

Shivaji University, Kolhapur
Question Bank for Mar 2022 (Summer) Examination

Subject Code: 81681

Subject Name: Botany Paper XIV

Unit 1: Bioinformatics **14**

- 1.1 Introduction, Aim, Scope and Branches of Bioinformatics
- 1.2 Biological Databases: Classification, Format and Retrieval system of Biological Database,
National Center for Biotechnological Information (NCBI), Basic Local Alignment Search Tool (BLAST)
- 1.3 Protein Information Resource (PIR) - Concept, Resources, Databases and Data Retrieval
- 1.5 Applications of Bioinformatics- Molecular Phylogeny (Concept, Methods, Analysis and Consistency)*

Unit 2: Biostatistics **11**

- 2.1 Introduction, definition, terminology.
- 2.2 Collection and presentation of data: Types of data, techniques of data collection- Census method, sampling method- simple random, stratified and systematic sampling.
Classification, tabulation, graphical representation- Histogram and polygon.
- 2.3 Measures of central tendency and Dispersion: Arithmetic mean, Mode, Median, Range, Deviation, Mean deviation, Standard Deviation, Coefficient of Variation.
- 2.4 Statistical methods for testing the hypothesis') Students' T-test ii) Chi-square test.

Unit 3: Economic Botany: Cereals, Legumes and Oils

10

- 3.1 Origin of Cultivated Plants - Concept of centers of origin, their importance with reference to Vavilov's work.
- 3.2 Cereals: Origin, Botanical Name, Morphology, Sources and Economic importance of Wheat.
- 3.3 Legumes: Origin, Botanical Name, Morphology, Sources and Economic importance of Gram and Soybean.
- 3.4 Oils and Fats: Origin, Botanical Name, Morphology, Parts used and uses of Ground nut.

Unit 4: Economic Botany: Spices, Beverages and Fibers **10**

- 4.1 Spices and Condiments - Origin, Botanical Name, Morphology, Parts used and Uses of

Clove and Black pepper.

4.2 Beverages – Origin, Botanical Name, Morphology, Parts used and uses of Tea.

4.3 Fibre yielding Plants - Origin, Botanical Name, Morphology, Parts used and uses of Cotton.

Q.1. Rewrite the following sentences using the correct alternatives given below:

1. Any sequences can be used to draw a phylogenetic tree.

a. DNA and RNA

b. RNA

c. Protein

d. DNA, RNA or protein

2. In a phylogenetic tree, each line is called a

a. node

b. tip

c. branch

d. leaf

3. In a phylogenetic tree each point where two branches split is called a which is the most recent common ancestor of all species on those branches.

a. node

b. root

c. branch

d. leaf

4. In a phylogenetic tree the last node is called the which is the common ancestor of all the species in the tree.

a. node

b. root

c. branch

d. leaf

5. Five Stages of Molecular Phylogenetic Analysis include sequence acquisition, multiple sequence alignment, substitution models, and tree evaluation.

- a. tree branching
- b. tree growing
- c. tree drawing

d. tree building

6. Bioinformatics is an interdisciplinary field, which harnesses mathematics, physics and biology.

- a. History
- b. Geography

c. Computer science

- d. Sociology

7. Bioinformatics uses computer programs for a variety of applications, including determining functions, establishing evolutionary relationships, and predicting the three-dimensional shapes of proteins.

- a. growth

b. gene and protein

- c. reproductive
- d. flowering

8. Typical job responsibilities for a bioinformatics career include.....

- a. Conduct quantitative analysis of biological images.
- b. Assist in developing more efficient methods of food production
- c. Design strategies for DNA, RNA, and protein sequence analysis.

d. All of the above

9. Term Bioinformatics was invented by in 1970.

a. Paulien Hogeweg and Ben Hesper

- b. Gregor Mendel
- c. James Watson and Francis Crick
- d. Ainsworth and Bisby

10. An unrooted phylogenetic tree us anything about the series of evolutionary events.

a. does not tell

- b. tells
- c. analyses
- d. explains

11. Bioinformatics is defined as the application of tools ofto the capture

and interpretation of biological data.

a. computation and analysis

- b. genetics
- c. physiology
- d. biotechnology

12. The field of bioinformatics involves the analysis and interpretation of various types of data such as nucleotide and amino acid sequences and

- a. Lipid profile
- b. Cell wall structure

c. Protein structure

- d. Carbohydrates

13. SRS, Entrez, DBGET are threeof relevance to a molecular biologist.

a. Data retrieval systems

- b. Data processing systems
- c. Data analysis systems
- d. Data management systems

14. BLAST is

a. Basic Local Alignment Tool

- b. Basic Legal Alignment Tool
- c. Basic Local Assignment Tool
- d. Basic Local Assessment Tool

15. National Center for Biotechnological Information (NCBI) is situated in

- a. India

b. USA

- c. China
- d. Japan

16.is the branch of phylogeny that analyzes genetic, hereditary molecular differences to gain information on an organism's evolutionary relationships.

