



Register Number:

Date: 09-01-2020

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BANGALORE – 27**  
**BCA(DATA ANALYTICS) – I SEMESTER**  
**SEMESTER EXAMINATION – JANUARY 2021**  
**BCADA1120: PROBABILITY THEORY AND EXPLORATORY STATISTICS I**

Time : 2 1/2 hours

Max Marks : 70

**THIS PAPER CONTAIN THREE PRINTED PAGES AND THREE PARTS**  
**STUDENTS ARE ALLOWED TO USE SCIENTIFIC CALCULATORS**

**PART A**

**Answer All Questions**

1. Choose the correct option:

2x10=20

(i) If the minimum value in a series is 20 and its range is 47, the maximum value of the series is

- (a) 67            (b) 57            (c) 48            (d) none of the above

(ii) If each observation of a series is divided by 5, the S.D of the new observations is

- (a) 1/10 th of S.D of original observations  
(b) 5 times of S.D of original observations

(c) not changed

(d) 1/5 th of S.D of original observations

(iii) If the first and third quartiles are 22.16 and 56.36 respectively, then the quartile deviation is

- (a) 17.1            (b) 34.2            (c) 51.3            (d) 30.3

(iv) If  $P(A)=P(B)$ , then the two events A and B are:

- (a) independent            (b) dependent            (c) equally likely            (d) both(a) and (c)

(v) The basic objective of a sample is to draw \_\_\_\_\_ about the population from which such sample is drawn.

- (a) conclusion            (b) characteristics            (c) inferences            (d) parameter

(vi) A \_\_\_\_\_ is a phenomenon of interest in which the observed outcomes of an activity are entirely by chance, are absolutely unpredictable and may differ from response to response.

a) Discrete variable    b) Continuous variable    (c) Random Variable    (d) None of the above

(vii) Level of significance is related to  
(a) Type I error    (b) Type II error    (c) both Type I and Type II error  
(d) none of the above

(viii) A statement made about a population for testing purpose is called---  
a) Statistic    b) Hypothesis    c) Level of Significance    d) Test-Statistic

(ix) If we reject the null hypothesis, we might be making  
(a) a Type II error    (b) a Type I error    (c) a correct decision    (d) either (a) or (b)

(x) The point where the Null Hypothesis gets rejected is called as?  
a) Significant Value    b) Rejection Value    c) Acceptance Value    d) Critical Value

### PART - B

5x4 = 20

#### 2. Answer Any Four Questions

(a) Which measure of central tendency is the best and why? (5)

(b) Define coefficient of variation. Write a note on this measure. (5)

(c) Determine standard deviation from the following observations: (5)

7,8, 6,8,9,7,5,6

(d) Two events A and B are mutually exclusive:  $P(A)=1/5$ ,  $P(B)=1/3$ . Find the probability that :

(i) Either A or B will occur (5)

(ii) Both A and B will occur (5)

(iii) Neither A nor B will occur (5)

(e) If  $p(x) = kx/4$ ,  $x=1,2,3$  is the p.m.f of X, find  $E(X)$  and  $Var(X)$  (5)

(f) State and prove Bayes' Theorem.

(g) A can solve 90 percent of the problems given in a book and B can solve 70 percent. What is the probability that atleast one of them will solve a problem selected at random? (5)

### PART - C

10x3 = 30

#### Answer Any Three Questions

3.(a) State the classical definition of probability. What are the limitations of Classical approach? (5)

(b) Two cards are drawn one by one from a deck of cards . What is the chance (probability) that the first drawn card is red and the second drawn card is also red if the first drawn card is not replaced before the second draw? (5)

4. (a) Write a short note on skewness and kurtosis . (5)

(b) Find mean deviation from mean for the following observations. (5)

x	10	11	12	13	14
y	3	12	18	12	3

5. (a) Explain the concept of mathematical expectation . The probability that a man fishing at a particular place will catch 1,2,3,4 fish are 0.4, 0.3, 0.2 and 0.1 respectively. What is the expected number of fish caught? (5)

(b) The probability that a boy will get a scholarship is 0.9 and that a girl will get is 0.8. What is the probability that at least one of them will get the scholarship? (5)

6. (a) What are the two types of errors in hypothesis testing? Differentiate between one tailed test and two tailed test. (5)

(b) A random sample of size 16 has 53 as mean . The sum of the squares of the deviations taken from mean is 135. Can this sample be regarded as taken from the population having 56 as mean? Obtain 95% confidence limits of the mean of the population . [  $t_{15,0.05}=2.13$  ] (5)

7. (a) Define Chi-Square Distribution. Write a note on the application of Chi Square test. (3)

(b) A marketing agency gives following information about the age groups of the sample informants and their liking for a particular model of scooter which a company plans to introduce :

	Age Group of Informants			Total
	Below 20	20-39	40-59	
Liked	125	420	60	605
Disliked	75	220	100	395
Total	200	640	160	1000

On the basis of above data , can it be considered that the model appeal is independent of the age group of the informants? [The tabulated value of ChiSquare for 2d.f at 5% level of significance is 5.99] (7)