B.Sc. MICROBIOLOGY FIFTH SEMESTER [SPECIAL REPEAT] BIOINFORMATICS AND BIOSTATISTICS BMB-503

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Time: 30 mins.

Objective

Marks: 20

2024/07

SET

Full Marks: 70

 $1 \times 20 = 20$

Choose the correct answer from the following:

1. Automated DNA sequencing was invented by:

a. Marvin Carruthers

b. Leory Hood

c. Both a and b

d. Neither a nor b

2. Following is not an example of secondary nucleotide database:

a. RefSeq

b. PIR

c. OMIM

d. dbEST

3. Restriction enzyme site for EcoR1 is:

a. 5'-GAATTC-3'

b. 5'-ATTACT-3'

d. None of the above

c. 5'-GATA-3'

4. GenBank database is divided into: a. 20 divisions

b. 15 divisions

c. 10 divisions

d. 18 divisions

5. BLOSUM 82 means:

a. Sequences are distantly related

b. Sequences are closely related

c. Homologous sequences

d. None of the above

6. Following is an example of Global Alignment web based program.

a. SIM

b. LALIGN

c. GAP

d. SSEARCH

7. The suitable substitution matrix to align closely related sequences is:

a. PAM 250 or BLOSUM 80 c. PAM 120 or BLOSUM 40

b. PAM 40 or BLOSUM 80 d. PAM 250 or BLOSUM 40

8. In isoelectric point, the net charge on the amino acid is:

a. 1

c. 0

d. None of these

9. The genome size of E. coli is:

a. 10Mb

b. 12Mb

c. 15Mb

d. 5Mb

10. In Ramachandran plot, the phi, psi angles are also called:

a. Dihydral angles

b. Torsional angles

c. Both a and b

d. None of these

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1

 β-meander is an example of: a. Super-secondary structure c. β-pleated sheet b. Tertiary structure 13. The events A = The person X is death at a certain time and B = The perthe same time, are: a. Exhaustive b. Mutually exclusive c. Independent d. Dependent 14. Which of the following measures is affected by the extreme values? a. Median b. Mode c. Mean d. None of the above 15. In a Binomial distribution with parameters n = 10 and p = 0.6 then the a. 6 b. 2.4 d. None of the above 16. The number of people died due to viral fever in a certain month, is an a. Binomial distribution b. Poisson distribution 	
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	variance is:
c. Normal distribution d. None of the above	example of:
17. Degree of freedom is associated with: a. t test b. Chi-square test d. All of the above	
 18. If the calculated value of the test statistic is less than its critical value, t a. The null hypothesis is not rejected b. The null hypothesis is c. No conclusion d. None of the above 	
19. If $r_{XY} = c$, then X and Y are: a. Dependent b. Independent c. Not related d. None of the above	
 20. To predict Y, when X is given, which of the following regression line is a. X on Y b. Y on X c. Either a or b d. None of the above 	is used?

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[Descriptive]

Marks: 50 Time: 2 hr. 30 mins. [Answer question no.1 & any four (4) from the rest] Write down the general features of eukaryotic and prokaryotic genome. 10 10 Generate phylogenetic tree from the given UPGMA matrix. BCDE A A 0 В 2 0 C 4 4 0 D 0 6 6 6 4 0 E 6 6 6 8 F 8 8 8 8 3. Explain the hierarchy of protein structures through primary, secondary 10 and tertiary structures. a) Write the properties of Binomial distribution. 4 b) If the rate of recovery of patients in a hospital from a certain disease 6 is 2%, in a sample of 100 patients in the hospital, what is the probability that (i) Exactly three people recover? (ii) At least 2 people recover? [Given, $e^{-2} = 0.1353$] 5 5. a) Write the steps of testing of hypothesis. b) A pharmaceutical company maintains that the mean time for a drug 5 to take effect is 24 minutes. In a sample of 20 trials, the mean time is found to be 26 minutes with a standard deviation of 4 minutes. Can you say that the claim of the company is justified at 5% level of significance? [Given, the critical value of the test statistic at 5% significance level and 19 df is 2.09] 10 6. Find mean, median, mode, standard deviation and coefficient of variation for the following distribution: Class : 10 - 15 15 - 20 20 - 25 25 - 3030 - 35 12 Frequency: 10 Explain with examples the positive, negative and zero correlations. 5+5=10 8. Write short notes on: a) Mass spectrometry b) NCBI