



# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

## B.C.A. DEGREE EXAMINATION – COMPUTER APPLICATIONS

### THIRD SEMESTER – APRIL 2016

#### CS 3204 / CA 3201- STATISTICAL METHODS

Date: 04-05-2016  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

#### PART A

Answer all the questions:

(10 x 2 = 20)

1. State any two merits of median.
2. State Pearson's  $\beta$  coefficient.
3. Write the multiplication law of probability for independent events.
4. A bag contains 3 red, 6 white and 7 blue balls. What is the probability that two balls drawn are white and blue?
5. What is a Sampling error?
6. State any two properties of regression coefficients.
7. Let X be a random variable with probability distribution.

X	-1	2	3
P(X=x)	1/6	1/2	1/3

Find  $E(X^2)$ .

8. The mean and variance of a binomial distribution are 4 and  $\frac{4}{3}$  respectively. Find  $P(X \geq 1)$ .
9. Prove that  $\sum_{x=0}^{\infty} \frac{e^{-\lambda} \lambda^x}{x!} = 1$ .
10. Write any two properties of normal distribution.

#### PART B

Answer all the questions:

(5 x 8 = 40)

11. (a) Find mean, median and mode for the following distribution:

Class interval	0 -10	10-20	20 -30	30 -40	40- 50	50 -60	60 -70	70 -80
Frequency	5	8	7	12	28	20	10	10

(OR)

- (b) Calculate the first four moments of the following distribution about the mean and hence find  $\beta_1$  and  $\beta_2$ .

12. (a) The ranks of some 16 students in Mathematics and Physics are as follows: Two numbers within brackets denote the ranks of the students in Mathematics and Physics (1,1) (2,10) (3,3) (4,4) (5,5) (6,7) (7,2) (8,6) (9,8) (10,11) (11,15) (12,9) (13,14) (14,12) (15,16) (16,13). Calculate the rank correlation coefficient for Proficiencies of this group in Mathematics and Physics.

(OR)

- (b) In a partially destroyed laboratory record of an analysis of correlation the following results only are legible. Variance of X = 9.

Regression equations:  $8X - 10Y + 66 = 0$ .  $40X - 18Y = 214$ . What are (i) the mean values of X and Y (ii) The correlation coefficient between X and Y (iii) The standard deviation of Y?

13. (a) State and prove the addition theorem of probability.

(OR)

- (b) If two dice are thrown, what is the probability that the sum is (i) greater than 8, and (ii) neither 7 nor 11?

14. (a) State and prove Baye's theorem of conditional theorem.

(OR)

- (b) A random variable X is distributed at random between the values 0 and 1 so that

its probability density function is  $f(x) = kx^2(1 - x^3)$ , where k is a constant. Find the value of k, find its mean and variance.

15. (a) Find the moment generating function for the binomial and hence find its mean and variance.

(OR)

(b) If X is a Poisson variate such that

(i) If  $P(X = 2) = 3 P(X = 3)$ , find  $P(X = 4)$ .

(ii) If  $P(X = 2) = 9 P(X = 4) + 90 P(X = 6)$  find the mean. (3 + 5)

### PART C

Answer any two questions:

(2 x 20 = 40)

16. (a) Calculate (i) Quartile deviation (Q .D) and (ii) Mean Deviation (M.D) from median for following data:

Marks	: 0-10	10-20	20-30	30-40	40-50	50-60	60-70
No of students:	6	15	8	15	7	6	3.

(b) An incomplete frequency distribution is given as follows:

Variable	Frequency	Variable	Frequency
10 – 20	12	50 – 60	?
20 – 30	30	60 – 70	25
30 – 40	?	70 – 80	18
40 – 50	65	Total	229

Given that the median value is 46. Determine the missing frequencies using median formula.

17. For the following data:

(a) Obtain the equations of two lines of regression and also obtain the estimated of X for Y = 70.

(b) Obtain the correlation coefficient

X:	65	66	67	67	68	69	70	72
Y:	67	68	65	68	72	72	69	71

18. (a) Two random variables X and Y have the following joint probability density function:

$$f(x,y) = \begin{cases} k(2 - x - y); & 0 \leq x \leq 1; 0 \leq y \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

Find (i) the constant k.

(ii) Marginal density functions of X and Y.

(iii) Conditional density functions and

(iv) Var (X), Var (Y), Cov (X, Y).

(b) An irregular six faced die is thrown and the expectation that in 10 throws it will give five even numbers is twice the expectation that it will give four even numbers. How many times in 10,000 sets of 10 throws each, would you expect it to give no even number. (14 + 6)