

11. (a) Discuss in detail the traditional and modern fermentation processes with a neat labeled diagram of a fermenter. (16)

Or

- (b) Explain the different methods for sterilization of culture media and air in fermentation. (16)
12. (a) Explain the steps involved in the ethanol production from a substrate containing starch with a neat flow chart. (16)

Or

- (b) What are the organisms used in acetic acid production? Explain the production process of acetic acid. (16)
13. (a) Give the flow chart for penicillin fermentation. Explain the biosynthesis of penicillin. (16)

Or

- (b) What is the precursor of all the subunits of aminoglycoside antibiotics? Explain the biosynthesis of streptomycin with the flow chart. (16)
14. (a) Write short notes on: (2 × 8)
- (i) Biofertilizers
 - (ii) Biopreservatives.

Or

- (b) What are the different types of cheese? Explain the steps involved in the production of cheddar cheese. (16)
15. (a) Discuss in detail the applications of recombinant DNA technology in the field of human therapy and agriculture. (16)

Or

- (b) Write short notes on : (2 × 8)
- (i) Vaccines
 - (ii) Animal cell culture.