Admission Test

1. **The correct order of events for sequencing DNA is**
   a. amplify DNA fragment of unknown sequence, gel electrophoresis, heat, add four different chain-terminating chemical tags, mix with primer, computer analysis.
   b. amplify DNA fragment of unknown sequence, heat, gel electrophoresis, mix with primer, computer analysis, add four different chain-terminating chemical tags.
   c. amplify DNA fragment of unknown sequence, mix with primer, add four different chain-terminating chemical tags, heat, gel electrophoresis, computer analysis.
   d. amplify DNA fragment of unknown sequence, add four different chain-terminating chemical tags, gel electrophoresis, heat, mix with primer, computer analysis.

2. **The new area of science that seeks to catalog and analyze every protein in the human body in order to help understand the human genome is called :**
   a. Bioinformatics
   b. Proteomics
   c. molecular genetics
   d. genomics

3. **Labeling a stretch of DNA according to its function is called:**
   a. recombinant DNA technology
   b. functional analysis
   c. annotattion
   d. screening

4. **The language used application programs to request data from the DBMS is referred to as the**
   a. DML
   b. DDL
   c. DCL
   d. any of the above

5. **The management information system (MIS) structure with one main computer system is called a:**
   a. hierarchical MIS structure
   b. distributed MIS structure
   c. centralized MIS structure
   d. decentralized MIS structure

6. **A protein can have ---------------------- active forms.**
   a. More than one
   b. Only one
   c. More than three
   d. None of the above

7. **Two sequences which are evolved from same ancestor are known as --------------------**
   a. Homologs
   b. Paralogs
   c. Orthologs
   d. None of the above

8. ------------------------- are assigned for each gap in alignment.
    a. Penalties
    b. Scores
    c. Identities
    d. All of above

9. A secondary structure element cannot be less then ------------------------ residues.
    a. Two
    b. Three
    c. One
    d. Four

10. A database should be --.
    I.   Logical
    II.   Integrated
    III. Searchable
    IV.   Cross referenced
    a. I and II are correct
    b. All are correct except I
    c. II and III are correct
    d. All are correct

11. Which two are valid constructors for Thread?
    i. Thread(Runnable r, String name)
    ii. Thread()
    iii. Thread(int priority)
    iv. Thread(Runnable r, ThreadGroup g)
    a. i and ii
    b. i and iii
    c. ii and iv
    d. i and iv

12. Which class does not override the equals() and hashCode() methods, inheriting them directly from class Object?
    a. java.lang.String
    b.java.lang.Double
    c. java.lang.StringBuffer
    d. java.lang.Character

13.   /* Missing Statement ? */
        public class foo
        {
                public static void main(String[]args)throws Exception
                {
        java.io.PrintWriter out = new java.io.PrintWriter();
                new java.io.OutputStreamWriter(System.out,true);
        out.println("Hello");
                }
        }

What line of code should replace the missing statement to make this program compile?

        a. No statement required
        b. import java.io.*;
        c. include java.io
        d. import java.io.PrintWriter;

14. What allows the programmer to destroy an object x?

        a. x.delete( )
        b. x.finalize( )
        c. Runtime.getRuntime( ).gc( )
        d. Only the garbage collection system can destroy an object

15. Which is true about an anonymous inner class?

        a. It can extend exactly one class and implement exactly one interface.
        b. It can extend exactly one class and can implement multiple interfaces.
        c. It can extend exactly one class or implement exactly one interface.
        d. It can implement multiple interfaces regardless of whether it also extends a class.

16. 3D structure of protein can be predicted in --------------------------------.

        a. Wet lab
        b. Computer lab
        c. In Both
        d. None of the above

17. PCR stands for -------------------------------.

        a. Polymerase chain reaction
        b. Polymer chain reaction
        c. Polymerase cycle reaction
        d. Polymer Cycle reaction

18. In a eukaryotic genome entry, its genome can have ------------------------ topology.

        a. Circular
        b. Linear
        c. Tetrahedral
        d. None of the above

19. A regular expression can be extracted from --------------------------------.

        a. MSA
        b. Conserved Columns of MSA
        c. Highly conserved columns of MSA

d. Highly conserved adjacent columns of MSA

20. In-silico 3D structure can be predicted through-------------------------.
    a. Homology Modeling
    b. Comparative Modeling
    c. Target-Template Modeling
    d. All are the same

21. ------------------------- is the 3D structure prediction server.
    a. Geno-3D
    b. ESyPred 3D
    c. SWISS MODEL
    d. All of the above

22. ------------------- is not a secondary structure prediction tool.
    a. GOR
    b. CPHmodels
    c. APSSP
    d. Jpred

23. --------------------- is a 3D structure visualization tool.
    a. Cn3D
    b. CINEMA
    c. SMS
    d. EBI

24. ----------------------- is used to identify vector sequences from DNA.
    a. VecScreen
    b. VecScan
    c. VecBlast
    d. None of the above

25. Alphabet complexity of DNA is ------------------------- then protein.
    a. Higher
    b. Lower
    c. Equivalent
    d. Can't say anything about.

