Multiple Choice Questions

1. Literature review is not usually concerned with helping in
   a) objective setting   b) research instrument design
   c) literary appreciation   d) subsequent data collection.

2. The literature review will examine:
   a) only facts   b) only one side of the main argument   c) only opinions   d) all aspects of a topic

3. The starting point for a literature search is
   a) primary data   b) tertiary data   c) secondary data   d) some other data

4. Which is the major disadvantage of using peer-reviewed journals in literature reviews?
   a) the information is too recent   b) information could be as old as four years
   c) subscription fees are high   d) Humans control the quality

5. Why is it important for a researcher to review the literature?
   a) Because it will find if anyone has done the work before
   b) Because it is traditional
   c) Because it identifies like-minded researchers
   d) Because it shows time has been spent on the subject

6. To read the literature critically means
   a) to suggest the previous research was always poorly conducted
   b) skimming through the material because most of it is just padding
   c) evaluating what you read in terms of your own research questions
   d) being negative about something before you read it.

7. Schematic literature review is
   a) one which generates a literature review using a treasure hunt system
   b) a replicable, scientific, and transparent process
   c) one which gives equal attention to the principal contributors to the area
d) a manufactured system for generating literature reviews tailored to your subject.

8. According to the Harvard referencing convention, pick out the correct version of showing this book in a bibliography


c) Bryman and Bell, Business Research Methods (2011: OUP)

d) Bryman, A. Business Research Methods (2011)

9. Which of the following statements about plagiarism is most accurate?

a) It is so easy to "copy and paste" from the internet that everyone does it nowadays. If a proper reference is given, where is the harm in that?

b) How can we say for sure where our own ideas come from exactly? If we tried to give a reference for everything we could never hope to succeed.

c) Any suggestion that we have written what another actually wrote is morally wrong. The whole point of a literature review is to show what we have read and what we thought about it.

d) Plagiarism is such an awful crime that those found guilty should be obliged to wear a scarlet "P" on their clothing.

10. Which of the following is not required in a reference list or bibliography entry?

a) Call number

b) Place of publication

c) Authors’ names

d) Publisher.

11. The main purpose of research in education is to _________

a) Help in the personal growth of an individual

b) Help the candidate become an eminent educationist

c) Increase job prospects of an individual

d) Increase social status of an individual

12. _____ is the classical form of research?

a) Experiment 

b) Case study 

c) Grounded theory 

d) Narrative inquiry

13. Preliminary data collection is a part of the________

a) Descriptive research  

b) Exploratory research 

c) Applied research 

d) Explanatory research
14. _______research is the naturalism  
   a) Field research   b) Descriptive research   c) Basic research   d) Applied research
15. If the researcher is concerned with finding out who, what, when or how much, then the study is ________
   a) Descriptive research   b) Exploratory research   c) Empirical research   d) Causal research
16. _______ is referred to as "the father of research on teaching"?
   a) N. L. Gage   b) David Berliner   c) Egon Brunswik   d) Donald T. Campbell
17. MLA stands for______
   a) Modern Literature Art   b) Modern Linguistic Association   c) Modern Language Association   d) Make Life Awesome
18. E-books are______
19. Reference should be ______
   a) In the alphabetical order   b) In the end of research article   c) Strictly follow the instruction of the publisher   d) All the above
20. What is a bibliography?
   a) A true story written about someone   b) Another name for writing a book.   c) A religious book.   d) A list of sources used in a report and where they can be found.
21. If a solution has to be a buffer, its pH should be
   a) at its $pka$ value   b) at its $ka$ value   c) at 7   d) at 14
22. Molar absorbtivities of compounds exhibiting charge transfer absorption are
   a) small   b) moderate   c) large   d) extra large
23. Beer Lambert’s law gives the relation between which of the following?
   a) Reflected radiation and concentration   b) Scattered radiation and concentration   c) Energy absorption and concentration   d) Energy absorption and reflected radiation
24. Beer’s law states that the intensity of light decreases with respect to
25. What is the use of tubular-bowl centrifuge?
   a) to separate soap from oil          b) to separate waste material
   c) to separate cells and viruses from broth  d) to separate salts from mixtures

