



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A. DEGREE EXAMINATION – COMPUTER APPLICATIONS

SECOND SEMESTER – NOVEMBER 2016

CA 2803 - STATISTICAL METHODS FOR COMPUTER APPLICATIONS

Date: 03-11-2016
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

PART A

Answer ALL Questions

(10 X 2 = 20 Marks)

1. Define arithmetic mean
2. Write the properties of regression coefficient
3. In a random experiment, two coins are tossed simultaneously, what is its sample space?
4. Define probability density 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 not equal.
 - ii. Tossing of coin is an example of Binomial distribution
7. Give the procedure for testing the hypothesis.
8. What are Type I and Type II errors?
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 Marks)

11a. The following table gives the distribution of wages in two branches of a factory. Find the combined mean for the two branches together.

Monthly wages(Rs.)	100-150	150-200	200-250	250-300	300-350	Total
Workers in Branch A	167	207	253	205	168	1000
Workers in Branch B	63	93	157	105	82	500

(or)

11b. 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

12a. A doctor has to visit a patient. From past experience it is known that probability with which he will come by train, bus, bike and by other means of transport are respectively $\frac{3}{10}$, $\frac{2}{10}$, $\frac{1}{10}$ and $\frac{4}{10}$. If he comes by train the probability that he will be late is $\frac{1}{4}$, by bus it is $\frac{1}{3}$, by bike it is $\frac{1}{12}$ and by means of other transport it is $\frac{1}{3}$. When he arrived, he was late. What is the probability that he came by train and by bike.

(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)	$\frac{3}{20}$	$\frac{2}{20}$	$\frac{4}{20}$	$\frac{4}{20}$	$\frac{3}{20}$	$\frac{4}{20}$

i Find $P(X = 3)$ ii. $P(1 < X < 4)$ iii. $P(X > 3)$ iv. Show that it is probability mass function

13a. i. Define Binomial distribution.

ii. The incident of certain disease is such that on an average 20% workers suffer from it. If 10 workers are selected at random, find the probability that exactly 2 workers suffer from the disease and not more than 3 workers suffer from the disease.

(or)

- 13b. 1000 light bulbs with a mean life 120 days are installed in a new factory, their length of life is normally distributed with standard deviation 20 days. How many bulbs will expire in less than 90 days. If it is decided to replace all the bulbs together, what interval should be allowed between replacements if not 10% should expire before replacement?
- 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 sample of 900 members has a mean 3.4 cm. and standard deviation 2.61 cm. Can the sample be regarded as drawn from a population with mean 3.25 cm. at 1% level of significance.? ($Z_{.05} = 2.54$).
- 15a. i. Define time series.
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.

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production	68	62	61	66	65	69	63	64	67	64

(or)

- 15b. i. Explain about semiaverages method.
ii Using the method of semiaverages, obtain the trend values for the sales data (in thousands) given in the table given below:

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 Marks)

- 16a. Find standard deviation, quartile deviation, coefficient of variation and coefficient of quartile deviation for the following frequency distribution.

Wages/day (Rs.)	150-159	160-169	170-179	180-189	190-199	200-209	210-219
No. of workers	15	40	50	60	45	40	15

- 16b. In order to find the correlation coefficient between two attributes X and Y from 20 pairs of observations, the following calculations were made: $X = 120$, $Y = 80$, $X^2 = 1440$, $Y^2 = 650$, $XY = 886$. It was found later that the pair ($X = 10$, $Y = 5$) was copied wrongly, instead of the correct value ($X = 11$, $Y = 4$). Find the corrected value of correlation coefficient

- 17a. i. Prove $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
ii. A continuous random variable X has the pdf given by $f(x) = Ax^2$ in the interval $0 < x < 1$, Find $P(.2 < x < .5)$, $P(x > .75)$ and also find A.

- 17b. i. Define the following: sample space, independent events.
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 3 calls

- 18a. Two horses A and B were tested according to the time (in seconds.) to run a particular track with the following results:

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. ($t(11) @ 5\% = 2.20$)

- 18b. A test was given to 5 students taken at random from the tenth class of three schools. The individual scores (out of 10) are as follows:

School 1	9	7	6	5	8
School 2	7	4	5	4	5
School 3	6	5	6	7	6

Carry out the analysis of variance and state your conclusions. $F(2, 12) @ 5\% = 3.88$.
