C 81758   (Pages : 3)   Name...

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SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, APRIL 2020

B.C.A.

BCA 2C 03—COMPUTER ORIENTED STATISTICAL METHODS

(2014 Admissions)

Time : Three Hours   Maximum : 80 Marks

Part A

*Answer **all** questions, each question carries 1 mark.*

1. The relation between A.M., G.M. and H.M. is ————————.

2. Sum of squares of the deviations is minimum when deviations are taken from ————————.

3. If $P(A) = p_1$, $P(B) = p_2$ and $P(A \cap B) = p_3$, then $(A|B) =$ ————————.

4. The probability that a leap year will have 53 sundays is ————————.

5. Two random variables X and Y with density functions $f(x)$ and $f(y)$ respectively are said to be independent if $f(x, y) =$ ————————.

6. For a ———————— distribution, mean and variance are same.

7. Let $X \sim N(\mu, \sigma^2)$, then the central moments of odd order are ————————.

8. The independence between two attributes is tested with the help of ———————— distribution.

9. If an estimator T_n of population parameter θ converges in probability to θ as n tends to infinity, is said to be ————————.

10. If β is the probability of type II error, then the power of the test is ————————.

                                                              $(10 \times 1 = 10 \text{ marks})$

Part B (Short Answer Type Questions)

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

11. Define the term Regression.

12. Define the intersection of two events.

                                                              Turn over

13. What is meant by probability density function ?

14. Distinguish between estimator and estimate.

15. State Neyrnan-Pearson Lemma.

$(5 \times 2 = 10 \text{ marks})$

Part C (Short Essay Type Questions)

(Answer any **five** *questions, each question carries 4 marks.*

16. Explain Lorenz curve.

17. How can the regression lines be identified ?

18. Explain classical definition of probability and give its defects.

19. Distinguish between discrete and continuous random variables. Give two examples each.

20. X is a random variable for which $E(X) = 10$ and $V(X) = 25$. Find the positive values of a and b such that $Y = aX - b$ has expectation 0 and variance 1.

21. What do you mean by 'sampling distribution' of a statistic ? Give an example. Also define standard error.

22. Derive the 95% confidence interval for the variance of a normal population.

23. Define :

    (1) critical region ; (2) significance level ; (3) null hypothesis ; (4) power of a test.

$(5 \times 4 = 20 \text{ marks})$

Part D (Essay Questions)

Answer any **five** *questions, each question carries 8 marks.*

24. Find mean, median and mode for the following data :

Class	5–9	10–14	15–19	20–24	25–29	30–34	35–39
Frequency	8	12	23	12	7	5	3

25. Compute Karl-Pearson's co-efficient of correlation for the following data :

x	2	3	4	5	6	7	8
y	4	5	6	12	9	5	4

26. The ranking of 10 individuals at the start and at the finish of a course of a training are as follows :

Individuals	:	A	B	C	D	E	F	G	H	I	J
Rank before	:	1	6	3	9	5	2	7	10	8	4
Rank after	:	6	8	3	2	7	10	5	9	4	1

Calculate the rank correlation coefficient.

27. From the following results, estimate the yield of crops when the rainfall is 22 cms and the rainfall when the yield is 600 kgs :

	Rainfall in cms (X)	Yield in kgs (Y)
Mean	26.7	508.4
S.D.	4.6	36.8

Co-efficient of correlation between rainfall and yield is 0.52.

28. Two balls are drawn from an urn containing six balls of which 4 are white and 2 are red. Find the probability that :

   (a) both balls are white.

   (b) both balls are of the same colour.

   (c) at least one of the balls is white.

29. Find c if $p(x) = c\left(\dfrac{2}{3}\right)^x$; $x = 1, 2, 3, ...$ is a probability distribution. Also find $P(1 < X < 3)$ and $P(X \geq 3)$.

30. For random sampling from normal population $N\left(\mu, \sigma^2\right)$, find m.l.e. for (1) μ when σ^2 is known ; (2) σ^2 when μ is known.

31. The diameters of 200 ball-bearings made by a mechanic during a week were found to have a mean 0.824 and standard deviation 0.042. Find 90% and 95% confidence intervals for the mean diameter of the ball-bearings.

(5 × 8 = 40 marks)