26. In which industry tubular-bowl centrifuge not used?
   a) food industry       b) pharma industry     c) metallurgical  d) baking industry

27. The product of freeze dried sample can be stored at________ for long time.
   a) 3°C           b) 4°C           c) 10°C               d) 12°C

28. Freeze drying’s second phase is ______
   a) primary drying     b) condensation drying    c) secondary drying    d) freeze drying

29. Agarose can be extracted from which of the following?
   a) *Gracilaria esculentus*          b) *Lycazusican esculentum*
   c) *Ficum benghalensis*               d) *Agrostis stolonifera*

30. Electrophoresis cannot be used to separate___________
   a) DNA           b) RNA           c) amino acid         d) protein

31. The polymerization of the gel used in PAGE occurs between polyacrylamide and________
   a) N, N- acrylamide          b) Bisacrylamide
   c) N- methyleneacrylamide       d) N, N- methylene bisacrylamide

32. If DNA is digested by endonucleases in four sites giving rise to fragments of which two are equal in length how many bands would be seen after electrophoresis?
   a) 3             b) 4             c) 5            d) 6

33. The fluorescent dye such ethidium is used for visualizing DNA. How do ethidium binds to DNA?
   a) stacked between histone molecules   b) binds to the nucleotide base
   c) intercalated between the stacked bases   d) binds to the phosphodiester backbone

34. Which of the following will migrate faster? The condition is the molecular weight of the following is equal.
   a) concentration     b) distance     c) composition       d) volume
a) supercoiled circular DNA  b) nicked circular DNA  
c) single stranded DNA  d) Double stranded DNA

35. Which of the following is not a character of polyacrylamide gel?
a) inert  b) ionic strength  c) stable over a wide range of pH  d) separate up to a few 100bp of DNA

36. Lead levels in drinking water could be determined by using
a) HPLC  b) GC-MS  c) CZE  d) AAS

37. Which of the following techniques would be useful for monitoring dioxin levels in the environment?
a) GC-MS  b) AES  c) CZE  d) AAS

38. Which of the following is commonly used as the mobile phase in GC-MS?
a) CH\textsubscript{3}CN  b) He  c) H\textsubscript{2}O  d) air

39. Derivatization of drugs is a routine strategy during analysis by GC-MS. Which of the following is not a routine derivatization method?
a) methylation  b) trimethylsilylation  c) perfluoroacylation  d) bromination

40. 1 pg is equal to
a) 1\times10^{9} g  b) 1\times10^{-12} g  c) 1\times10^{-9} g  d) 1\times10^{12} g

41. Sample size depends on
a) Type of problem investigated  b) Resources available  c) Required precision  d) all of them

42. Data obtained by the investigator from personal experimental studies is called
a) Primary data  b) Arrayed data  c) chronological data  d) None of these

43. When data is classified according to the magnitude it is called
a) Chronological  b) qualitative  c) quantitative  d) continuous

44. Frequency of a discrete variable can be represented by
a) Line diagram  b) Bar diagram  c) none of them  d) both of them

45. Continuous variables are represented by
a) Histogram  b) line diagram  c) bar diagram  d) pie chart
46. Percentage frequency distribution is represented by
   a) Frequency polygon   b) Ogive representation   c) pie diagram   d) frequency table

47. Mode is
   a) Most frequent value   b) Least frequent value   c) Middle most value   d) none

48. The positional average is
   a) mean   b) median   c) mode   d) harmonic mean

49. Mean deviation can be computed from
   a) arithmetic mean   b) mode   c) median   d) variance

50. Which of the following is a measure of variation?
   a) standard deviation   b) midrange   c) mode   d) median

51. The ratio between experimental and observed results is represented by
   a) theta value   b) chi-square   c) variance ratio   d) correlation

52. Chi-square test was developed by
   a) W. S. Gosset   b) Karl Pearson   c) A. R. Fisher   d) Pascal

53. Two variables deviate in opposite directions is called
   a) positive correlation   b) ideal correlation   c) inverse correlation   d) moderate positive