- a. Molecular technology
- b. Biotechnology

c. Molecular phylogenetics

- d. Genetic engineering

17. In a phylogenetic tree, a may be defined as a group of organisms having a common ancestor throughout evolution.

- a. Species
- b. Taxon
- c. Clade**
- d. Cluster

18. is NCBI's search and retrieval system that provides users with integrated access to sequence, mapping, taxonomy, and structural data.

- a. SRS
- b. Entrez**
- c. DBGET
- d. Powerpoint

19. The bioinformatics toolbox includes computer software programs such aswhich depend on the availability of the internet.

- a. Powerpoint
- b. Adobe
- c. BLAST and Ensembl**
- d. QuickHeal

20. The field of bioinformatics experienced explosive growth largely by the

- a. Human Survival Project
- b. Human Environment Project
- c. Human Genome Project**
- d. Human Rights Project

21.is an interface to over 80 biological databases of sequences, metabolic pathways, transcription factors, protein 3-D structures, genomes, mutations, etc.

- a. Entrez
- b. DBGET
- c. BLAST
- d. Sequence Retrieval System**

22. NCBI supports and distributes a variety of databases for the medical and scientific communities such as

- a. Online Mendelian Inheritance in Man (OMIM)
- b. Molecular Modeling Database (MMDB)
- c. Taxonomy Browser
- d. All of the above**

23. NCBI's mission is to develop newto aid in the understanding of fundamental molecular and genetic processes that control health and disease.

a. Information technologies

b. Medicines

c. Vaccines

d. Medical equipments

24. In bioinformatics..... is an algorithm and program for comparing primary biological sequence information, such as the amino-acid sequences of proteins.

a. ADOBE

b. BLAST

c. McAfee

d. OUTLOOK

25. is a method of species identification using a short section of DNA from a specific gene or genes.

a. DNA barcoding

b. Genetic fingerprinting

c. Forensics

d. DNA testing

26. A phylogenetic method is a estimation of phylogeny if and only if it is guaranteed to give the correct tree, given that sufficient (possibly infinite) independent data are examined.

a. Relevant

b. Significant

c. Existent

d. Consistent

27. The use of computer science, mathematics, and information theory to organize and analyze complex biological data, especially genetic data is known as

a. Biophysics

b. Bioinformatics

c. Biostatistics

d. Biotechnology

28. The NCBI work is carried out by branches.

a. Computational Biology Branch (CBB)

b. Information Engineering Branch (IEB)

c. Information Resources Branch (IRB)

d. All of the above

29. NCBI provides access to a set of databases that together contain 690 million records.

a. 37

b. 100

c. 2

d. None

30. BLAST output can be delivered in a variety of formats such as, plain text and XML formatting.

a. HTML

b. Image

c. JPEG

d. Photoplate

31. BLAST finds similar sequences, by locating short matches between the two sequences.

This process of finding similar sequences is called

a. Assembling

b. Seeding

c. Compiling

d. Reading

32. program, given a DNA query, returns the most similar DNA sequences from the DNA database that the user specifies.

a. Protein-protein BLAST (blastp)

b. Nucleotide 6-frame translation-protein (blastx)

c. Large numbers of query sequences (megablast)

d. Nucleotide-nucleotide BLAST (blastn)

33. Phylogenetics is the science of estimating and analyzing relationships.

a. Evolutionary

b. Anatomical

c. Physiological

d. Cytological

34. In a phylogeny tree, a branch represents the persistence of a genetic lineage through time, and each represents the birth of a new lineage.

a. Leaf

b. Node

c. Twig

d. Bud

35. To construct a histogram, the first step is to divide the entire range of values into a series of intervals which is also known as

a. bin

b. mean

c. group

d. set

36. A histogram is used for data, while a bar chart is a plot of categorical variables.

a. random

b. continuous

c. unrelated

d. irregular

37. The words used to describe the patterns in a histogram are

a. symmetric

b. unimodal

c. skewed

d. All of the above

38. If two data sets having similar values need to be compared then the can be used.

a. coefficient of variation

b. mean

c. median

d. standard deviation

39. If two data sets having different unit need to be compared then the needs to be used.

a. histogram

b. coefficient of variation

c. polygon

d. standard deviation

40. The science of collecting and analyzing biologic or health data using statistical methods is

known as

- a. Biophysics
- b. Biochemistry
- c. Biostatistics**
- d. Bioinformatics

41. Standard deviation represents the extent to which individual values differ from the average or Mean represented by Greek symbol

- a. Alpha
- b. Beta

c. Sigma

- d. Gamma

42. A..... random sample is obtained by separating the population into mutually exclusive sets, or strata, and then drawing simple random samples from each stratum.

