

**2022**

**Time - 3 hours**

**Full Marks - 60**

*Answer all groups as per instructions.*

*Figures in the right hand margin indicate marks.*

*Candidates are required to answer*

*in their own words as far as practicable.*

*Draw labelled diagrams wherever necessary.*

**GROUP – A**

1. Fill in the blanks (all). [1 × 8]
- (a) When one gene code for a single m-RNA, then the m-RNA is called \_\_\_\_\_ .
- (b) The amino acid carried by initiation t-RNA is \_\_\_\_\_ .
- (c) \_\_\_\_\_ factor helps in termination of transcription.
- (d) The transfer of activated amino acid to its specific t-RNA is called \_\_\_\_\_ .
- (e) The non-coding nucleotide sequences in DNA and RNA are called \_\_\_\_\_ .
- (f) The post transcriptional processing of RNA is called \_\_\_\_\_ .



[ 2 ]

- (g) Repressor protein is synthesised by \_\_\_\_\_ gene.
- (h) The small non-coding ssRNA that inhibits m-RNA expression is called \_\_\_\_\_ .

**GROUP – B**

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

- (a) What is Palindromic sequence ?
- (b) What is semi-conservative mode of DNA replication ?
- (c) What is the function of topoisomerase ?
- (d) What is a transcription unit ?
- (e) What is genetic code ?
- (f) What is the function of polyribosome ?
- (g) What is RNA splicing ?
- (h) What is exon shuffling ?
- (i) What are the components of Lac operon ?
- (j) What are si-RNA ?



[ 3 ]

GROUP – C

3. Write notes on any eight the following within 75 words each.

[2 × 8

- (a) Pyrimidine dimerization
- (b) Okazaki fragments
- (c) Degeneracy of genetic code
- (d) t-RNA
- (e) Differences between prokaryotic and eukaryotic translation
- (f) Prokaryotic ribosome structure
- (g) Globin m-RNA
- (h) Split genes
- (i) Silencer elements
- (j) Regulator gene

GROUP – D

*Answer any four questions in 500 words each.*

- 4. Describe Watson and Crick model of DNA. [6
- 5. Differentiate between DNA and RNA. [6

P.T.O.



[ 4 ]

6. Describe the process of protein synthesis in prokaryotes. [6]
7. Write an essay on genetic code. [6]
8. Give an account on Alternating splicing. [6]
9. Briefly describe processing of t-RNA. [6]
10. Describe transcription regulation in prokaryotes taking Trp Operon as example. [6]



**2022**

**Time - 3 hours**

**Full Marks - 60**

*Answer all groups as per instructions.  
Figures in the right hand margin indicate marks.  
Candidates are required to answer  
in their own words as far as practicable.  
Draw labelled diagrams wherever necessary.*

**GROUP – A**

1. Answer all questions and fill in the blanks as required. [1 × 8]
- (a) \_\_\_\_\_ coined the term mutation.
  - (b) Myogenetics deals with the genetical study of \_\_\_\_\_.
  - (c) The ratio of recessive epistasis is \_\_\_\_\_.
  - (d) Haemophilia is caused by a mutant gene present in which chromosome ?
  - (e) The cross of  $F_1$  hybrid with dominant homozygous parent is called \_\_\_\_\_.
  - (f) A sudden change in the gene which is heritable from one generation to other is known as \_\_\_\_\_.



- (g) Two pairs of dominant genes present together in an individual is called \_\_\_\_\_
- (h) When one gene affects more than one phenotypic character is known as \_\_\_\_\_

GROUP - B

2. Answer any eight of the following questions within two to three sentences each. [1/2 = 8]

- (a) What is back cross?
- (b) What is crossing over?
- (c) What is complete linkage?
- (d) What is spontaneous mutation?
- (e) What are autosomes?
- (f) What is inter-sex?
- (g) What is lethal allele?
- (h) What is sex pill?
- (i) What is holandric gene?
- (j) What is inversion?



[ 3 ]

GROUP – C

3. Write notes on any eight the following within 75 words each.

[2 × 8

- (a) Frame shift mutation
- (b) Types of somatic hybrids
- (c) Checker board
- (d) Codominance
- (e) Pleiotropy
- (f) Bleeder's disease
- (g) Types of transduction
- (h) Insertion sequence
- (i) Cytoplasmic inheritance
- (j) Gynandromorphs in *Drosophila*

GROUP – D

Answer **any four** questions in 500 words each.

- 4. What are the Mendelian laws of heredity ? Add a note on test cross. [6
- 5. What is epistasis ? Add a note on lethal alleles. [6

P.T.O.