54. The fundamental statistical indicators are
   a) Mean   b) Median   c) Variance   d) Standard deviation

55. The average of a series of numerical values is
   a) The sum of the values divided by their number
   b) Lower than the minimum value in the series
   c) Lower than the maximum value in the series
   d) An indicator of central tendency for the values of the series

56. Standard deviation
   a) is the square root of variance
   b) is measured using the unit of the variable
c) is measured using the squared unit of the variable
d) has values generally comparable with the average value

57. If the average of a series of values is 10 and their variance is 4, then the coefficient of variation (= the ratio standard deviation / average) is

a)40%  b)20%  c) 80%  d) 10%

58. The median of a series of numerical values is

a) Equal to the average   b) A graph or chart   c) A number   d) A frequency table

59. The median of a series of numerical values is

a) A value for which half of the values are higher and half of the values are lower
b) The value located exactly midway between the minimum and maximum of the series
c) The most commonly encountered values among the series
d) A measure of the eccentricity of the series

60. In a contingency table that shows data from a clinical trial is good to have high values for

a) sick subjects, diagnosed as negative
b) sick subjects, diagnosed as positive
c) healthy subjects, diagnosed as negative
d) healthy subjects, diagnosed as positive

61. A regression line is a straight line which

a) is located as close as possible to all the points of a scatter chart
b) is defined by an equation having 2 parameters: the slope and the intercept
c) provides an approximate relationship between the values of two parameters
d) is parallel to one of the coordinate axes

62. Pearson correlation coefficient, denoted by r, measures

a) The scattering strength of data for a statistical series
b) The strength of the correlation between the mean and median
c) The strength of the correlation between two numerical parameters
d) The tendency of simultaneous increase or decrease, or inverse evolution, for two numerical parameters

63. The Student's t test is

a) a parametric test
b) a nonparametric test  
c) a test for comparing averages   
d) a test for comparing variances

64. Which of the following tests are parametric test?
   a) ANOVA   b) Student   c) Wilcoxon   d) Kruskal-Wallis

65. A subset of the population selected to help make inferences on a population is called
   a) a population   b) inferential statistics   c) a census   d) a sample

66. A set of all possible data values for a subject under consideration is called
   a) descriptive statistics   b) a sample   c) a population   d) statistics

67. The number of occurrences of a data value is called
   a) the class limits   b) the frequency   c) the cumulative frequency   d) the relative frequency

68. A large collection of data may be condensed by constructing
   a) classes   b) a frequency polygon   c) class limits   d) a frequency distribution

69. What is the purpose of a summary table?
   a) This is the only way to present categorical data in numerical form
   b) To sum the values of responses to a survey
   c) To list data to create a bar or pie chart
   d) To see differences between or among categories

70. A graphical representation of a frequency distribution is called a
   a) stem and leaf plot   b) scatter diagram   c) time-series plot   d) histogram

71. The width of a class interval in a frequency distribution will be approximately equal to the
   range of the data divided by the
   a) highest value in the data set   b) lowest value in the data set
   c) number of class intervals   d) average of the data set

72. The cumulative frequency for a particular class is equal to 35. The cumulative frequency for the
   next class will be _______
73. The highest bar in a histogram represents?
   a) the class with the highest cumulative frequency
   b) the class with the lowest frequency
   c) the class with the highest frequency
   d) the class with the lowest relative frequency

74. Which of the following would be most helpful in the construction of a pie chart?
   a) cumulative percentages
   b) frequency distribution
   c) ogive
   d) relative frequencies

75. The following numbers represent exam scores in botany:
   78, 93, 85, 8, 73, 96, 72, 86, 90, 85. If a stem and leaf diagram is developed from this data, how many stems will be used?
   a) 3  b) 5  c) 10  d) 4

76. Can a frequency distribution have overlapping classes?
   a) sometimes
   b) no
   c) yes
   d) all of the above

77. Which of the following is not a measure of central tendency?
   a) mode
   b) variability
   c) median
   d) mean

78. Which of the following is the crudest measure of dispersion?
   a) mean absolute deviation
   b) variance
   c) mode
   d) range