26. The memory address of fifth element of an array can be calculated by the formula
    a. LOC(Array[5]=Base(Array)+w(5-lower bound), where w is the number of words per memory cell for the array
    b. LOC(Array[5])=Base(Array[5])+(5-lower bound), where w is the number of words per memory cell for the array
    c. LOC(Array[5])=Base(Array[4])+(5-Upper bound), where w is the number of words per memory cell for the array
    d. None of above

27. Which of the following is not the required condition for binary search algorithm?
    a. The list must be sorted
    b. there should be the direct access to the middle element in any sublist
    c. There must be mechanism to delete and/or insert elements in list
    d. none of above

28. When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return

     a.   FAEKCDBHG

     b.   FAEKCDHGB

     c.   EAFKHDCBG

     d.   FEAKDCHBG

29. A data structure where elements can be added or removed at either end but not in the middle

     a.   Linked lists

     b.   Stacks

     c.   Queues

     d.   Deque

30. Two main measures for the efficiency of an algorithm are

     a. Processor and memory

     b. Complexity and capacity

     c. Time and space

     d. Data and space

31. Which of the following case does not exist in complexity theory

     a. Best case

     b. Worst case

     c. Average case

     d. Null case

32. cin extraction stops execution as soon as it finds any blank space character

     a.   true

     b.   false

     c.   Sometimes true

     d.   sometimes false

33. Which of the following are features of the object-oriented approach to databases?

     a. The ability to develop more realistic models of the real world.

b. The ability to represent the world in a geometric way.

c. The ability to develop database models based on location rather than state and behavior.

d. All of the above

34. A ------------------- RMSD value indicates a bad 3D structure.

     a. Higher

     b. Lower

     c. Negative

     d. Logarithmic

35. "x" in a regular expression indicates ------------------------------.

     a. Any amino acid.

     b. Repetition of specific amino acid

     c. Specific amino acid

     d. No any amino acid.

36. ---------------------- is an example of folded RNA.
    a. mRNA
    b. rRNA
    c. tRNA
    d. snRNA

37. Distance matrix is made to calculate ------------------ score.
    a. Convergence
    b. Divergence
    c. Emergence
    d. None of above

38. In each column of every alignment, each residue is ------------------.
    a. Homologs
    b. Paralogs
    c. Orthologs
    d. All of the above

39. Gap penalties differ according to --------------------- of sequence.
    a. Type
    b. Size
    c. Region
    d. All of above

40. Every residue exhibit --------------- to go into specific secondary structure.
    a. No any notable property
    b. Attribute
    c. Preference
    d. Trait

41. User 'ALI' would like to insert a row into the Emp table, which has 3 columns: empid, lastname, salary. The user would like to enter data for empid 59694, lastname Harry, but no salary. Which statement would work best:
    a.   INSERT INTO EMP VALUES (59694,'Harry', NULL);
    b.   INSERT INTO EMP VALUES (59694,'Harry');
    c.   INSERT INTO EMP (empid, lastname, salary) VALUES (59694,'Harry');
    d.   INSERT INTO EMP(empid, lastname) VALUES (59694,'Harry');

42. Which of the following statements contains an error?
    a.   select * from EMP where EMPID = 493945;
    b.   select EMPID from EMP where EMPID = 493945;
    c.   select EMPID from EMP;
    d.   select EMPID where EMPID = 56949 and LASTNAME = 'SMITH';

43. Observe the following statements and decide what do they do.
    string mystring;
    getline(cin, mystring);
    a. reads a line of string from cin into mystring
    b. reads a line of string from mystring into cin
    c. cin can't be used this way
    d. none of above

44. Identify the correct statement regarding scope of variables
  a. Global variables are declared in a separate file and accessible from any program.
  b.   Local variables are declared inside a function and accessible within the function only.
  c. Global variables are declared inside a function and accessible from anywhere in program.
  d.   Local variables are declared in the main body of the program and accessible only from unctions.

45. How does variable definition differ from variable declaration?
  a. Definition allocates storage for a variable, but declaration only informs the compiler as to the variable's type.
  b. Declaration allocates storage for a variable, but definition only informs the compiler as to the variable's type.
  c. Variables may be defined many times, but may be declared only once.
  d. Variable definition must precede variable declaration.

