

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2015 – 2016)

SUBJECT CODE: 15BY/PC/EB34

M. Sc. DEGREE EXAMINATION - NOVEMBER 2016
BIOTECHNOLOGY
THIRD SEMESTER

COURSE : CORE
PAPER : ENZYME AND BIOPROCESS TECHNOLOGY
TIME : 3 HOURS **MAX. MARKS: 100**

SECTION – A

ANSWER ALL QUESTIONS. (20 x 1 = 20)
CHOOSE THE CORRECT ANSWER:

1. ----- lowers the activation energy of a reaction.
2. Define active site of an enzyme.
3. In the induced fit model, the shape of the enzyme----- when the substrate binds.
4. How to find out the parameters of M-M equation (any one method)?
5. Define Specific activity of the enzyme.
6. Define turn over number.
7. Write any one advantage of immobilization?
8. Define undefined media with examples.
9. Define Del factor in sterilization.
10. How to sterilize the heat sensitive media components?
11. Shorter sterilization time means less thermal degradation of medium. (True/False)
12. Spargers are used for mixing the components in the fermenter. (True/False)
13. What is monod kinetics?
14. Define the condition, wash-out of cells in a chemostat.
15. Define yield co-efficient.
16. What are the functions of a baffle in a fermenter?
17. What is solid state fermentation?
18. What is log P value in extraction method?
19. Bioconversion techniques are used for -----.
20. Define Lyophilization.

SECTION – B**ANSWER ANY FOUR QUESTIONS:****(4 x 10 = 40)**

21. Explain the various principles of catalysis in Enzyme Catalysed Reactions?
22. Eadie measured the initial reaction rate of hydrolysis of acetylcholine (substrate) by dog serum (source of enzyme) in the absence & presence of prostigmine (inhibitor), 1.5×10^{-7} mol/L and obtained the following data.

Substrate Concn.(mol/L)	Initial Reaction Rate(mol/L.min)	
	Absence of Prostigmine	Presence of Prostigmine
0.0032	0.111	0.059
0.0049	0.148	0.071
0.0062	0.143	0.091
0.0080	0.166	0.111
0.0095	0.200	0.125

- a) Determine the type of Inhibition.
- b) Evaluate the M-M kinetic parameters in the presence of inhibitor.
23. Describe the methods involved in Immobilisation of enzymes.
24. Write short notes on: a) Carbon sources b) Metabolic regulators in media formulation c) Media optimization (2+ 4+4)
25. Explain the types of bioreactors without mechanical agitation with a neat diagram.
26. Write the significance of $K_L a$ and the major resistances involved in the transfer of oxygen molecule from a bubble to the cell.
27. Write the principle of various separation methods in downstream processing.

SECTION – C**ANSWER ANY TWO QUESTIONS:****(2 x 20 = 40)**

28. Derive the equation for M-M kinetics and solve for all the three reversible inhibitions of an enzymecatalysed reaction with the suitable graphs.
29. Describe microbial growth curve with importance of each phase of growth and explain. How would you estimate specific growth rate for batch culture? Write in detail about the environmental factors enhances cell growth?
30. Describe in adequate detail, with a neat process flow chart, the sterilization methods used to sterilize the fermentation liquid media and air.
31. Describe the various cell disruption methods in downstream processing to get the intracellular products and explain the principle of chromatography with an example.