- a. Random
- b. Simple
- c. Cluster

d. Stratified

43. The is the number that occurs most often in a data set.

- a. Mode**
- b. Mean
- c. Median
- d. Deviation

44. Interval data is characterized by an interval between two measurements.

a. Equal and definite

- b. Irregular
- c. Indefinite
- d. Inaccurate

45. The axis in a histogram depicts what the data represents.

- a. Vertical
- b. Diagonal
- c. Horizontal**
- d. Square

46. If σ =standard deviation and μ =mean, then Coefficient of Variation is calculated by the

formula.....

a. $CV = \sigma / \mu$

b. $CV = \mu / \sigma$

c. $CV = \sigma / 100$

d. $CV = \mu + 1 / 100$

47. In research biostatistics is applied for

a. Deriving logical conclusions from the data

b. Selection of chemicals

c. Identification of plants

d. Microscopy

48. Biostatistics is a tool for converting biological data into

a. Addition

b. Information

c. Confirmation

d. Recognition

49. Direct observation, experiments andare methods used to collect data for statistical analysis.

a. Surveys

b. Calculations

c. Analysis

d. Validation

50. A sampling method is useful when it is difficult or costly to develop a complete list of the population members or when the population elements are widely dispersed geographically.

a. Random

b. Stratified

c. Cluster

d. Simple

51. The vertical axis in a Histogram represents or probability.

a. Mean

b. Distribution

c. Dispersion

d. Frequency

52. 5, 7, 6, 8, 4, 8, 7, 6, 5, 4 represent the number of flowers per plant. The mean or average

number of flowers per plant is

- a. 5
- b. 6**
- c. 7
- d. 4

53.. method is the method of statistical enumeration where all members of the population are studied.

- a. Census**
- b. Average
- c. Sampling
- d. Survey

54. When there is a natural order among categories, and they can be ranked or arranged in order such data is termed as.....

- a. Nominal data
- b. Ordinal data**
- c. Interval data
- d. Terminal Data

55. The histogram gives shape of the data,, and the spread of the data.

- a. The center**
- b. The Average
- c. The Total
- d. The Mean

56. Median is calculated by the formula

- | | | | |
|--------------------------------------|--------------------------------|--------------------|-----------------------------|
| a. $\frac{n+1}{2}$ | b. $\frac{1+2+3+4+5+\dots}{n}$ | c. $\frac{n}{100}$ | d. $\frac{n \times 100}{1}$ |
|--------------------------------------|--------------------------------|--------------------|-----------------------------|

57. Tabular presentation of data saves space without compromising of data.

- a. Colour
- b. Quality and quantity**
- c. Median
- d. Font style

58. A which is used to compare sets of data or to display a cumulative frequency distribution uses a line graph to represent quantitative data.

- a. Histogram

b. Frequency polygon

- c. Pie chart
- d. Bar diagram

59. is a measure that is used to find the difference between the observed value and the expected value of a variable.

- a. Mean
- b. Frequency
- c. Average

d. Deviation

60. The data collected by or on behalf of the person or people who are going to make use of the data refers to data.

- a. Secondary
- b. Continuous

c. Primary

- d. Discrete

61. In the flower of groundnut, the stamens are

- a. polyadelphous
- b. diadelphous

c. monadelphous

- d. free

62. The leaves in cultivated groundnut plants are

- a. simple

b. paripinnate

- c. sessile
- d. palmate

63. The papilionaceous flower of soybean consists of a tubular calyx of five sepals, a corolla of five petals, one pistil and

