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M. Tech. (Biotechnology)**SECOND SEMESTER EXAMINATION, 2010-11****DOWNSTREAM PROCESSING**Time : **3 Hours**Total Marks : **100**

Note : (i) Attempt any **FIVE** questions.
(ii) Marks are indicated against each question.

1. (a) Write a note on the purification of proteins by precipitation method. **15**
- (b) Describe the term "Adsorption and its advantages in down stream processing. Also write about adsorption isotherms. **5**

2. Attempt any **Five** options: **4 x 5 = 20**
 - (a) Salt induced precipitation
 - (b) Pervaporation
 - (c) Supercritical fluid extraction
 - (d) Pulsed – Field gel electrophoresis
 - (e) Ultrafiltration
 - (f) Trickling filters
 - (g) Isoelectric focusing

3. (a) How Downstream processing is essential and important aspect of bioprocess. Support your answer by giving an example. **10**
- (b) What do you understand by liquid-liquid extraction? Define various criteria on which physical extraction depends. **10**

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4. (a) Write a note on the process of crystallization and its use in downstream processing. **15**
- (b) Discuss sludge loading for conventional activated sludge treatment process. **5**
5. (a) Define various stages of sewage treatment system. Write about fluidized expanded bed reactor. **10**
- (b) Write short note on freeze drying and its advantages. **10**
6. "Affinity chromatography is a method of separating biochemical mixtures based on highly specific biological interaction". Justify this statement by explaining principle, working and one application. **20**
7. (a) Describe centrifugal sedimentation using mathematical expression and write about different types of rotors. **10**
- (b) Describe different method of cell disruption. **10**

