REV-01
MMB/25/30

2023/06

SET B

M.Sc. MICROBIOLOGY
FOURTH SEMESTER
RESEARCH METHODOLOGY, BIOSTATISTICS & BIOINFORMATICS
MMB-401

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. BLOSUM 80 means:
   a. Sequences are 80% similar
   b. Sequences are divergent
   c. Both sequences are homologous
   d. Both a and c

2. Global alignment uses:
   a. Needleman-Wunsch algorithm
   b. Smith-Waterman algorithm
   c. Both a and b
   d. None of the above

3. Following is a pathway analysis software:
   a. RASMOL
   b. MEGA
   c. KEGG
   d. BioEdit

4. Formation of a database to infer characteristics or relationships of population is:
   a. Inferential approach
   b. Experimental approach
   c. Simulation approach
   d. All of the above

5. Scientific and systematic search for pertinent information on a specific topic can be defined as:
   a. Methodology
   b. Experiment
   c. Research
   d. None of the above

6. Bibliography means:
   a. Quotations
   b. Foot Note
   c. Systematic list of references
   d. References

7. Subjective bias is eliminated in:
   a. Observation method
   b. Interview method
   c. Both a and b
   d. None of the above

8. .....is the best measure of central tendency.
   a. Mean
   b. Median
   c. Mode
   d. None of the above

9. The rate of infection of a certain disease is 4.5%. In a sample of 100 people, the variance of the number of infected people is:
   a. 4.5
   b. 2.073
   c. 4.2975
   d. None of the above

10. Population characteristics are called:
    a. Sampling
    b. Statistics
    c. Parameters
    d. None of the above

11. PAM 250 means:
    a. Sequences are highly similar
    b. Sequences are divergent
    c. Both sequences are homologous
    d. None of the above

12. The joints in a phylogenetic tree are called:
    a. Nodes
    b. Branch lengths
    c. Cladogram
    d. None of the above

13. CLASTAL W is an example of:
    a. Pairwise sequence alignment
    b. Multiple sequence alignment
    c. Local alignment
    d. All of the above

14. The research based on generalizations and formulations of theory are:
    a. Applied research
    b. Fundamental research
    c. Both a and b
    d. None of the above

15. "All progress is born of inquiry. Doubt is often better than overconfidence, for it leads to inquiry and inquiry leads to inventions" signifies:
    a. Utility of research
    b. Basics of research
    c. Significance of research
    d. None of the above

16. In research methodology, Interpretation is the search of:
    a. Research problem
    b. Research findings
    c. Statistical data
    d. Research plan

17. Interpretation should be:
    a. Integral
    b. Subjective
    c. Objective
    d. Differential

18. Educated respondents become a factor in case of:
    a. Personal interview
    b. Collection of data through questionnaire
    c. Telephonic interview
    d. None of the above

19. Which of the following measures is not affected by the extreme values?
    a. Mean
    b. Median
    c. Standard deviation
    d. None of the above

20. Null hypothesis implies that:
    a. There is no significant difference between the true value and a hypothetical value of a parameter
    b. There is significant difference between the true value and a hypothetical value of a parameter
    c. True value of a parameter is more than its hypothetical value
    d. True value of a parameter is less than its hypothetical value

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Descriptive

Time : 2 hr. 30 mins. **Marks : 50**

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

1. Explain different types of research. 10

2. What do you understand by sequence alignment? State the differences between pairwise and multiple sequence alignment. 10

3. Write the techniques of interpretation and significance of report writing. 10

4. Following were the cut sizes of DNA when applied with restriction enzyme EcoR1 and HindIII of a circular DNA. What will be the restriction mapping of the DNA sequences? 10
   EcoR1: 5.1Kb 5.4Kb 3.5Kb
   HindIII: 6.5Kb 1.8Kb 5.7Kb
   EcoR1/HindIII: 1.9Kb 4.6Kb 0.8Kb 1Kb 3.2Kb 2.5Kb

5. Explain the Observation and Interview method of primary data collection. 10

6. Find mean, median, mode and CV of the following distribution: 2+2+2+4=10

Age(less than in years):	10	20	30	40	50	60	70	80
Number of persons:	2	5	10	17	26	32	37	40

7. Explain the importance of Statistics in Biological science. 5+5=10
   If the heights of 500 students are normally distributed with mean 68.0 inches and standard deviation 3.0 inches, how many students have height between 65 and 71 inches?

8. A sample of size 10 drawn from a normal population has a mean 31 and variance 2.25. Is it reasonable to assume that the mean of the population is 30 at 1% level of significance? [Given, the critical value of t at 1% level of significance for 9 degrees of freedom is 3.25] 10

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