- a. five fused and five separate stamens
- b. ten free stamens
- c. no stamens

d. nine fused and a single separate stamen

64. Botanical name of soy bean is

- a. *Glycine max*

b. *Triticum aestivum*

c. *Cicer arietinum*

d. *Arachis hypogaea*

65. Lemma and palea are the parts of the Wheat

a. sheath

b. flag leaf

c. floret

d. awn

66. The floret in wheat does not have a

a. calyx and corolla

b. ovary

c. stamens

d. bracts

67. The center of origin of wheat is

a. Southeast Asia

b. Southwest Asia

c. Asia minor and Afghanistan

d. None of these

68. Cereals are the edible seeds or grains of the family.

a. Orchidaceae

b. Malvaceae

c. Fabaceae

d. Gramineae

69. The seven principal cereals grown in the world are wheat, maize,, barley, oats, rye and sorghum.

a. tur

b. moong

c. rice

d. groundnut

70. Soybeans must be cooked to destroy thethat will interfere in the process of digestion in humans.

a. Trypsin

b. Chymotrypsin

c. Trypsin and protease inhibitors

d. Trypsinogen

71. Black pepper used for preparation of edible products is

a. Cooked and dried unripe fruits

b. Dried unripe fruits

c. Dried ripe fruits

d. Cooked ripe fruits

72. Botanically, the wheat kernel is a type of fruit called a

a. Drupe

b. Caryopsis

c. Berry

d. Pod

73. The two varieties of *Cicer arietinum* cultivated in India are known as varieties.

a. Macrosperma and microsperma

b. Purple and white flowered

c. Tall and dwarf

d. Simple and compound leaved

74. Yield in cotton plants depends on the number and growth of fruiting branches.

a. Monopodial

b. Sympodial

c. Unbranched

d. Vertical

75. The dominant constituent of *Piper nigrum* that is responsible for its pungency i.e. its strong odor and taste is

a. Mandarin

b. Alkaloid,

c. Flavonoid

d. Piperine

76. The most widely cultivated species of wheat throughout the world is *Triticum aestivum* which is a Species.

a. Diploid

b. Tetraploid

c. Hexaploid

d. Monoploid

77. Clove tree is a native of

a. Indonesia

- b. China
- c. America
- d. Brazil

78. The flower of *Arachis hypogaea* is typically

- a. Bilabiate

b. Papilionaceous

- c. Infundibuliform
- d. Cruciform

79. Clove is reddish-brown in colour, with an upper crown and a dome shaped.....

- a. Calyx

b. Hypanthium

- c. Ovary
- d. Stamens

80. *Triticum durum* the Duram wheat is a form of wheat widely used today and the second most widely cultivated wheat.

- a. Hexaploid
- b. Diploid

c. Tetraploid

- d. Haploid

81. Wheat grain has three main parts namely..... germ and peripheral layers.

- a. Endosperm
- b. Spikelet
- c. Awn
- d. Kernel

82. The leaves & pods of Bengal gram on the growing crop are coated with thin film of which give sour taste.

a. Malic and Oxalic acid

- b. Hydrochloric and Malic acid
- c. Oxalic and Nitric acid
- d. Citric acid

83. Fermented soybean cake is known as.....

- a. Soysauce
- b. Tofu

c. Sofu

d. Tempeh

84. The peanut (*Arachis hypogaea*) is native to central South

a. Africa

b. India

c. America

d. Russia

85. The reddish brown of Clove are used to flavour many foods, particularly meats and bakery products.

a. Roots

b. flower buds

c. Fruits

d. Stems

86. Eugenol is used as

a. Cosmetic

b. Food

c. Expectorant

d. Steroid

87. Black pepper is native of

a. Kerala

b. Telangana

c. Tamil Nadu

d. Karnataka

88. *Gossypium hirsutum* and *G. barbadense* are known as

a. Egyptian cotton

b. Old world cotton.

c. New world cotton

d. Upland cotton

89. Cotton seeds have two type of trichomes namely.....

a. Long fuzz and glands

b. Short fuzz and lint

c. Lint and scales

d. Fuzz and very short lint

90. Wheat normally needs between between sowing and harvest, depending

upon climate, seed type, and soil conditions.

a. 110 and 130 days

b. 365 days

c. 60 and 70 days

d. 2 and 3 years

91. The endosperm (80–85% of the grain) of the wheat grain is mainly composed of embedded within a protein matrix.

a. Starch granules

b. Amino acids

d. Minerals

d. Lipids

92. Feathery pinnately compound leaves are present in plants

a. Groundnut

b. Cotton

c. Wheat

d. Gram

93. Soybean belongs to family

a. Malvaceae

b. Fabaceae

c. Asteraceae

d. Poaceae

94. After fertilization, the of the peanut curves downward and the developing fruit is forced into the ground.

a. Petiole

b. Pedicel

c. Peduncle

d. Peg

95. comprises 72–90% of the essential oil extracted from cloves, and is the compound most responsible for clove aroma.

a. Caryophyllenes

b. Gallotannic acid

c. Resin

d. Eugenol

96. The clove is generally adulterated by

a. Exhausted clove

- b. Clove flowers
- c. Clove roots
- d. Pepper seeds

97. The seed of the ripe fruit of the pepper plant is known as

- a. Black pepper

b. White pepper

- c. Green pepper
- d. Peppercorn

98. Piperine, protects againstby inhibiting free radicals and reactive oxygen species, as well as positively influencing antioxidant enzymes.