[ 4 ]

6. Briefly describe Morgan's concept of linkage. [6]
7. Briefly describe about somatic cell hybridization. [6]
8. Describe about euploidy and aneuploidy in chromosomes. [6]
9. Describe about chemical mutagens. [6]
10. What is transposon ? Write about transposon in bacteria. [6]



**2022**

**Time - 3 hours**

**Full Marks - 60**

*Answer all groups as per instructions,  
Figures in the right hand margin indicate marks,  
Candidates are required to answer  
in their own words as far as practicable,  
Draw labelled diagrams wherever necessary.*

**GROUP - A**

1. Fill in the blanks (all), [1 × 8]
- (a) The common naturally occurring circular extra-chromosomal dsDNA used as cloning vector is \_\_\_\_\_.
- (b) The common screening method used to screen hybrid plasmid is \_\_\_\_\_.
- (c) The blotting technique used for identification and separation of proteins is \_\_\_\_\_.
- (d) The technique of DNA fingerprinting was first developed by \_\_\_\_\_.
- (e) The mice in which a gene of interest is replaced by a non-functional gene is called \_\_\_\_\_.



[ 2 ]

- (f) The first transgenic animal generated through nuclear transplantation method was named \_\_\_\_\_ .
- (g) The recombinant human insulin is marketed under the trade name \_\_\_\_\_ .
- (h) The technique used to treat genetic disorder by replacing defective gene with corrected gene is called \_\_\_\_\_ .

**GROUP – B**

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

- (a) How cosmids are different from plasmids ?
- (b) What are expression vectors ?
- (c) What does ORI-site indicate in a cloning vector ?
- (d) Why DNA sequencing is being done ?
- (e) Define amplification cycle.
- (f) State application of technique of DNA fingerprinting.
- (g) What is xeno-transplantation ?
- (h) What is transgenesis ?
- (i) What is a primary cell culture ?
- (j) Define cell line.



[ 3 ]

**GROUP – C**

3. Write notes on any eight the following within 75 words each.

[2 × 8

- (a) Cloning vectors
- (b) Restriction enzymes
- (c) Plague hybridization
- (d) PCR
- (e) DNA microarray
- (f) Retroviral method of transgenesis
- (g) Pharmaceuticals from transgenic animals
- (h) Sickle-cell anemia diagnosis
- (i) Mammalian expression system
- (j) Construction of genomic libraries

**GROUP – D**

*Answer any four questions in 500 words each.*

- 4. Write an account on concept and scope of Biotechnology. [6
- 5. Describe various transformation techniques used in biotechnology. [6

P.T.O.



[ 4 ]

6. What is Southern blotting ? Describe the technique briefly. [6]
7. Describe Sanger's method of DNA sequencing briefly. [6]
8. Write an essay on production of transgenic animals. [6]
9. What are knock-out mice ? Briefly describe about their production technique and application. [6]
10. Write an account on recombinant DNA in medicines. [6]



**2022**

*Time - 3 hours*

*Full Marks - 60*

*Answer all groups as per instructions.*

*Figures in the right hand margin indicate marks.*

*Candidates are required to answer  
in their own words as far as practicable.*

*Draw labelled diagrams wherever necessary.*

**GROUP – A**

1. Fill in the blanks (all). [1 × 8

- (a) T-lymphocyte originated in \_\_\_\_\_ of human body.
- (b) \_\_\_\_\_ immunoglobulin has a secretory component.
- (c) \_\_\_\_\_ antibody can cross placenta.
- (d) \_\_\_\_\_ antibody has highest life span.
- (e) Antibodies are produced by \_\_\_\_\_ cell.
- (f) Antigen binding site present on antibody is called \_\_\_\_\_.



[ 2 ]

- (g) \_\_\_\_\_ MHC expressed in all nucleated cell.
- (h) \_\_\_\_\_ immunoglobulin is more efficient in activating complement system.

**GROUP – B**

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

- (a) What is humoral immunity ?
- (b) What is artificial passive immunity ?
- (c) What is immunogenicity ?
- (d) What is an epitope ?
- (e) What is an adjuvant ?
- (f) What is the role of class-I MHC ?
- (g) What are interkeurins ?
- (h) What is the role of C<sub>3</sub> convertase in complement system ?
- (i) What is erythroblastosis foetalis ?
- (j) What is the role of hapten ?



[ 3 ]

GROUP – C

3. Write notes on any eight the following within 75 words each.

[2 × 8

- (a) Anatomical barriers in innate immunity
- (b) B lymphocyte
- (c) T lymphocyte
- (d) IgM
- (e) Factors influencing immunogenicity
- (f) Active and passive immunity
- (g) Antigen Presenting Cell (APC)
- (h) Exogenous antigen processing
- (i) RIA
- (j) Polio vaccine

GROUP – D

*Answer any four questions in 500 words each.*

- 4. Give an account of organs of immune system. [6
- 5. What is an antibody ? Describe the types and structure of antibody. [6

P.T.O.



6. Give an account of components and pathways of complement activation. [6]
7. What is MHC ? Describe structure and functions of MHC molecules. [6]
8. What is immunoassay ? Describe ELISA and its uses in immunology. [6]
9. Describe properties and functions of cytokines. Write a short note on therapeutic cytokines. [6]
10. What is hypersensitivity ? Describe the types of hypersensitivity according to Gell and Coomb's classification. [6]