Code: 9A23703 **R09**

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2015

DOWNSTREAM PROCESSING

(Biotechnology)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1 (a) What is the role of process engineer in bio-separation process? Explain in detail with suitable examples.
(b) Explain briefly about high volume, low value biotechnology products.

2 Write about recent developments in product isolation with more emphasis on reverse micro cellular extraction.

3 (a) Write short notes on classification of cell disruption methods and explain them.
(b) A plate and frame filter press filtering slurry, gave a total of 25 m^3 of filtrate in 30 minutes and 35 m^3 in 60 minutes when filtration was stopped. Estimate the washing time in minutes if 10 m^3 of wash water are used. The resistance of the cloth can be neglected and a constant pressure is used throughout.

4 (a) What is the driving force in microfiltration process? Write the similarities as well as differences between ultra-filtration and microfiltration.
(b) Explain plate and frame membrane module with neat sketch.
(c) Write the applications of reverse osmosis.

5 (a) What is Cohn equation?
(b) What are the separation techniques available for insitu product removal? Explain them briefly.

6 (a) A 1×10^{-9} m diameter particle has a measured mobility of 1×10^{-8} m^2/sv in a 0.0001 M aqueous solution of $Na_2 SO_4$ 25° C. What is the value of ξ?
(b) Why is two-dimensional electrophoresis currently the system of choice for scale – up?
(c) Explain briefly various complicating factors in electrophoresis.

7 (a) A liquid chromatography using 20 μm Silica gel is separating Acetylnaphthalene (A) from Dinitronaphthalene (D). K values are K_A = 5.5, K_D = 5.8 in a solvent which is 23% Methylene chloride, 77% pentane. With an interstitial velocity of 1.0 cm/sec, H is measured as 0.12 cm. We desire a resolution of R = 1.0. What column length is required?
(b) Explain physically why large molecules exit before small molecules in size exclusion chromatography.

8 (a) Write short notes on Form Separation with suitable examples.
(b) Write the important unit operations involved in the production citric acid.

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