79. Second moment about mean is
   a) SD
   b) variance
   c) coefficient of variation
   d) none

80. The most frequently occurring value in a data set is called the
   a) spread
   b) mode
   c) skewness
   d) maximum value

81. Which of the following is true for a positively skewed distribution?
   a) mode = median = mean
   b) mean < median < mode
   c) mode < median < mean
   d) median < mode < mean

82. If the number of values in a data set is even, and the numbers are ordered, then
   a) the median cannot be found
   b) the median is the average of the two middle numbers
83. The coefficient of skewness is always zero for_________ distribution
a) symmetrical     b) skewed     c)median     d) none

84. If the correlation coefficient is zero, the slope of a linear regression line will be
a) positive     b) negative     c) positive or negative     d) none

85. Thin layer chromatography is
a) partition chromatography     b) electrical mobility of ionic species
     c) adsorption chromatography     d) one of the above

86. In gas chromatography, the basis for separation of the components of the volatile material is the difference in
a) partition coefficients     b) conductivity     c) molecular weight     d) molarity

87. Which section of a paired samples t test output can be ignored?
 a) regression     b) mean     c) median     d) paired samples correlation

88. A regression line is a straight line which:
 a) is located as close as possible to all the points of a scatter chart
 b) is defined by an equation having 2 parameters: the slope and the intercept
 c) provides an approximate relationship between the values of two parameters
 d) is parallel to one of the coordinate axes

89. What is the alternative name for a repeated measures t- test?
 a) unrelated t-test     b) related t-test     c) a paired samples t-test     d) unpaired sample t-test

90. Conducting multiple t- tests increases the likelihood of which of the following?
 a) finding correct conclusions     b) type I error     c) homogeneity     d) type II error

91. SPSS stands for
 a) simple perfect squaredsquare
 b) statistical product and service solutions
 c) statistical package for social science
 d) software package for statistical science

92. HPLC stands for
93. The eluent strength is a measure of
   a) solvent absorption energy   b) solvent adsorption energy
   c) solvent diffusivity         d) solvent mixing index

94. Which can be used as a mobile phase in HPLC applications?
   a) any compound with solubility in liquid
   b) any compound with limited solubility in liquid
   c) any compound with non-solubility in liquid
   d) none

95. HPLC methods includes
   a) liquid/liquid chromatography
   b) liquid/solid chromatography
   c) ion exchange and size exclusion chromatography
   d) all of the above

96. For a typical adsorbent such as silica gel, the most popular pore diameters are
   a) 10 and 50 Å   b) 60 and 100 Å   c) 100 and 150 Å   d) 150 and 200 Å

97. What is the possibility of having 53 Thursdays in a non-leap year?
   a) 6/7   b) 1/7   c) 1/365   d) 53/365

98. The collection of one or more outcomes from an experiment is called
   a) probability   b) event   c) random variable   d) Z-value

99. Which of the following is not a condition of the binomial distribution?
   a) only 2 possible outcomes   b) have constant probability of success
   c) must have at least 3 trials   d) trials must be independent

100. When two coins are tossed simultaneously, what are the chances of getting at least one tail?
    a) 3/4   b) 1/5   c) 4/5   d) 1/4
K3 and K4 level questions

Unit I (K3)

1. Why research subject should be related to the societal needs?
2. Comment on the role of internet in modern research.
3. Explain the stages involved in research article publication.
4. Define plagiarism and explain its oriented softwares.
5. Write short notes on research experimental designs.
6. Describe the significance of research.
7. Describe the quantitative research.
8. Describe the applied research.
9. Differentiate quantitative and qualitative research.
10. Define Citation explain its types.

Unit I K4

1. Explain the steps involved in writing the thesis /dissertation.
2. Define Bibliometrics. Explain its laws.
3. Describe the various types of research.
4. What are various points to be kept in mind while selecting and formulating a research problem?
5. Explain the various steps of writing of research report in detail?
6. Write short notes on the limitations and cautions in secondary data collection.
7. How is it used as a tool for research evaluation.
8. Write different types of citation style of the following research article.

