B.Sc. (Hons.) Sem.-IV Examinations, 2022

Biotechnology (Hons.)

Paper: GE-4 (Human Genetics)

Time: 2 hrs **Full Marks: 40**

Q.1Answer *any five* questions : 2x5=10

a. What is sex linked inheritance. Give an example.

b. Define the role of SRY in the sex determination of human.

c. What are LINEs and SINEs?

d. Differentiate between paracentric and pericentric inversions.

e. What is translocation?

f. What is gene pool?

g. What is the difference between Missense and Nonsense mutation?

h. What is Barr body?

Q.2Answer *any two* questions : 5x2= 10

a. What is Satellite DNA? Describe repetitive sequences in eukaryotic genome. Mention its significance. 1+3+1

b. What is Fragile-X- syndrome? Describe its cause and symptoms. 2+3

c. What is aneuploidy? What do you mean by monosomy? Give example of autosomal trisomy and two sex chromosomal aneuploidy syndromes from the human population.1+1+3

d. Describe procedure of Ames test for mutagenicity screening. 5

Q.3Answer *any two* questions : 10x2=10

a. What does the Hardy-Weinberg principle state? Mention the conditions of Hardy Weinberg Law. Differentiate between gene frequency and genotype frequency. One hundred persons from a small village of District Burdwan were tested for their MN blood types. The genotypic data are: MM 41; MN 38 and NN 21. Calculate gene frequency of M and N. 2+3+2+3

b. Describe the Genic balance theory of sex determination in Drosophila. How is the level of X linked genes expression equalized in the two sexes of (a) humans, (b) flies, (c) worms? State the significance of dosage compensation. 5+3+2

c. Differentiate between reciprocal and Robertsonian translocation. What do you mean by translocation carrier? With a schematic diagram show how the chromosomes segregate at meiosis in a balanced reciprocal translocation carrier and mention the possible outcomes after fertilization with normal gametes. 2+2+6

d. Briefly describe sex influenced dominance and sex-limited gene expression. What is meant by Y-linked inheritance? Describe with a suitable example Sex linked inheritance. An X-chromosome mutation leads to Hemophilia in humans. What will be the results of mating between (1) a hemophilac male and a normal (non-carrier) female; (2) a hemophilac male and a normal (carrier) female; (3) a normal male and a normal (carrier) female? 3+1+3+3

OR

B.Sc.Semester-IVExam,2022

Subject-Biotechnology(Hons.)

PAPER- GE 4 [OR] (Immunotechniques)

TIME-2Hours **FullMarks-40**

Q.1 Answer *any five* questions from the followings : 2x5=10

a. Compare between monoclonal and polyclonal antibody .
b. What do you mean by Pro-zone and Post-zone effect ?
c. What are the different cells responsible for Cell-mediated and Humoral immunity ?
d. Differentiate competitive and Non-competitive immune assay .
e. Name two Auto-immune disorders.
f. What is Bombay Phenotype ?
g. Which radio-isotope is commonly used in RIA ? Write down its symbol.
h. What are Zymogens ?

Q.2 Answer *any two* questions from the followings : 5×2=10

a. Briefly describe the process of RIA. Write down its application .

b. Deduce the structure of antibody by treating with Papain and Pepsin.
c. What do you mean by Live attenuated vaccine? Write down its advantages and Disadvantages.
d. Describe Coombs test. Under what circumstances do we perform Coombs test ?

Q.3 Answer *any two* questions from the followings : 10×2=20

a. How does Mancini diffusion differ from Ouchterlony Double diffusion? Describe the principle and different types of ELISA with schematic diagram 2+8 =10
b. What is Delayed type hyper sensitivity reaction? How are hybrid cells selected using " Hybridoma Technology" ? 2+8=10
c. Write a short note on Hemolytic Disease of New-born. What is DNA Vaccine? What do you mean by tracer antigens ? 5 +3 +2 =10
d. Briefly describe the basic idea of Natural and Artificial Passive immunization. Show how MAC (Membrane Attack Complex) is formed in classical pathway of complement activation.