Five Year Integrated M.Sc. Examination, 2019

Semester - VI

Course: LS-3-6-1

(Inheritance Biology)

Time: Four Hours **Full Marks: 80**

Questions are of value as indicated in the margin.
Answer ***Question No.1*** and ***any six*** from the rest.

1. Answer ***any ten*** of the following: 2x10=20
   a) What do you mean by allele? How does it related to genes?
   b) What do you mean by test cross? How does it differ from back cross?
   c) What do you mean by genome? How does it differ from a gene?
   d) What is the difference between F and F'?
   e) What is the difference between transformation by a linear and plasmid DNA?
   f) Name two chemicals that can help to induce competence in bacteria.
   g) What do you mean by co-dominance? How does it differ from law of dominance?
   h) Differentiate between loss of function and gain of function mutations.
   i) Ploidy
   j) Significance of germinal mutations.
   k) Karyotyping
   l) Amniocentesis

2. Define the following phenomenon with proper example (mentioning the phenotype of parent and progeny):
   a) Law of dominance
   b) Law of segregation (2x5 = 10)

3. Describe the phenomenon of "independent assortment" with proper example and line diagram. Describe extra-chromosomal inheritance in details. Describe sex limited and sex influenced traits with proper example. (5+2+3)

4. Write short note on the following: (2.5x4 = 10)
   a) Genomic imprinting
   b) Multiple allelism
   c) Penetrance and expressivity
   d) Linkage

5. Mention the genetic features that must be present in a plasmid for their efficient mobilization? What are Hfr strains and why are they called so? Explain how conjugation between different Hfr and F- strains can be used to map the location of genes in a genome taking example of some auxotrophic mutants. (3+2+5=10)

6. Define the three modes of horizontal gene transfer in bacteria? How can the exact mechanism be identified with the help of auxotrophic mutants. (5+5=10)

7. a) With suitable diagrams, explain how chemical modifications of nucleotides can produce mutations. (6)
   b) Briefly describe Down syndrome. (4)

8. a) What is reciprocal translocation? (2)
   b) What are pericentric inversions? (2)

P.T.O.

c) From the pedigree chart given below, characterize the symbols, give statement of proband, state the pattern of inheritance and analyze the data. (6)