Research Article
ISSN: 0974-6943

Antibacterial activity of Amorphophallus comnatus, an endemic plant of Western Ghats, South India.
Available online through www.jpronline.info

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ABSTRACT

Amorphophallus comnatus (Schott. Engl) (Acanthaceae), a rare evergreen herb. Aqueous and organic solvent extracts of the roots were investigated for anti-bacterial activity properties by using disc diffusion method, against pathogens causing gram-negative bacteria (Escherichia coli, Proteus vulgaris, Pseudomonas aeruginosa and Staphylococcus epidermidis). The different extracts showed significantly in their anti-bacterial properties with the benzene extract being very effective followed by petroleum ether, chloroform, and ethyl acetate extracts. Aqueous and methanol extract showed very less activity. The results of this study support the use of this plant in traditional medicine.

Key words: Amorphophallus comnatus, anti-bacterial activity, human pathogens.
UNIT-II (K3)

1. List out the applications of pH meter.
2. Write the basic principles of pH meter.
3. Explain the working principle of UV-Visible spectrophotometer with neat diagram.
4. Write a brief note on working principle of centrifuge and its types.
5. Define lyophilizer. Point out its applications.
7. Expand GLC. Mention its significance.
8. Expand HPLC. Write its working principle.
10. Write the difference between AGE and PAGE.

UNIT-II (k4)

1. Give a detailed note on UV-Visible spectrophotometer.
2. Write about HPLC in detail.
3. Explain GLC and its working principle in detail.
4. Give a detailed note on AGE with neat diagram.
5. Write about PAGE in detail.

UNIT-3 (K3)

1. Explain about primary and secondary data.
2. How can you classify and tabulate the given data? List out its characters.
3. Explain about the organization of a table.
4. What are the general rules for the construction of table?
5. Define table. Explain its types.

6. Describe the construction and use with an example for each of the following.
   (i) Bar diagram  (ii) pie diagram

7. What is mean by average? Explain its types.

8. The following are the weights in g of a species frog, with a sample size n=8.
   75, 60, 55, 80, 45, 70, 40, 85

9. Explain about measures of dispersion.

10. Lengths of two species of fish, A and B, are as follows. Comment on the variability of the length in the species.
    Species A: = 67 ± 2.5
    Species B: = 64± 2.4.

**Unit- 3 K4**

1. Describe the construction and use with an example each of the following (i) Bar-diagram; (ii) Pie-diagram; (iii) Cartogram; (iv) Pictogram.

2. Define and discuss the biological applications of (i) geometric mean; (ii) harmonic mean and (iii) weighted averages.

3. Define mean, median and mode. Compute the mean and median for the following data of weight of a species of frog.
   Weight in g: 16, 11, 8, 10, 14, 16, 9, 9, 13 and 12.

4. Compute arithmetic mean for the following data of weight of fish in grams.

<table>
<thead>
<tr>
<th>Wt. of fish</th>
<th>6-10</th>
<th>11-15</th>
<th>16-20</th>
<th>21-25</th>
<th>26-30</th>
<th>31-35</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of fish</td>
<td>5</td>
<td>8</td>
<td>12</td>
<td>10</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

5. Calculate the standard deviation and coefficient of variation for the following data of length (mm) of an aquarium fish. Represent the data in a histogram.

<table>
<thead>
<tr>
<th>Length in mm</th>
<th>0-6</th>
<th>6-12</th>
<th>12-18</th>
<th>18-24</th>
<th>24-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of fish</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>
6. What is coefficient of variation? What is it uses? The statistics on the length and weight of 20 Tilapia are given below.

<table>
<thead>
<tr>
<th></th>
<th>Length</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>67.20 mm</td>
<td>137.50 g</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>2.68 mm</td>
<td>13.37 g</td>
</tr>
</tbody>
</table>

7. Define standard deviation. What are its properties? A sample of 1000 prawns from an aquaculture pond yielded a mean weight of 800g with a standard deviation of 20 g. what is your inference about the sample data?

8. The following data is on the number of students in a city college having different blood groups. Represent the data in a pie-diagram and in a bar diagram.