46. A constructor is called whenever:
  a. an object is declared
  b. an object is used
  c. a class is declared
  d. a class is used

47. Overloaded functions are
  a. Very long functions that can hardly run
  b. One function containing another one or more functions inside it.
  c. Two or more functions with the same name but different number of parameters or type.
  d. None of above

48. In case of pass by reference
  a. The values of those variables are passed to the function so that it can manipulate them
  b. The location of variable in memory is passed to the function so that it can use the same memory area for its processing
  c. The function declaration should contain ampersand (& in its type declaration)
  d. All of above

49. 1 nanometre= _____ cm.
  a. $10^{(-9)}$
  b. $10^{(-8)}$
  c. $10^{(-7)}$
  d. $10^{(-6)}$

50. The size of E.coli bacteria is _____ nm
  a. 75000
  b. 2000
  c. 200
  d. 5

51. _____lower the energy needed to initiate a chemical reaction in a living cell.
  a. Enzymes
  b. Nucleotides
  c. Amino acids
  d. Carbohydrates

52. **According to the Denver Classification, a chromosome with its centromere located very close to, but not on, the end of the chromosome is _____.**
   a. Telocentric
   b. Metacentric
   c. Acrocentric
   d. Subcentric

53. **Every nucleus in a eukaryotic organism contains the same amount of DNA, with the exception of nuclei in the _____.**
   a. Epidermal Cells
   b. Muscle Cells
   c. Gametes
   d. Nuerons

54. **The term phenotype refers to the _____ of an individual.**
   a. Breeding pattern
   b. Number of chromosomes
   c. Genetic constitution
   d. Appearance of a characteristics or trait

55. **A human pedigree may give us information on _____.**
   a. How a mutation occured
   b. The type of mutation that caused a specific genetic trait
   c. how a gene is inherited
   d. The protein product of a mutated gene

56. **The prevalence rate of a disease has the following features:**
   a. it is dependent on the incidence of the disease
   b. it is dependent on the duration of illness
   c. it measures all the current cases in the community
   d. All of the above

57. **Lipid–soluble signal molecules, such as testosterone, cross the membranes of all cells but affect only target cells because:**
   a. Only target cells retain the appropriate DNA segments.
   b. Intracellular receptors are present only in target cells.
   c. Most cells lack the Y chromosome required.
   d. Only target cells possess the cytosolic enzymes that transduce the testosterone.

58. **Consider this pathway: epinephrine → G–protein–linked receptor → G protein → adenylyl cyclase → cAMP. Identify the second messenger.**
   a. cAMP
   b. G protein
   c. GTP
   d. adenylyl cyclase

59. **Which of the following is not true about the Fc regions of an immunoglobulins:**
   a. they can be cleaved from the Fab regions by papain
   b. they are responsible for antibody binding
   c. they are involved in mast cell binding
   d. they are involved in the activation of the complement cascade

60. Human immunodeficiency virus-1 (HIV-1):
    a. is a retrovirus containing RNA
    b. contains env gene which encodes the core nucleocapsid polypeptides
    c. binds specifically to B lymphocytes
    d.   causes a decrease in CD8 lymphocytes during seroconversion

61. With regard to the chi-squared test:
    a. it is not used to test the difference between frequencies
    b. it is used as an alternative to the t-test to determine the difference between two means
    c.   the number of degrees of freedom is the number of independent comparisons.
    d. the greater the value of the chi-squared test, the less likely it is to be significant

62. GOR method is ---------------------------------- based method.
    a. Information theory
    b. Probability theory
    c. Statistical theory
    d. Combinatorial theory

63. GOR method is based upon ------------ residue window.
    a. 07
    b. 17
    c. 27
    d. 9

64. Ab-initio means -------------------------------.
    a. From initial level
    b. From basic principles
    c. From Common method
    d. None of the above

65. There is a -------------------- number of naturally occurring folds.
    a. Varying
    b. Constant
    c. Calculated
    d. Limited

66. ------------------ the fold recognition server.
    a. 3D-PSSM
    b. SCOP
    c. CATH
    d. None of the above

67. Double line in pedigree show ---------------- relationship.
    a. Marital
    b. Sibling
    c. Parental
    d. Cousingenous

68. Confidence level of ------------------ means a badly predicted structure.
    a. Lesser then five

b. above then five
c. Nine
d. None of the above

69. Motifs can be derived through a --------------------.
  a. Pair wise sequence alignment
  b. Regular expression
  c. Global alignment
  d. None of the above

70. Drug can be designed against -------------------- type of genome.
  a. Protein genome
  b. Carbohydrate genome
  c. Ligand binding protein genome
  d. Lipids

71. The unpaired bases in the stem of RNA are --------------------.
  a. Bulges
  b. Knots
  c. Semi-Bulge
  d. All of above

72. LOCUS keyword in a genomic entry mean ----------------------------.
  a. Location of organism in Food web
  b. Location of organism in food chain
  c. Location of gene in genome
  d. Location of genome in genome of all organisms

73. A ------------------- rich DNA is categorized as more stable.
  a. AT
  b. AG
  c. GC
  d. TC

74. Multiple sequence alignment can be ------------------------.
  a. Local
  b. Global
  c. Both
  d. A, B and C all can be true

75. PUBMED is ---------------------- version of MedLine.
  a. Public and old
  b. Free and old
  c. Free and obsolete
  d. Free and public

76. During biological database search, quoted queries behave as --------------------.
  a. A Single string
  b. A single sentence
  c. A single word
  d. None of the above

77. Why are colour schemes important in creating and analysing sequence alignments
  a. They look pretty.
  b. To make clearer printouts and presentations.

c. To allow you to distinguish conserved residues and residue groups and to interpret their physicochemical properties more easily.

d. To help identify active sites.

