

Day : Thursday  
Date : 07/04/2016



Time : 10.00 AM TO 01.00 PM  
Max Marks : 60 Total Pages : 1

N.B.;

- 1) Q. No. 1 & Q. No. 5 are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from Section - I and any **TWO** questions from Section - II.
- 2) Answers to both the sections should be written in **SEPARATE** answer books.
- 3) Draw well labeled diagrams **WHEREVER** necessary.

SECTION - I

- Q.1 Answer the following: (10)
- a) What is DNA proofreading?
  - b) Define frame shift mutation
  - c) State the role of DNA polymerase  $\alpha$
  - d) What is abortive initiation?
  - e) Define the terms: i) Coding strand, ii) Downstream sequences
- Q.2 a) Describe the organization of nucleosome assembly (05)  
b) Explain the structure and role of centromere. (05)
- Q.3 Explain the following with suitable diagrams. (10)
- a) The mechanism of DNA replication on leading and lagging strands of *E. coli* DNA.
  - b) Excision repair mechanism
- Q.4 Write short notes on Any **TWO** of the following: (10)
- a) Nick translation
  - b) Transposons
  - c) Site specific recombination

SECTION - II

- Q.5 Attempt any **TWO** of the following: (10)
- a) Explain the role of Sigma factor in bacterial transcription.
  - b) Describe the role of transcription factors in initiation of eukaryotic mRNA transcription.
  - c) Outline the steps involved in initiation of bacterial protein synthesis.
- Q.6 a) What are TATA and TATA less promoters? Explain its interaction with TBP (05)  
in eukaryotic transcription.  
b) Define the terms (05)  
i) Operon ii) Promoter iii) Inducer iv) Enhancer v) Repressor
- Q.7 Explain the following with suitable diagrams
- a) Regulation of tryptophan operon (05)
  - b) Mechanism of splicing of introns by lariat formation (05)
- Q.8 Explain the role of any **TWO** of the following (10)
- a) Signal sequences in targeting of proteins
  - b) Release factors in synthesis of proteins
  - c) Intrinsic terminator in prokaryotic transcription

**Subject : Genetic Engineering & Applications**

Day : Saturday  
Date : 09/04/2016



Time : 10.00 AM TO 01.00 PM  
Max Marks : 60 Total Pages : 2

**N.B.:**

- 1) Q. No. 1 and Q. No. 5 are **COMPULSORY**.
- 2) Attempt any **TWO** questions from Q. No. 2, Q. No. 3, Q. No. 4.
- 3) Attempt any **TWO** questions from Q. No. 6, Q. No. 7, Q. No. 8.
- 4) All questions carry **EQUAL** marks.
- 5) Write both sections on **SEPARATE** answer sheets.
- 6) Draw well labeled diagrams **WHEREVER** is necessary.

**SECTION – I**

- Q.1** Explain in brief the reactions catalyzed by the following enzymes. (draw suitable diagrams) (Attempt any **FOUR**) (10)
- a) Klenow enzyme
  - b) Restriction endonuclease
  - c) Terminal transferase
  - d) T4 DNA ligase
  - e) Alkaline phosphatase
- Q.2** Explain in brief with suitable diagrams (Attempt **any TWO**) (10)
- a) Different methods to introduce DNA into living cells
  - b) Principle and applications of PCR technique
  - c) Distinguishing features between genomic DNA and cDNA library
- Q.3** Write short notes on (10)
- a) Different methods of DNA labelling
  - b) M13 based vectors
  - c) Virus vectors for mammalian cells
  - d) Southern hybridization
- Q.4** Answer the following (**any TWO**) (10)
- a) With the help of suitable diagrams, explain different strategies for cloning in plant cells.
  - b) Explain in detail immunochemical and sequence based methods of screening the library.
  - c) Elaborate on: Expression vectors. Add a note on “strong promoters”.

**P.T.O.**

## SECTION II

- Q.5** Explain in detail with suitable diagrams (**Any TWO**) (10)
- a) Principle of Sanger's method of DNA sequencing.
  - b) Different methods of restriction mapping
  - c) Applications of site directed mutagenesis
- Q.6** Write Short notes on (10)
- a) Different yeast vectors
  - b) Different methods of transcript analysis
  - c) Phage display
  - d) HRT and HART
- Q.7** Explain in brief applications of genetic engineering in (10)
- a) Disease diagnosis
  - b) Gene therapy
  - c) Forensic science
  - d) Insect resistant plants
- Q.8** Answer the following (10)
- a) What are the advantages and limitations of using *E.coli* as a host for producing recombinant proteins?
  - b) What are reporter genes? Explain with suitable examples. Add a note on their applications.

\* \* \* \* \*

## Subject : Immunology

Day : Monday  
Date : 11/04/2016



Time : 10.00 AM TO 01.00 PM  
Max Marks : 60 Total Pages : 1

**N.B.:**

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of the remaining attempt any **TWO** questions from each section.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the section should be written in **SEPARATE** answer books.
- 4) Neat diagrams must be drawn **WHEREVER** necessary.

**SECTION-I**

- Q.1** Answer the following in brief. (10)
- a) Expand the terms PALS, CDR.
  - b) Define – “Aquired immunity”.
  - c) Enlist the surface markers on “B” cells.
  - d) Enlist he attributes of “Cytokines”.
  - e) What are haptens?
- Q.2** Answer the following questions: (10)
- a) Discuss the cytosolic pathway for processing and presentation of endogenous antigens.
  - b) Discuss the requirements for a substance to be antigenic.
- Q.3** Answer the following questions: (10)
- a) Discuss the “Lectin” pathway of complement activation.
  - b) What are Interleukins? Describe briefly, the properties of Interleukins.
- Q.4** Write short notes on: (10)
- a) Monoclonal antibodies
  - b) ADCC

**SECTION-II**

- Q.5** Answer in brief. (10)
- a) Recombinant vaccines
  - b) NK cells
  - c) TCR
  - d) Arthus reaction
  - e) Perforins
- Q.6** Answer the following questions:
- a) Discuss “Juvenile Diabetes”.
  - b) Describe the structure and function of “MHC Class – II” molecules.
- Q.7** Briefly describe: (10)
- a) Activation of B cells by TD antigen.
  - b) Sensitizing stages of allograft rejection.
- Q.8** Answer in brief: (10)
- a) Discuss the techniques of flow cytometry.
  - b) Enlist the different types of vaccines and discuss any one in detail.