

(3 Hours)

(100 Marks)

Instructions to the candidates:

- i) All questions are **compulsory**. Choice is **internal**
- ii) Figures to **the right** indicate **full marks**.
- iii) Draw structures and diagrams wherever necessary.
- iv) Draw flowcharts /diagrams wherever necessary.

Q.1A) State true or false:

(04)

- i) All viruses contain DNA.
- ii) Presence of *Mycobacterium* indicates faecal contamination.
- iii) Large number of actinomycetes are present in dry warm soil.
- iv) *Staphylococcus* produces mycotoxin.

Q.1B) Write short notes on: (Any three)

(09)

- i) Asymbiotic nitrogen fixation.
- ii) Classification of viruses based on hosts.
- iii) Diagrammatic representation of lysogenic cycle.
- iv) Yeast and its uses.
- v) Probiotics.
- vi) Bacterial infection.

Q.1C) Answer the following:(Any two)

(12)

- i) Write detailed account of airborne pathogens.
- ii) Discuss water and food borne diseases and their control.
- iii) Write a note on *Shigella* and Morbillivirus
- iv) Beneficial microorganisms of human gut.

Q2. A) State True or False:

(04)

- i) Cell culture of blood cells is anchorage independent.
- ii) Septic conditions are necessary to eliminate contaminations.
- iii) Culture systems are dependent on environmental factors.
- iv) Secondary metabolites participate in metabolism of plants.

Q2. B) Answer the following: (Any three)

(09)

- i) What is the composition of nutrient agar? Mention use of each component.
- ii) What are vaccines? Discuss in detail different types of vaccines used these days.
- iii) In brief, explain callus regeneration and factors affecting it.
- iv) Schematically represent the technique of micropropagation.
- v) Briefly explain the concept of totipotency.
- vi) What is HGPRT? Briefly explain its significance in animal tissue culture.

Q2. C) Answer the following: (Any two) (12)

- i) Which technique is used to produce 'pomato', a hybrid of tomato and potato? Explain the same.
- ii) Elaborate on the various components of growth media used in cell culture.
- iii) Discuss the different types of stem cells. Add a note on application of stem cell culture.
- iv) Discuss technique and applications of animal tissue culture.

Q.3A) State true or false: (04)

- i) Continuous fermentation is monitored by use of turbidometric principle.
- ii) DEAE sephadex is used as inert support for adsorption.
- iii) A biosensor has four distinct components.
- iv) Symba process was developed in USA for single cell protein production.

Q.3B) Write short notes on: (Any three) (09)

- i) Bubble cap fermenter
- ii) Optical biosensor
- iii) Stabilization of enzymes by solvent and substrate
- iv) Fungal proteins
- v) Applications of biosensors in pollution control
- vi) Role of baffle, sparger and impellor in a fermenter

Q.3C) Answer the following: (Any two) (12)

- i) With the help of a suitable diagram discuss a typical fermenter with its features.
- ii) Describe the single cell protein production from high energy sources and wastes. Add a note on its applications.
- iii) Describe covalent binding and entrapment as immobilization techniques.
- iv) With the help of a flowsheet give detailed account of penicillin production.

Q.4 (a) Define and explain: (Any five) (10)

- (i) Protoplast culture. (ii) Dedifferentiation (iii) Whole embryo culture (iv) Proteolysis
(v) Pathogen (vi) Icosahedral symmetry (vii) Countercurrent extraction

Q.4 (b) Write elaborate notes on: (Any three) (15)

- i) Secondary metabolites
- ii) Hybridoma
- iii) Continuous stirred tank fermenter
- iv) Immunobiosensors
- v) Typical virus with labelled diagram
- vi) Wine production