< .5) iii.   P($x > .7$) iv. Verify that it is pdf.

13a. i. Define binomial distribution   (3 marks)
    ii. In a random experiment, 6 coins are tossed simultaneously. What is the probability that a. Getting 4 heads.b. getting at least 3 heads.   (5 marks)

(or)

13b. i. Define Poisson distribution   (3 marks)
    ii. It is known from the past experience that in a certain plant there are on an average 4 industrial accidents per month. Find the probability that in a given month, there will be less than 4 accidents. (Given $e^{-4} = 0.0183$).   (5 marks)

14a. Specification for the manufacture of a particular type of ornament state that the variance in weight shall not exceed 0.015m.gm squared. A random sample of 15 such ornaments yields a variance of 0.027. Can we say that the specifications are not met?   Use α = 0.05. (chi-square 14d.f = 23.68)

(or)

14b. 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%. ($Z_{0.01}$= 2.33).

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)	102	107	109	100	103	108	112	115	111	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.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sales	20.0	20.6	20.9	21.7	22.5	23.6	24.7	24.8	24.6	23.3

PART C

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

16a. Find out which of the following batsmen is more consistent and who is more efficient

Batsman A	5	7	16	27	39	53	56	61	80	101
Batsman B	0	4	16	21	41	43	57	78	83	93

16b. Discuss control statements in R each with an example.

17a.i. Define normal distribution   (4 marks)

    ii. The mean weight 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 kg. and 54.5 kg.   b. less than 42.5 kg.   c. greater than 56.5 kg.

(8 marks)

17b. Two horses A and B were tested according to the time (in secs.) to run a particular track with the following results: (8 marks)

    Horse A: 28, 30, 32, 33, 33, 29, 34.   Horse B: 29, 30, 30, 24, 27, 29.
    Test whether the two horses have the same running capacity at 5% level t_{11}. @ 5% = 2.20

18a.i. How matrix is created in R? Give an example   (4 marks)

    ii. Two sample poles of votes for two candidates A and B for a Public Office are taken, by choosing one from among residents of rural and urban areas. The results are given below. Examine whether the nature of the area is related to voting preference in this election.

Chi-square, 1 d.f @ 5% = 3.841   (8 marks)

Vote for→ Area↓	A	B	Total
Rural	620	380	1000
Urban	550	450	1000
Total	1170	830	2000

18b. A test was given to 5 students taken at random from the tenth class of 3 schools of a town. The individual scores are given in the following table: (8 marks)

School I	9	7	6	5	8
School II	7	4	5	4	5
School III	6	5	6	7	6

Carry out the analysis of variance and state your conclusions. $F_{2,12}$@ 5% = 3.88