N.B. All questions are compulsory
Numbers to the right indicate marks
Draw neat labeled diagram wherever necessary

Duration: 2.5 hours **Total marks: 60**

Q.1 Answer **any four** of the following **16**

a. Write a note on Watson and Crick model of DNA.

b. Diagrammatically explain the Hershey-Chase experiment.

c. Distinguish between A and B forms of DNA.

d. Justify: Nucleic acids from different species can form hybrids.

e. What are the effects of UV and ionizing radiations on DNA?

f. Differentiate between eukaryotic and prokaryotic chromosomes.

g. What is supercoiling? Diagrammatically represent the process of DNA supercoiling.

h. Discuss the role of nucleotides as regulatory molecules.

Q.2 Answer **any four** of the following **16**

a. Give a detailed account of the macromolecular composition of the cell.

b. Write a comparative analysis of Lowry and Bradford methods of protein estimation.

c. What is the principle of HPLC? Describe the different types of HPLC.

d. Explain in detail the Fiske-Subbarow method of phosphorus estimation.

e. Which method is used for the quantitative estimation of reducing sugars ? Write the principle and protocol of the same.

f. Explain the principle of Gel permeation chromatography along with a neat labeled diagram.

g. Write a short note on Agarose Gel Electrophoresis.

h. Diagrammatically explain the Kjeldahl method of nitrogen estimation from biological specimens.

Q.3 Answer **any four** of the following **16**

a. Write a short note on the three domain concept based on phylogeny.

b. Discuss in detail DNA profiling as a molecular method used in taxonomy.

c. What are taxonomic ranks ? Elaborate on their role in microbial taxonomy.

d. Write a note on phylogenetic trees.

e. Summarize the relevance of ecological characters and fatty acid composition as methods of analysis in taxonomy.

f. What is numerical taxonomy ? Discuss its role as an important taxonomic tool

g. Write a detailed note on : Phenetic and Phylogenetic system of classification.

h. Define : a) Dendogram b) Dahlgrenogram c) Cladogram d) Phylogram

Q.4 Answer **any six** of the following **12**

a. State Chargaff's rules for DNA.

b. Draw any one unusual structure adopted by DNA.

c. State the significance of DNA methylation.

d. Define: a) tRNA b) mRNA

e. State any two solvent mixtures used in lipid extraction by Soxhlet method.

f. What are the modifications done in Leibeg's method to eliminate nitrogen and halogen detection?

g. Give an example of anion exchanger and cation exchanger cellulose resin used in Ion-Exchange chromatography.

h. Write the reaction involved the estimation of RNA by orcinol method and mention the absorption maxima of the final complex formed.

i. Give any two characteristics of the kingdom Archezoa.

j. State any two rules to be followed for binomial nomenclature of an organism.

k. What is LUCA ? In which system of classification was the concept of LUCA proposed ?

l. Define : a) systematics b) Jaccard coefficient.