B.Sc. MICROBIOLOGY
FIFTH SEMESTER (SPECIAL REPEAT)
BIOINFORMATICS
BMB– 503
(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

(PART-A: Objective)

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1x20=20

1. Which of the following is an example of tertiary structure of protein?
   a. Greek key motif
   b. Helix turn helix
   c. EF hand
   d. All

2. Beta pleated sheet is found mostly in
   a. Fibrous protein
   b. Globular protein
   c. Transmembrane protein
   d. All

3. Which of the peptides will be least deflected by magnetic field in mass spectrometry?
   a. 120 KDA
   b. 350 KDA
   c. 1256 KDA
   d. 100 KDA

4. Which of the following is a E. Coli metabolic pathway and transcriptional regulation database?
   a. WIT
   b. Regulon DB
   c. Ecocyc
   d. Metacyc

5. Which of the following database is of short sequence pattern and profile of protein?
   a. PROSITE
   b. iProclass
   c. PDB
   d. Pfam

6. Which database classifies proteins based on class and homology?
   a. CATH
   b. SCOP
   c. swissprot
   d. TrEMBL

7. Which of the following is the best measure of central tendency?
   a. Median
   b. Mode
   c. Mean
   d. None of the above

8. The _____ ignores the negative sign.
   a. Quartile Deviation
   b. Mean Deviation
   c. Standard Deviation
   d. Range

9. In a binomial variable X with parameters n and p
   a. Mean = np(1-p), Variance = np
   b. Mean = n(1-p), Variance = np(1-p)
   c. Mean = np, Variance = np(1-p)
   d. None of the above

10. The number of persons died due to a rare disease is an example of
    a. Binomial distribution   b. Poisson distribution
    c. Normal distribution   d. None of the above

11. Degree of freedom is associated with
    a. t test   b. Chi-square test
    c. F test   d. All of the above

12. If the calculated value of the test statistic is less than its critical value, then
    a. the null hypothesis is not rejected   b. the null hypothesis is rejected
    c. no conclusion   d. None of the above

13. The two variables X and Y have linear relation, if the correlation coefficient between X and Y is
    a. +1   b. -1
    c. ±1   d. 0

14. If one of the regression coefficients is greater than or equal to 1, the other must be
    a. less than or equal to 1   b. greater than or equal to 1
    c. equal to 1   d. None of the above.

15. Which of the following transposons is found in higher eukaryotes?
    a. Ty elements   b. Copia elements
    c. Retroviral elements   d. LINES and SINES

16. Highly variable repeats of almost 15 base pairs are called
    a. microsatellite   b. minisatellites
    c. VNTR   d. Both b and c

17. Which is the algorithm for using encrypted file transfer?
    a. DES   b. Triple DES
    c. Both a and b   d. DFS

18. Which of the entity in RDBMS is called an attribute?
    a. row   b. column
    c. Table   d. All

19. Which of the following file transfer protocol is used over remote network?
    a. FTP   b. SFTP
    c. TCP   d. SSH

20. What is the size of yeast genome?
    a. 24 mb   b. 16 mb
    c. 2400 mb   d. 28 mb

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(PART-B : Descriptive)

Time : 2 hrs. 40 min.   Marks : 50

[Answer question no. 1 & any four (4) from the rest]

1. a. What are conserved sequences? What are the advantages of MSA   2+2+2
    over pairwise alignment? Maximum parsimony is considered better   =6
    than maximum likelihood. Comment

    b. Differentiate between motif and domain AND alpha helix and   2+2=4
    beta sheet.

2. a. Describe the process of 2D gel electrophoresis with suitable   6
    diagram

    b. Write a note on lead identification and lead optimisation in drug   4
    discovery.

3. a. The average height of 10 males is 66 inches and standard
    deviation is 9 inches. Test the hypothesis that the average height is   6
    greater than 64 inches. [Given $t_{0.05,9}$ = 1.833]
                                                                            4
    b. Distinguish between correlation and regression.

4. a. Write the characteristics of an ideal measure of central tendency   4

    b. Find the coefficient of variation of the following distribution   6
    Class limit: 59 – 61 61 – 63 63 – 65 65 – 67, 67 – 69
    Frequency: 4   30   45   15   6

5. a. Wrte the properties of Poisson distribution   4

    b. If X is normally distributed with mean μ = 20 and standard
    deviation σ = 2, Find P(18 < X < 23). [Given, $\Phi(1)$ = 0.3413 and $\Phi(1.5)$ 6
    = 0.4322]

6. Which is the most suitable database to retrieve nucleotide   10
    sequences? Explain the features of that database and also the file
    format in which it can be retrieved in detail.

7. a. Differentiate between local and global alignment. Which type of   5
    alignment is used in homology finding?

    b. Discuss about the data or sequence submission tools highlighting   5
    the differences between them.

8. a. Eukaryotic genome is superior to prokaryotic genome. Subtantiate you answer with atleast 5 points.   5

b. Explain phi, psi and omega angles along with Ramachandran plot and primary structure of protein.   5

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