78. Hydropathy plots are usually used to predict.

a. Beta secondary structures.

b. Transmembrane domains.

c. Alpha secondary structures.

d. Tertiary structure.

79. Which of the following is NOT a protein secondary structure.

a. Alpha-helix

b. Beta-sheet.

c. Beta turn (Coil).

d. Leucine Zipper

80. Genetic operators can be applied on ---------------------------.

a. Seq alignment problem

b. Structure prediction problem

c. Any biological problem

d. None of the above

81. Dynamic programming methods include ------------------------.

a. Needleman-Wunsch

b. Smith-Waterman

c. both

d. None

82. Simulated annealing is --------------------- technique.

a. CS inspired

b. Bio inspired

c. Statistically inspired

d. Information theory inspired

83. What type of noncoding DNA tends to be localized around the centromere?

a. constitutive heterochromatin

b. structural DNA

c. repeated sequences

d. All of the above

84. What type of transposon jump is most likely to cause a harmful mutation?

a. long terminal repeats

b. ALU transpositions

c. retroposons

d. DNA transposons that copy themselves rather than RNA

85. What proportion of the genes of the fruit fly *Drospholia* have human counterparts?

a. less than 1%

b. about 5 to 7 %

c. around one quarter

d. more than half

86. Which of the following statements about the cell theory is true?

a. All organisms are composed of several cells

b. The smallest living thing is a cell

c. Life continues to evolve a new with each new cell
d. New cells arise spontaneously when conditions are right

87. Cystic fibrosis has all of the following characteristics except:
    a. is fatal if untreated
    b. is a disease caused by a type of bacteria
    c. is characterized by mucus buildup in pancreatic ducts
    d. is associated with plasma membrane defects

88. Which of the following structures contain microtubules?
    a. cilia
    b. flagella
    c. centrioles
    d. all of the above

89. The net movement of molecules down a concentration gradient is:
    a. osmosis
    b. osmotic pressure
    c. diffusion
    d. exocytosis

90. Epithelial tissue arises from embryonic ....:
    a. ectoderm
    b. mesoderm
    c. endoderm
    d. neural tube cells.

91. Hormones are secreted by what type of tissue?
    a. connective
    b. nervous
    c. muscle.
    d. epithelial

92. Oligonucleotide primers are needed in sequencing reaction because:
    a. They ensure that each DNA strand made in the sequencing reaction starts at exactly the same nucleotide.
    b. DNA polymerase cannot polymerize DNA chains without a primer to start from
    c. Both a and b.
    d. None of the above

93. Genome sequencing is:
    a. Full of promise for finding causes and cures for genetic diseases.
    b. controversial because it might be used to discriminate against people.
    c. helping industry make products more cleanly and efficiently
    d. all of the above

94. Protein microarrays and high throughput (HT) mass spectrometry (MS) can provide
    a. a snapshot of the proteins present in a biological sample
    b. a snapshot of proteins, DNA and RNA in the biological sample
    c. a snapshot of protein-enzyme compositions
    d. none of the above

95. A data type whose properties (values and operations) are specified independently of any particular implementation:
    a. Abstract Data type
    b. Primitive Data Type

c. Enumerated Data Type
d. Structure

96. Using the same operator symbol for more than one operations or for abstract data types:
a. Polymorphism
b. Binding
c. Overloading
d. Inheritance

97. The loss of available memory space that occurs when memory is allocated ……………… but never deallocated is known as………………
a. Referentially, Memory downsizing
b. Referentially, Memory Leak
c. Dynamically, Memory downsizing
d. Dynamically, Memory Leak

98. When used as a unary operator, * operator is known as:
a. Multiplication Operator
b. Dereferencing Operator
c. Dynamic Operator
d. Address Operator

99. Suppose int *p;
   int i = 5;
   p = & i; (suppose address of i = 1001, so p = 1001)
   p + 2 means:
a. 1003
b. 1009
c. Error
d. None of the above

100.   ………………….is formed from the most popular element in each column of the alignment matrix, which is the nucleotide with the largest entry in the profile matrix.
a. Alignment String
b. Edit distance
c. Consensus String
d. Profile String