2 ½ Hours

Total Marks: 75

1. **All** questions are **compulsory.**
2. **All questions** carry **equal** marks.
3. Draw **neat, labelled diagrams** wherever necessary.

Q.1 a. Do as directed. (Any three) **03**

i) Name a fermenter used for production of vinegar.
ii) Define on-line sensor.
iii) Name any one gauge used to measure pressure in a fermenter.
iv) What are perfusion cultures?
v) Fill in the blank.
_____ is a device for introducing air into the liquid in a fermenter.
vi) State any one agent used for foam control.

Q.1 b. Answer the following. (Any two) **12**

i) Describe construction, principle and working of a deep jet fermenter.
ii) Briefly explain the measuring and control of temperature in a fermentation process.
iii) Elaborate on hollow fibre chambers and perfusion cultures with respect to animal cell cultures.
iv) How can you measure and control inlet and exit gas?

Q.2 a. Explain the following terms. (Any three) **03**

i) Auxanography
ii) Indicator Dye
iii) Scale-up
iv) Seed culture
v) Crop
vi) Log phase

Q.2 b. Answer the following. (Any Two) **12**

i) Elaborate on the aspects to be considered in the scale down of pilot plant systems
ii) Describe the development of mycelial inoculum by sporulation on a solid medium with a suitable example
iii) Discuss development of inocula for yeast process with suitable examples
iv) Explain citing suitable example the stages involved in secondary screening of an antibiotic producer.

Q.3 a. Give significance of /importance of (Any three) **03**

i) Mashing
ii) Acetator
iii) Hops in Beer
iv) Soybean meal
v) Clarification
vi) Boiling of wort

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Q.3 b. **Elaborate on (Any two) of the following.** **12**

i) Production of White wine
ii) Submerged culture method for Citric acid production
iii) Fermentation of Beer
iv) Quick Vinegar process

Q.4 a. **Mention the application/role of the following in downstream processing (Any three)** **03**

i) Tangential filtration
ii) Colligends
iii) Precipitation
iv) Cell aggregation
v) Kieselgurh
vi) Batch centrifuge

Q.4 b. **Give an account of the following with respect to product recovery (Any two)** **12**

i) Ultrafiltration and reverse osmosis
ii) Two types of chromatography techniques used
iii) Any two types of continuous filters
iv) Drying - any two methods

Q.5 **Write short notes on the following. (any three)** **15**

i) Measurement of biomass
ii) Enrichment culture method
iii) Criteria involved in strain selection for industrial fermentation
iv) Semisynthetic Penicillin
v) Single Cell protein
vi) Any two chemical methods for cell disruption

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