Zoology (P.G.)
[CBCS]
M.Sc. Third Semester End Examination-2023
(Regular & Supplementary Paper)
PAPER-302

Full Marks: 40   **Time: 02 Hrs**

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their own words as
far as practicable
Illustrate the answers wherever necessary
[USE SEPARARE ANSWER SCRIPT IN EACH GROUP]

Group A
Full Marks 20
Molecular Evolution

1. **Answer any two questions of the following:**   **2x2= 4**

a. The average numbers of offspring produced by there genotypes are 44=6, 49=3, 99=2 find out the fitness.

b. What is antigenic distance? Define maskovian property.

c. Why the sequences of human and horse β-globin sequence are much similar?

d. Differentiate synapomorphy from apomorphy

2. Answer any two questions of the following: 2x4= 8

a. Find out equilibrium frequencies ($\hat{p}$ and $\hat{q}$) in Hardy Weinberg population, When $u=10^{-5}$ and $v=10^{-6}$.

b. Cystic fibrosain in a recesasive disease characterized by malabnorption of food and obntruction of the bronchial tubes and other tissues. Death usually occurs by the late teens. About 4 in 10,000 new borns will suffer from cystic fibrosin. Assuming Hardy-weinberg equilibrium, What are the frequencies of the three qenotypes among new borns?

c. Explain the principle of parsimony with example

d. In the distance matrix shown the which pair of taxa to be joined first What is the outcome of this matrix.

	B	C	D	E
A	8	15	20	25
B		22	17	14
C			6	4
D				2

3. Answer any one question of the following: 1x8=8

a. In the united states, people of mixed Caucasian and black descent are considered numbers of the black population. Racial admixture can hence be seen as a process of gene flow from the cancasian to the black population. The frequency of the R^0 allele

at the locus determining the Rhesus blood group in P=0.028 in the U.S. cancasian populations. Among the African population from which the ancestors at U.S. Blackn came, the frequency of R^0 in 0.630, this can be considered the allele frequency of the U.S. Black population Po=0.630. The African ancestors of the U.S. Black. Came to the united states about 300 years or some 10 generations ago, hence t=10. The frequency of R^0 among U.S Black is at present Pt=0.446. Find out the gene flow rate.

b. In a homologous region containing 10000 bp the following number of sequence differences are found.

	Human	Chimpanzee	Gorilla	Orangutan	Rhesus monkey
Human	0	145	151	398	851
Chimpanzee	145	0	197	294	855
Gorilla	151	197	0	304	840
Orangutan	398	294	304	0	810
Rhesus monkey	851	855	840	810	0

Construct a gene tree using UPGMA method.

Group B
Full Marks 20
[Microbiology]

4. **Answer any two questions of the following:**   2x2= 4

a. What is antoinducer?

b. What is the purpose of using enriched media?

c. What do you mean by Gaiducov phenomenon?

d. What do you know about Bergey's manuals?

5. **Answer any two questions of the following:**   2x4= 8

a. Briefly describe the molecular structure of the cell wall of Gram-positive bacteria.

b. Write down the role of microorganisms in Soil fertility.

c. What is the generation time of a bacterial population that increases from 100 cells to 100000 cells in 3hrs of growth?

d. A bacterial culture had an initial cell density of 10^3 cells/ml. The number of generation (n) the cells have undergone is?

6. **Answer any one question of the following:**   1x8=8

a. i) What is fire algae? Differentiate between rhodophyceae and phacophyceae. Mention the name of the algae responsible for the red sea.   1+2+1

   ii) What is Koch's postulate? Write down its limitation.   2+2

b. i)Briefly describe the general mechanism of QS in Gram negative bacteria. [QS=Quorum Sensing]   6

   ii) What do you mean by Quorum quenching?   2