

C 24771

Name.....

(Pages : 3)

Name.....

Reg. No.....

**SECOND SEMESTER B.C.A. DEGREE EXAMINATION, MAY 2017**  
(CUCBCSS—UG)

Complementary Course

BCA 2C 03—COMPUTER ORIENTED STATISTICAL METHODS

Time : Three Hours

Maximum : 80 Marks

**Part A**

Answer **all** questions.  
Each carries 1 mark.

1. The arithmetic mean of  $n$  natural numbers from 1 to  $n$  is \_\_\_\_\_.
2. If the mean of a series is 10 and its coefficient of variation is 40%, the variance of the series is \_\_\_\_\_.
3. The probability of the intersection of two mutually exclusive events is always \_\_\_\_\_.
4. Given that  $P(A) = \frac{1}{3}$ ,  $P(B) = \frac{1}{4}$  and  $P(A | B) = \frac{1}{6}$ , then  $P(B | A) =$  \_\_\_\_\_.
5. The variance of a constant is \_\_\_\_\_.
6. For a normal curve, the quartile deviation (Q.D.), mean deviation (M.D.) and standard deviation (S.D.) are in the ratio \_\_\_\_\_.
7. Mode of the chi-square distribution with  $n$  degrees of freedom lies at the point \_\_\_\_\_.
8. The relation between mean and variance of a chi-square distribution is \_\_\_\_\_.
9. The difference between the expected value of an estimator and the value of the corresponding parameter is known as \_\_\_\_\_.
10. Critical region is also known as \_\_\_\_\_.

(10 × 1 = 10 marks)

**Part B (Short Answer Type Questions)**

Answer **all** questions, each carries 2 marks.

11. What do you mean by correlation ?
12. Define independent events.

Turn over

13. Define Poisson distribution. Give its mean and variance.

14. Define  $t$  distribution.

15. Give the maximum likelihood method of estimation.

25. F

(5 × 2 = 10 marks)

### Part C (Short Essay Type Questions)

Answer any five questions.

Each carries 4 marks.

26.

16. Discuss the various measures of dispersion.

17. Why are the two regression lines ? Under what conditions, only one regression line would be obtained ?

27.

18. Define :

(a) Mutually exclusive events.

(b) Exhaustive events and

(c) Equally likely events and give examples of each.

2

19. Given  $f(x) = e^{-x}$ ,  $x \geq 0$ , find the p.d.f. of  $y = -3x + 7$ .

20. State and prove addition theorem of expectation.

21. Define the statistics  $t$  and  $F$  and write down their sampling distributions.

22. Obtain the interval estimates of the proportion of binomial population.

23. If  $x_1, x_2, \dots, x_n$  are  $n$  independent observations on a random variable  $X$  with p.d.f.  $f(x) = \theta x^{\theta-1}$ ,  $0 < x < 1$ ,  $\theta \geq 1$ , show that the best critical region for testing  $H_0 : \theta = 1$  against  $H_1 : \theta = 2$  can be defined in terms of the geometric mean of  $x_1, x_2, \dots, x_n$

(5 × 4 = 20 marks)

### Part D (Essay Questions)

Answer any five questions.

Each carries 8 marks.

24. Find the geometric mean for the following distribution.

Marks	...	0-10	10-20	20-30	30-40	40-50
Number of students	...	5	7	15	25	8

25. Find the rank correlation coefficient between poverty and overcrowding from the table below :

Town	...	A	B	C	D	E	F	G	H	I	J
Poverty	...	17	13	15	16	6	11	14	9	7	12
Overcrowding	...	36	46	35	24	12	18	27	22	2	8

26. Fit a straight line of the form  $y = a + bx$  to the following data :

$x$	...	3	5	8	4	10
$y$	...	2	3	7	5	8

27. From the following data, obtain the two regression equations.

Sales	...	91	97	108	121	67	124	51	73	111	57
Purchase	...	71	75	69	97	70	91	39	61	80	47

28. From a group of 5 boys and 3 girls, 3 children are selected at random. Calculate the probability that the selected group contains.

- (a) No girl
- (b) Only one girl
- (c) At least one girl
- (d) More girls than boys

29. The p.d.f. of  $X$  is given by  $f(x) = 2x$ ,  $0 < x < 1$  and 0 elsewhere. Compute  $P\left(X \leq \frac{1}{2} \mid \frac{1}{3} \leq X \leq \frac{2}{3}\right)$ .

30. Find the maximum likelihood estimates of the mean and variance in the case of a normal population.

31. A sample of 100 voters were asked to vote in a gallop poll, 55% of them voted in favour of a candidate. Find 95% and 99% confidence limits for the proportion of voters in favour of the candidate in the population.

(5 × 8 = 40 marks)