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Total number of printed pages – 2

B. Tech
PCBT 4306

Sixth Semester (Special/Back) Examination – 2013

DOWNSTREAM PROCESS ENGINEERING

BRANCH : BIOTECH

QUESTION CODE : E 308

Full Marks – 70

Time : 3 Hours

*Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.*

1. Answer the following questions : 2×10
- (a) What do you mean Ostwald ripening ?
 - (b) What are the different types of rotors used in centrifugation ?
 - (c) Define critical moisture content.
 - (d) What do you mean reverse phase chromatography ?
 - (e) Write the different types of chromatography depending upon different principles involved.
 - (f) Find the g- number of a centrifuge with radius of 10 cm and rotating at 30 rps?
 - (g) Define sigma factor of a centrifuge.
 - (h) Write the importance of prior art in patent.
 - (i) Differentiate between upstream and downstream process.
 - (j) Distinguish between sedimentation and precipitation



P.T.O.

2. (a) Write the theory of centrifugation. Add a note on continuous centrifugation. 5
- (b) Write briefly about ultrafiltration. 5
3. (a) Cells of fall armyworm *S. frugiperda* are cultured in a fermenter to produce viral particles for insecticide. Viral particles are released into the culture broth after lysis of the host cells. The initial culture volume is 5 lit. An aqueous two-phase polymer solution of volume 2 lit is added to this liquid; the volume of the bottom phase is 1 lit. The virus partition coefficient is 0.01. Find the yield of virus at equilibrium. 5
- (b) Explain the process of molecular exclusion chromatography. 5
4. Write the principle behind HPLC. Discuss in details about the instrumentation and working of HPLC. Write different types of detector used in HPLC. 10
5. (a) Describe the various physical cell disruption methods. 5
- (b) Write the theory of filtration. Differentiate dead end filtration and microfiltration. 5
6. (a) Draw the pressure-temperature diagram for water, indicating the triple-point. Explain the principle of freeze dryer. 5
- (b) Write the principle of crystallization. Describe the working of batch crystallizer. 5
7. (a) Discuss in details affinity chromatography. 5
- (b) Discuss in details about the ion-exchange chromatography. 5
8. Answer the following : 5 × 2
- (a) Differentiate between Dialysis and Electrodialysis
- (b) Aqueous two phase extraction.

