QUIZ I

(1 mark each)

1. Name one operation which is not a down stream process

(i) filtration (ii) extraction (iii) innoculum preparation (iv) adsorption

2. Which operations can be used for removal of insolubles

(i) absorption (ii) extraction (iii) sedimentation (iv) adsorption

3. Lyophilization is performed at

(i) high temperature and high pressure (ii) low temperature and high pressure (iii) low temperature and low pressure (iv) high temperature and low pressure

4. There are two down stream steps. If efficiency of separation in each is 98%, how much of the product is lost overall

(i) 2% (ii) 4% (iii) 3% (iv) 6%

5. Cost of a HPLC unit is Rs 15 Lakhs. We make a profit of Rs 100 when we do a sample for customers. We do 10 samples per day. Assuming 300 working days in a year, what will be the payback period in terms of years for the HPLC

(i) 6 (ii) 3 (iii) 5 (iv) 4

6. We need 5 ltrs of methanol to recover 2 kgs of a product. If the fermentation broth contains 10 kgs of the product, how much methanol is required.

(i) 20 (ii) 25 (iii) 30 (iv) 24

7. If 95% of the product is removed from a broth containing 100 kgs of it using a downstream process, how much of the product will be lost

(i) 4 (ii) 10 (iii) 5 (iv) 3

8. I give Rs 5000 to my friend. He has promised to return this money next year. What will be the net present value of that money (assume rate of discount as 10%). Ignore the decimal

(i) 4550 (ii) 4545 (iii) 4500 (iv) 4600

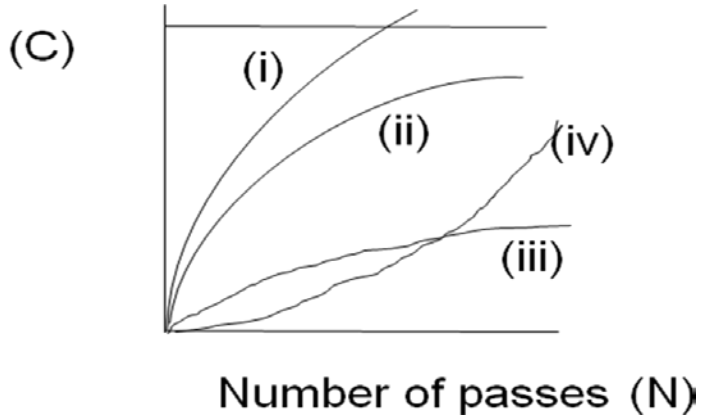
9. If a simple filter is used for filtering a slurry, the solids retain 10 wt% of the liquid, while if a centrifuge is used the solids retain only 2 wt% of the liquid. If a slurry contains 10 kg solids, how much difference of liquid will be lost (in kgs) if I use a filter rather than the centrifuge?

(i) 0.6 (ii) 0.8 (iii) 0.7 (iv) 0.75

10. The release of proteins during cell disruption into the extra cellular region may follow a

(i) first order kinetics (ii) second order kinetics (iii) zero order kinetics (iv) random kinetics

11. The release of intracellular protein into the medium of a homogenizer will follow one of the trend (i), (ii), (iii), (iv)



12. Protein denaturation due to increase in temperature follows one of the relationships given below

(i)) $[k]_f = [k]\, e^{-Ed/2RT}$ (ii) $[C] = [C]_o (1 - e^{-t/t})$ (iii) $[k]_f = [k]\, e^{-Ed/RT}$ (iv) $[k]_f = [k] (1- Ed/RT)$