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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -1 EXAMINATION- Feb 2019

B.Tech VI Semester

COURSE CODE: 16B11BT611

COURSE NAME: Downstream Processing

COURSE CREDITS: 04

MAX. MARKS: 15

MAX. TIME: 1 Hr.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. Define Downstream processing? What is its financial importance in a bioprocess? [2] [CO1]
2. a) Why the use of lysozyme for the lysis of Gram negative bacteria is not an effective method? [1] [CO2]
b) How the purification of an intracellular product is different from the extracellular product purification. [2] [CO2]
3. a) Determine the relative centrifugal force applied over the particles when a centrifuge rotates at 6000 rpm with 5 cm radius. [2] [CO3]
b) Why detergent induced precipitation of proteins is not preferred over the organic solvent based precipitation? [2] [CO3]
4. A 30-ml sample of broth from a penicillin fermentation is filtered in the laboratory on a 3 cm² filter at a pressure drop of 5 psi. The filtration time is 4.5 min. Previous studies have shown that filter cake of *Penicillium chrysogenum* is significantly compressible with $s = 0.7$. If 500 litres broth from a pilot-scale fermenter must be filtered in 1 hour, what size filter is required if the pressure drop is 5 psi. [3] [CO3, 5]
5. A pilot-scale disc-stack centrifuge is tested for recovery of bacteria. The centrifuge contains 25 discs with inner and outer diameters 2 cm and 10 cm, respectively. The half-cone angle is 35°. When operated at a speed of 3000 rpm with a feed rate of 3.5 litre min⁻¹, 70% of the cells are recovered. If a bigger centrifuge is to be used for industrial treatment of 80 litres min⁻¹, what operating speed is required to achieve the same sedimentation performance if the larger centrifuge contains 55 discs with outer diameter 15 cm, inner diameter 4.7 cm, and half-cone angle 45°. [3] [CO3, 5]