

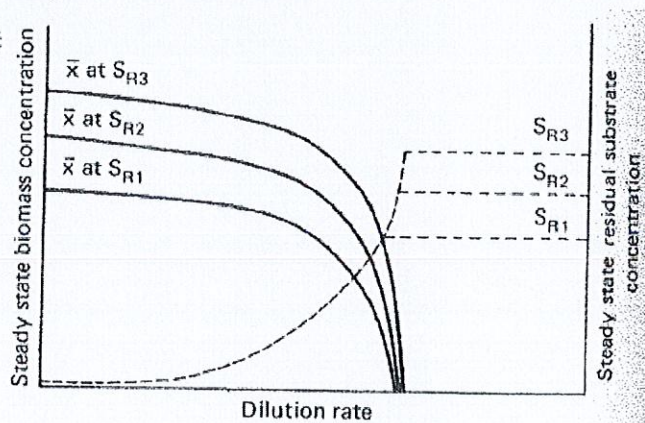
Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

[CO I]

1. Why the preservation of industrially important culture is important? [1]
2. a) How the productivity is different from yield? [1]
b) How the presence of fast metabolized sugar in fermentation medium affects the productivity of secondary metabolites? [1]

[CO II]

3. If an *E. coli* culture grows with a specific growth rate 0.45 h^{-1} , what will be the doubling time of the culture? [1]
4. *E. coli* is cultivated in continuous culture under aerobic conditions with glucose limitation. When the system is operated at $D = 0.2 \text{ hr}^{-1}$, determine the effluent glucose and biomass concentrations assuming Monod kinetics ($S_0 = 5 \text{ g/l}$, $\mu_m = 0.25 \text{ hr}^{-1}$, $K_S = 0.01 \text{ g/L}$, $Y_{x/s} = 0.4 \text{ g/g}$). [2]
5. Differentiate between following: [3]
 - a) Growth Associated and Non-Growth Associated Products
 - b) Chemostat and Fed Batch Culture
6. What is the significance of the following graph? Explain if S_R is the Initial Substrate concentration and \bar{x} is the biomass concentration at steady state. [2]



7. Why strain improvement is important? Explain the strain modification strategies for a protein production of which synthesis is regulated by an enzyme which is allosterically inhibited by its own final protein product (desired) in higher concentration. [2+2]