(Pages : 3)   Name.......................................

                                              Reg. No................................ 42

SECOND SEMESTER B.C.A. DEGREE EXAMINATION, MAY 2015

(CUCBCSS—UG)

Complementary Course

BCA 2C 03—COMPUTER ORIENTED STATISTICAL METHODS

Time : Three Hours   Maximum : 80 Marks

Section A

Answer all **ten** *questions.*

1. The pair (X,Y) takes values (5, 8) and (–1, 2). Then the correlation between X and Y is :

    (a) 0.   (b) 1.

    (c) –1.   (d) Cannot say.

2. The limiting relative frequency approach of probability is known as :

    (a) Axiomatic probability.   (b) Classical probability.

    (c) Statistical probability.   (d) A priori probability.

3. If P $(X \leq M) = P(X \geq M)$, then M is :

    (a) A.M.   (b) Median.

    (c) G.M.   (d) H.M.

4. For a Poisson distribution which of the following is true ?

    (a) Mean < Variance.   (b) Mean > Variance.

    (c) Mean $\geq$ Variance.   (d) Mean = Variance.

5. The Level of significance is the probability of :

    (a) Type I error.   (b) Type II error.

    (c) Not committing an error.   (d) None of the above.

6. The empirical relation between Mean, Median and mode is —————.

7. ————— is a measure of dispersion which utilizes only extreme values.

8. If A and B are two events and their union is the sample space, then $P(A^c \cap B^c) = $ —————.

9. If X_1 and X_2 are two independent standard normal variables, then the ratio of their squares follows ————— distribution.

10. 1-Probability of type II error is called —————.

                                                        (10 × 1 = 10 marks)

                                                        Turn over

Section B

Answer all **five** *questions.*

11. What is an average ? Define AM, GM, HM.

12. Define mutually exclusive events and independent events. Give one example for each.

13. Define r^{th} raw moment and r^{th} central moment. Evaluate the first two of each.

14. Distinguish between statistic and parameter. Give an example for each.

15. Define two types of errors.

$(5 \times 2 = 10 \text{ mark}$

Section C

Answer any **five** *questions.*

16. Find the A.M and Median of the following data :—

Class	...	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	...	6	14	20	12	8

17. Find the quartile deviation of the data given below :

X	...	10	20	30	40	50	60	70	80
Frequency	...	6	12	15	20	12	10	8	7

18. Fit the line $Y = A + BX$:

X	...	1	2	3	4	5	6	7	8	9	10
Y	...	5.5	8	10.5	13	15.5	18	20.5	23	25.5	28

19. Write the p.m.f. of Poisson distribution with mean λ. Evaluate the probabilities for X = 0, when $\lambda = 2$.

20. Derive the m.g.f. of binomial distribution. Hence find its mean and variance.

21. Define t, χ^2 and F distributions.

22. Distinguish between point estimate and interval estimate. Write the 95% confidence interval the mean and variance of normal population.

23. Find the mean and variance of the following distribution :—

X	...	2	4	6	8	10	12	14	16
p	...	.01	.01	.01	.02	.02	.01	.01	.01

$(5 \times 4 = 20 \text{ ma}$

Section D

Answer any **five** *questions.*

43

Compute Karl Pearson's correlation coefficient :

X	...	4	10	11	12	12	15	18	20	21	22
Y	...	3	12	18	20	21	28	32	18	35	30

Find the coefficient of variation for the following data :

Class	...	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	...	5	12	18	15	12	8

If $f(x, y) = e^{-x-y}$, $0 < x, y < \infty$, find the conditional distributions of X given Y and Y given X.

A random sample of size 64 is taken from a normal distribution with mean 100 and standard deviation 80. Find :

(a) $P(\bar{X} < 80)$; (b) $P(80 < \bar{X} < 120)$; (c) $P(\bar{X} > 90)$.

The probability of a light bulb produced by a company is defective is .001. In a box contains 100 bulbs. In a consignment of 1000 boxes how many boxes will have : (i) no defective ; (ii) exactly 1 defective.

In a survey, 1200 persons selected at random were asked their opinion whether an MP's term is to be limited to 3 years in the parliament. Out of this sample, 780 persons opined Yes. Construct a 995 confidence interval of the corresponding true proportion regarding such opinion of all persons.

Explain the desirable properties of an estimate. Give examples.

A movie house is filled with 700 people and 60% of these are females, 70% of these people are seated in the no smoking area including 300 females. What is the probability that a person selected at random in the movie house is : (a) a male ; (b) a female smoker ; (c) a male or a non-smoker and ; (d) a smoker if we knew that the person is a male ?

(5 × 8 = 40 marks)