



BRAINWARE UNIVERSITY

Term End Examination 2020 - 21

Programme – Master of Technology in Computer Science & Engineering

Course Name – Applicable Mathematics

Course Code - BSC-MM101

Semester / Year - Semester I

Time allotted : 75 Minutes

Full Marks : 60

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 60=60

1. (Answer any Sixty)

(i) The distribution for which mean and variance are equal is

- | | |
|-------------|----------------|
| a) Poisson | b) Normal |
| c) Binomial | d) Exponential |

(ii) A bag of 45 marbles contains 20 red, 15 blue, and 10 yellow. What is the probability of randomly selecting 12 from the bag and having 3 red, 4 blue, and 5 yellow

- | | |
|------------------------|-----------|
| a) 0 | b) 0.0587 |
| c) 0.09229999999999999 | d) 0.0136 |

(iii) The mean of the binomial distribution is

- | | |
|------------------------------|--|
| a) less than the variance | b) equal to its variance |
| c) greater than its variance | d) greater than or equal to its variance |

(iv)

If for a random variable X , $Var(X) = 1$, then $Var(3X + 3)$ is

- | | |
|------|---------|
| a) 1 | b) 2 |
| c) 9 | d) none |

- (v) The standard deviation is always _____ than the mean deviation
- a) Less
 - b) Greater
 - c) equal
 - d) none of these
- (vi) Variance remains unchanged by the change of
- a) Origin
 - b) Scale
 - c) both origin and scale
 - d) none of these
- (vii) The variance of 5 numbers is 10. If each number is divided by 2, then the variance of new numbers is
- a) 0
 - b) 20
 - c) 5
 - d) 2.5
- (viii) If the mean of the estimator is not equal to the population parameter, the estimator is said to be
- a) Unbiased
 - b) Biased
 - c) Positively biased
 - d) Negatively biased
- (ix) A tentative assumption about a population parameter is called
- a) hypothesis
 - b) null hypothesis
 - c) significance level
 - d) type-I error
- (x) Which of the following is not a measure of central tendency?
- a) Percentile
 - b) Quartile
 - c) Standard deviation
 - d) Mode
- (xi) Which of the following is not based on all the observations?
- a) Mean
 - b) Median
 - c) Mode
 - d) None of these
- (xii) Find the number of all possible samples from a population containing 8

items from which 2 items are selected at random without replacement.

- a) 56
- b) 28
- c) 38
- d) 66

(xiii) Cluster sampling, stratified sampling and systematic sampling are types of

- a) direct sampling
- b) indirect sampling
- c) random sampling
- d) None of these

(xiv) Type of sampling In which each element of population has equally likely chance of occurrence in a random sample is classified as

- a) regular and irregular sampling
- b) error free sampling
- c) inertia sampling
- d) simple random sampling

(xv) Any calculation regarding sample is called

- a) Statistic
- b) Parameter
- c) Estimator
- d) none of these

(xvi) A specific value calculated from sample is called:

- a) Estimator
- b) Estimate
- c) Estimation
- d) Bias

(xvii) A single value used to estimate a population values is called:

- a) Interval estimate
- b) Point estimate
- c) Level of confidence
- d) Degrees of freedom

(xviii) Bias of an estimator can be:

- a) Negative
- b) Positive
- c) Both Negative or Positive
- d) None of these.

(xix) A statistician calculates a 95% confidence interval for ? when ? is known. The confidence interval is Rs. 18000 to Rs. 22000, the amount of the sample

mean is:

- a) 18000
- b) 20000
- c) 22000
- d) 40000

(xx) A square matrix in which the diagonal elements are equal to 1 and the off-diagonal elements are equal to 0 is known as:

- a) A variance-covariance matrix
- b) A column vector
- c) An identity matrix
- d) The error sum of squares and cross-products matrix (or error SSCP)

(xxi) The mean of the values 8,5,7,10,15,21 is

- a) 10
- b) 11
- c) 12
- d) None

(xxii) The bias of the estimator sample mean of the population mean is

- a) 0
- b) 1
- c) 0.5
- d) none of these

(xxiii) The first order raw moment is equal to

- a) Zero
- b) 1
- c) Negative
- d) None of these

(xxiv) The value of the multiple correlation coefficient is always (lies)

- a) greater than 1
- b) between 0 to 1
- c) between -1 to +1
- d) less than -1

(xxv) The mean of a distribution is 23, the median is 24, and the mode is 25.5.

It is most likely that this distribution is:

- a) Positively Skewed
- b) Symmetrical
- c) Asymptotic
- d) Negatively Skewed

(xxvi) Analysis of variance is a statistical method of comparing the _____ of several populations.

- a) mean
- b) median
- c) mode
- d) variance

(xxvii) The sampling error is defined as

- a) difference between population and parameter
- b) difference between sample and parameter
- c) difference between population and sample
- d) None of these.