- a. Reductive damage

b. Oxidative damage

- c. Curative damage
- d. Oxido-reductive damage

99. Largest production of cotton in the world is from the known as upland cotton, native to Central America, Mexico, the Caribbean and southern Florida.

a. *Gossypium hirsutum*

- b. *Gossypium barbadense*
- c. *Gossypium arboretum*
- d. *Gossypium herbaceum*

100. Biological name of black pepper is

- a. *Mangifera indica*

b. *Piper nigrum*

- c. *Centella asiatica*
- d. *Pisum sativum*

101. Black pepper is which type of fruit?

- a. Berry
- b. Capsule

c. Drupe

- d. Legume

102. Types of roots present in pepper plant?

a. Aerial roots

- b. Haustorial roots

c. Epiphytic roots

d. Breathing roots

103. Number of seeds fruit of black pepper contains at maturity mostly?

a. Two seeds

b. Single seed

c. More than 5 seeds

d. Sometime 4 seeds and sometimes 6 seeds

Q.2: Answer the following in brief:

1. Describe in brief the Aim, Scope and Branches of Bioinformatics.

2. What is a BLAST database? Which programs are used by BLAST and describe the process for using BLAST.

3. What are biological databases? How are they classified?

4. Write an essay on NCBI.

5. Describe PIR database, its use and the retrieval system in brief.

6. Describe in brief the applications of Bioinformatics.

7. What is biostatistics? Describe in brief the collection and presentation of data:

8. What is data? Describe the types of data and techniques of data collection.

9. What is data? Describe the methods of classification, tabulation, graphical representation of data.

10. What are the measures of central tendency and dispersion?

11. What is arithmetic mean, mode and median? Explain with an example.

12. What are the methods used to test a hypothesis? Describe the Chi-square test.

13. What are the methods used to test a hypothesis? Describe the Student's t-test.

14. Describe in brief the concept of Centers of origin of cultivated plants and their importance with reference to Vavilov's work.

15. Describe the origin, Botanical Name, Morphology, Sources and Economic importance of Wheat.

16. Describe the Origin, Botanical Name, Morphology, Sources and Economic importance of Gram.

17. Describe the Origin, Botanical Name, Morphology, Sources and Economic importance

of Soybean.

18. Describe the Origin, Botanical Name, Morphology, Sources and Economic importance of Groundnut.
19. Describe the Origin, Botanical Name, Morphology, Parts used and Uses of Clove.
20. Describe the Origin, Botanical Name, Morphology, Parts used and Uses of Black pepper.
21. Describe the Origin, Botanical Name, Morphology, Parts used and uses of Tea.
22. Describe the Origin, Botanical Name, Morphology, Parts used and uses of Cotton.

Q.3 Write short notes on:

1. Aim of Bioinformatics
2. Scope of Bioinformatics
3. Branches of Bioinformatics
4. National Center for Biotechnological Information (NCBI)
5. Basic Local Alignment Search Tool (BLAST)
6. Data retrieval system
7. Protein Information Resource (PIR)
8. Applications of Bioinformatics
9. Concept of Molecular Phylogeny
10. Methods of Molecular Phylogeny
11. Analysis and Consistency of Molecular Phylogeny
12. Census method of data collection.
13. sampling method of data collection
14. Histogram
15. Polygon
16. Standard Deviation
17. Coefficient of Variation
18. Student's t-test
19. Chi-square test
20. Morphology of Wheat.
21. Economic importance of Wheat
22. Morphology of Gram.
23. Economic importance of Gram.
24. Morphology of Soybean.

25. Economic importance of Soybean
26. Morphology of Groundnut
27. Economic importance of Groundnut
28. Morphology of Clove
29. Economic importance of Clove
30. Morphology of Black pepper
31. Economic importance of Black pepper
32. Morphology of Tea
33. Economic importance of Tea
34. Morphology of Cotton
35. Economic importance of Cotton