(Theory Paper)

Paper Code : BOT 402 (Opt-2)

(Microbiology – II)

Full Marks – 80

Time – Three hours

The figures in the margin indicate full marks for the questions.

Multiple Choice Questions :

1. Choose the correct option : 1×6=6

(i) Plasmids are ideal vectors for gene cloning as

(a) they can be multiplied by culturing

(b) they can be multiplied in the laboratory using enzymes

(c) they can replicate freely outside the bacterial cell

(d) they are self-replicating within the bacterial cell

(ii) The HIV virus in AIDS kills

(a) T-helper cells

(b) T-cytotoxic cells

(c) antibody cells

(d) macrophage

(iii) Name the cell which receives antigen presented by MHC II molecules

(a) CD 4^+ T cells

(b) CD 8^+ T cells

(c) Macrophages

(d) Nk cells

(iv) DNA-B protein

(a) releases the tension in the super coiling DNA

(b) is responsible in polymerase activity

(c) recognizes *ori* sequence

(d) is also known as helicase and helps in unwinding of DNA duplex to form the open complex

(v) Which of the following could be coded by a tumor-suppressor gene ?

(a) A protein that helps prevent progression through cell cycle

(b) A protein that helps prevent apoptosis

(c) A protein that codes for a DNA repair enzyme

(d) A protein that forms part of a growth factor signaling pathway

(vi) The aim of genetic engineering is

(a) to add, remove or repair new geenes

(b) to prepare new genes

(c) to construct new machines

(d) to educate people about genetics.

2. Answer any *five* of the following short questions : 2×5=10

(a) Define proteomics and metabolomics.

(b) What is the function of sigma factor in prokaryotic transcription ?

(c) Give two uses of genetic engineering in agriculture.

(d) Write two essential features of cloning vectors.

(e) Name the heavy chain of different types of immunoglobulin.

(f) What do you understand by TATA box and PRIBNOW box ?

(g) Write the functions of helicase enzyme.

3. Write short notes on any *four* : 5×4=20

(a) Macrophage.

(b) Classical pathway of Compliment system.

(c) Attenuation of *trp*-Operon.

(d) RNA splicing.

(e) HIV Virus.

(f) Monoclonal antibodies.

(g) Endogenous representation of antigens.

4. Answer any *three* of the following questions : 10×3=30

(a) How many replication forms are found in Circular DNA replication ? Describe elaborately the prokaryotic replication process. 3+7=10

(b) What is regulation of gene action ? Define operon and name the scientists who gave this concept ? Discuss the negative control of gene regulation in *lac*-Operon. 1+2+7=10

(c) What are the different components of innate immune system ? Discuss the activation of cell mediated immune system. 7+3=10

(d) What are cancer cells ? Describe the role of oncogenes in causing cancer with suitable example. Write the function of tumor suppressor gene P^{53}. 2+4+4=10

5. Write the applications of the following in Genetic engineering (any *two*) : 7×2=14

(a) BAC, (b) YAC, (c) RNAi, (d) Bacterio phage.