<table>
<thead>
<tr>
<th>Blood group</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>744</td>
</tr>
<tr>
<td>B</td>
<td>971</td>
</tr>
<tr>
<td>O</td>
<td>888</td>
</tr>
<tr>
<td>AB</td>
<td>207</td>
</tr>
</tbody>
</table>

9. Represent the following data on the blood-glucose levels in a mammal following insulin injection, in a graph.

<table>
<thead>
<tr>
<th>Hours after insulin injection</th>
<th>Blood-glucose (mg/100 ml) Mean ±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>125±12</td>
</tr>
<tr>
<td>1.0</td>
<td>100±18</td>
</tr>
<tr>
<td>2.0</td>
<td>96±12</td>
</tr>
<tr>
<td>3.0</td>
<td>95±08</td>
</tr>
<tr>
<td>6.0</td>
<td>68±06</td>
</tr>
<tr>
<td>12.0</td>
<td>85±10</td>
</tr>
<tr>
<td>18.0</td>
<td>110±12</td>
</tr>
<tr>
<td>24.0</td>
<td>132±16</td>
</tr>
</tbody>
</table>

10. Explain the following with examples. (i) Range (ii) Quartile deviation (iii) Decile range.

Unit- IV (K3)

1. Define chi-square test. Write the procedure for chi-square test.

2. Write down the applications of chi-square test.
3. Define correlation. Write its types.

4. Explain regression and regression lines in brief.

5. What are the applications of t-distribution?

6. Expand ANOVA. What are its principles and applications?

7. Explain one-way classification of ANOVA.

8. Explain the properties of regression lines.

9. Explain about scatter diagram in brief.

10. Discuss about spearman’s rank of correlation coefficient.

**Unit- IV K4**

1. What is chi-square test? Explain its applications in biology.

2. In the garden pea, yellow cotyledon colour is dominant to green, and inflated pod shape is dominant to constricted form. When these traits were considered jointly in self-fertilized dihybrids, the progeny appeared in the following numbers: 193 green inflated; 184 yellow constricted; 556 yellow inflated; 6 green constricted. Test the date for independent assortment.

3. In crosses between pink 4 O’ clock, 30 red, 48 pink, and 27 white flowers were obtained. Are these results consistent with the genetic model?

4. The F2 generation resulting from the crosses between heterozygous red owls contained 16 red 8 gray owls. Are these results consistent with the genetic theory that red is dominant over gray?

5. Pure black rats when test crossed to albinos produce only black F1 offspring. The F2 in one experiment was found to consist of 43 blacks, 15 cream and 22 albino. The genetic control of these coat colours is postulated to involve two gene loci with recessive epistasis (9:3:4 ratio expected). Is the genetic hypothesis consistent with the data?

**Unit- V (K3)**

1. What is SPSS? Write down its applications.

2. Write the algorithm for t-test.

3. Give a brief note on multivariate analysis.

4. Write about cluster analysis in brief.

6. Enumerate and briefly explain the parameters and properties of binomial distribution.

7. List out the properties of poisson distribution.

8. Write the applications of poisson distribution.

9. Define normal curve. Write its properties.

10. What are the properties and parameters of normal distribution.

**Unit- V K4**

1. The probability that a person will die within a month after a certain heart transplant operation is 18%. What are the probabilities that in three such operations one, two or all three persons will survive?

2. Black hair in guinea pig is dominant to white hair. In families of 5 offsprings where both both parents are heterozygous black what is the probability of getting 3 black and 2 white.

3. From the following data on the distribution of gall-bearing plants, determine whether these plants are randomly distributed.

<table>
<thead>
<tr>
<th>No. of plants with galls</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of quadrates</td>
<td>60</td>
<td>24</td>
<td>11</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

4. Fit a poisson distribution to the following data on number (x) of bacterial colonies per culture per culture plate in 200 culture plates (f). Calculate the theoretical frequencies test their goodness-of-fit.

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>123</td>
<td>59</td>
<td>14</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

5. Explain with suitable examples the nature of normal variable. Enumerate and briefly explain the parameters and properties of normal distribution.