REV-01
MMB/01/05

2023/08

M.Sc. MICROBIOLOGY
FOURTH SEMESTER (SPECIAL REPEAT)
RESEARCH METHODOLOGY, BIOSTATISTICS & BIOINFORMATICS
MMB-401

SET A

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

2. CLASTAL W is an example of:
   a. Pair wise sequence alignment b. Multiple sequence alignment
   c. Local alignment d. All of the above

3. The term 'Ex post facto research' is used for:
   a. Analytical research b. Descriptive research
   c. Applied research d. Fundamental research

4. "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

5. Criteria of a good research is:
   a. Good research is systematic b. Good research is logical
   c. Good research is empirical d. All of the above

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

7. Final stage in the research process is:
   a. Data analysis b. Data collection
   c. Report writing d. Problem formulation

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

9. Which of the following is an optional part of a research paper?
   a. Glossary b. Discussion
   c. Bibliography d. Appendix

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

11. Primary data are:
    a. Fresh
    b. Collected for the first time
    c. Original in nature
    d. All of the above

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

13. Following term is/are part of personal interview:
    a. Focused interview
    b. Clinical interview
    c. Non-directive interview
    d. All of the above

14. The possibility of bias by the interviewer is observed in:
    a. telephone interview method
    b. Observation method
    c. personal interview method
    d. None of the above

15. 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

16. Type-II error is:
    a. Rejecting null hypothesis when it is true
    b. Rejecting null hypothesis when it is not true
    c. Not rejecting null hypothesis when it is true
    d. Not rejecting null hypothesis when it is not true

17. _____test is used when the sample size is small and population standard deviation is not given.
    a. Z
    b. Student's t
    c. χ^2
    d. F

18. Which of the following statement is the two-tailed test?
    a. There is significant difference between the true and hypothetical value of a parameter
    b. There is no significant difference between the true and hypothetical value of a parameter
    c. Hypothetical value is greater than the true value
    d. Hypothetical value is less than the true value

19. In a multiple regression with three variables, there are:
    a. Two dependent and one independent variables
    b. One dependent and two independent variables
    c. Either a or b
    d. Neither a nor b

20. _____ is used as a large sample test.
    a. F
    b. t
    c. Z
    d. χ^2

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Descriptive

Time : 2 Hr. 30 Mins. Marks : 50

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

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

2. Define research problem and its necessities. 5+5=10

3. Explain research methods versus methodology with possible examples. 5+5=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. Write a detailed note on data interpretation. 10

6. Explain telephonic interview method of collection of primary data through its merits and demerits. 10

7. To test the efficiency of a new drug a controlled experiment was conducted wherein 300 patients were administered the new drug and 200 other patients were not given the drug. The patients were monitored and results were obtained as follows: 10

	Cured	Condition worsened	No effect
Given the drug	250	45	65
Not given the drug	150	35	5

[Given, $\chi^2_{0.05}$ = 3.84 5.99 7.8
Df = 1 2 3]

8. The following data give the yield on 12 plots of land of three samples under the three varieties of fertilizers A, B and C. 10
   A: 25, 22, 24, 21
   B: 17, 16, 16, 18
   C: 24, 26, 30 28
   Test at 5% level of significance whether there is any significant difference in the average yields of land under three varieties of fertilizers. [Given, the critical value of the test statistic at 5% level of significance for (2, 9) df and (9, 2) df are respectively 4.26 and 19.38)

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