Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(BT) (2011 Onwards) (Sem.–7,8)

DOWNSTREAM PROCESSING

Subject Code : BTBT-702

Paper ID : [A2946]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt ANY FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt ANY TWO questions.**

SECTION-A

Q1. Write briefly :

a. Name any 4 major impurities and contaminants found in fermentation broth during product recovery.

b. *"Pressure is the driving force for microfiltration"* but not for dialysis. Explain.

c. Define *'terminal velocity'* in centrifugation.

d. How *'Coagulation'* and *'flocculation'* are related phenomena?

e. How detergents can be used for the isolation of intracellular products?

f. What do you understand by the term *'purification factor'*?

g. Define Langmuir isotherm adsorption model.

h. What is the role of *'stationary'* and *'mobile'* phases in chromatographic techniques?

i. Define the term *'partition coefficient'*.

j. Principle of capillary electrophoresis.

SECTION-B

Q2. Discuss the role and importance of downstream processing in bioprocess technology. Compare bioseparation process with conventional chemical process.

Q3. Discuss the theoretical principle of constant pressure filtration. How is compressibility of a cake determined?

Q4. Discuss the electrical double layer model in flocculation. Give an example of neutral polymeric and natural ionic flocculants.

Q5. Write short notes on :

a. Two phase extraction

b. Crystallization

Q6. The disc type centrifuge is available for the separation of *S.* aureus cells with settling velocity V_g of 1×10^{-4} cm/sec. The centrifuge has 100 discs with an angle of 40°, an outer radius of 16.8 cm, inner radius of 5.2 cm and is operated at 6,000 *rpm*. Estimate the volumetric capacity.

SECTION-C

Q7. Provide a detailed overview on the major steps involved in downstream processing of microbial alkaline proteases and enlist their applications.

Q8. Write a complete note on working principle, instrumentation and applications of size exclusion chromatography.

Q9. Comment on following (also provide the necessary sketch) :

a. salting-in, salting-out phenomenon for protein purification

b. Isoelectric focusing