(xxviii) A confidence interval will be widened if

- a) The confidence level increased and sample size is decreased
- b) The confidence level increased and sample size is increased
- c) The confidence level decreased and sample size increased
- d) The confidence level decreased and sample size is decreased

(xxix) A perfect negative correlation is signified by

- a) 0
- b) 1
- c) -1
- d) none of these

(xxx) In a one-tail test for the population mean, if the null hypothesis is rejected when the alternative hypothesis is not true, then:

- a) a type-I error committed
- b) a type-II error committed
- c) correct decision made
- d) nothing can be said

(xxxii) The probability of rejecting null hypothesis when it is true, is called

- a) level of confidence
- b) level of significance
- c) power of the test
- d) confidence interval

(xxxiii) For testing of hypothesis critical region is also known as

- a) confidence region
- b) acceptance region

c) rejection region

d) none of these

(xxxiii) The number of independent values in a set of values is called

a) test statistic

b) degrees of freedom

c) level of significance

d) level of confidence

(xxxiv) The process of making estimates about the population parameter from a sample is called:

a) Statistical Independence

b) Statistical Inference

c) Statistical Hypothesis

d) Statistical Decision

(xxxv) The power of MANOVA to detect an effect depends on:

a) A combination of the correlation between dependent variables and the effect size to be detected

b) A combination of the correlation between independent variables and the effect size to be detected.

c) A combination of the correlation between independent and dependent variables.

d) None of these

(xxxvi) The coefficient of correlation

a) is the square of the coefficient of determination

b) is the square root of the coefficient of determination

c) is the same as r-square

d) can never be negative

(xxxvii) In simple linear regression, the number of variables involves are

a) 2

b) 1

c) 3

d) None of these

(xxxviii) If $f(G, x)$ is the chromatic polynomial of a tree with 5 vertices then $f(G, 3) =$

a) 5

b) 320

c) 48

d) 14

(xxxix) Every vertex of a null graph is

- a) Pendant
- b) Isolated
- c) Odd
- d) none of these

(xl) If G is a tree with n vertices, then the number of edges of G are

- a) n
- b) $(n+1)$
- c) $n(n+1)$
- d) $(n-1)$

(xli) A vertex whose degree 1 is called

- a) isolated vertex
- b) pendant vertex
- c) even vertex
- d) none

(xlii) The degree of an isolated vertex is

- a) 0
- b) 1
- c) 2
- d) none

(xliii) Minimal spanning tree is found by

- a) Dijkstra's algorithm
- b) Ford-Fukerson's algorithm
- c) Floyd algorithm
- d) Kruskal's algorithm

(xliv) The maximum number of edges of a simple graph with 5 vertices and 2 components is

- a) 2
- b) 7
- c) 5
- d) 6

(xlv) If the origin and terminus of a walk coincide then it is a

- a) path
- b) open walk
- c) circuit
- d) closed walk

(xlvi) A minimally connected graph cannot have a

- a) cycle
- b) component

c) even vertex

d) pendant vertex

(xlvii) Dijkstra's algorithm is used to

a) find maximum flow in a network

b) to scan all vertices of a graph

c) find the shortest path from a specified vertex to another

d) none of these

(xlviii) A graph with no circuit and no parallel edges is called

a) Multi graph

b) Pseudo graph

c) Simple graph

d) None of these

(xlix)

The condition for independence of two events A and B is

a)

b)

$$P(A \cap B) = P(A)P(B)$$

$$P(A + B) = P(A)P(B)$$

c)

d)

$$P(A - B) = P(A)P(B)$$

$$P(A \cap B) = P(A)P(B|A)$$

(l)

The mean and standard deviation of a Binomial distribution are respectively 4 and

$\sqrt{\frac{8}{3}}$. The values of n and p are (where n and p are the parameters of the probability distribution)

a)

b)

$$11, \frac{3}{4}$$

$$12, \frac{2}{7}$$

c)

$$12, \frac{1}{3}$$

d)

$$11, \frac{4}{3}$$

(li)

A random variable X has the following p.d.f $f(x) = \frac{1}{4}, -2 < x < 2$, then $P(2X+3 > 5)$ is
=0, elsewhere

a) 1

b)

$$\frac{1}{2}$$

c)

d)

$$\frac{1}{4}$$

$$\frac{3}{4}$$

(lii)

The mean of Binomial distribution (where n and p are the number of trials and probability of success) is

a)

b) 0

$$\frac{n}{p}$$

c) np

d) 1

(liii)

If X is normally distributed with zero mean and unit variance, then expectation of X^2 is

- a) 1
- c) 8

- b) 2
- d) 0

(liv)

The maximum likelihood estimate is a solution of the equation

a)

b)

$$\frac{\partial L(\theta)}{\partial \theta} = 0$$

$$\frac{\partial L(\theta)}{\partial \theta} = \text{Constant}$$

c)

d) None of these

$$\frac{\partial L(\theta)}{\partial \theta} = \theta$$

(lv)

The m.l.e. of the unknown parameter m in poisson distribution is

a)

b)

$$n\bar{x}$$

$x?$

c)

d)

$$x? / n$$

None of these

(lvi)

The unbiased estimator of population variance σ^2 is

a)

b)

Sample variance

$$\frac{n}{n-1} \sigma^2$$

c)

d) None of these

$$\frac{n-1}{n} \sigma^2$$

(lvii)

Relation between mean, median, mode in Normal distribution is

a)

b)

Mean=Median \neq Mode

Mean \neq Median =Mode

c)

d)

Mean \neq Median \neq Mode

Mean=Median =Mode

(lviii)

The range of the test statistic Z is

a)

b)

-1 to +1

-1 to $+\infty$

c)

d) None of these

$-\infty$ to 0

(lix)

In hypothesis testing P(Type II Error)=?

a)

b)

$1 - \alpha$

α

c) 1

d)

β

(lx)

The independence number of the graph



Is

a) 1

b) 2

c) 3

d) None of these