

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2011 – 12)

SUBJECT CODE: 11BY/PC/BE34

M. Sc. DEGREE EXAMINATION, NOVEMBER 2012
BIOTECHNOLOGY
THIRD SEMESTER

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

SECTION – A

ANSWER ALL QUESTIONS. **(20 x 1 = 20)**

1. Doubling time refers to the time period required for:
 - a. Doubling in cell numbers
 - b. Weight of the biomass
 - c. Growth in size
 - d. Increase in enzyme production
2. Log Phase is the :
 - a. Most active growth of microbes
 - b. Transient period during which cells start growing slowly
 - c. Initial brief period of culturing
 - d. None of the above
3. Reverse osmosis is a phenomenon where
 - a. Solute is retained on the pressurized side of the membrane and the pure solvent is allowed to pass to the other side
 - b. The solvent naturally moves from an area of low solute concentration (High Water Potential), through a membrane, to an area of high solute concentration (Low Water Potential).
 - c. The solvent naturally moves from an area of high solute concentration (Low Water Potential), through a membrane, to an area of low solute concentration (High Water Potential).
 - d. Neither solute nor solvent moves and remains stationary.
4. Rheological properties are related to
 - a. Elasticity
 - b. Immobilization
 - c. Viscoelasticity
 - d. None of the above
5. In Fed-batch fermentation
 - a. Substrate is added in increments at different times
 - b. Substrate is not added in increments
 - c. A portion of the substrate is removed from the bioreactor and replaced by fresh medium
 - d. None of the above

6. Downstream processing refers to
 - a. The removal of products from fermentor
 - b. The recovery and purification of biosynthetic products from natural sources
 - c. Decreasing the products
 - d. All of the above
7. Centrifugation is the process of
 - a. The use of the gravitational force
 - b. The use of the centrifugal force
 - c. The use of the centripetal force
 - d. None of the above
8. Artificial enzyme is
 - a. Synthetic, organic molecule, prepared to recreate an active site of an enzyme
 - b. Synthetic, inorganic molecule, prepared to recreate the binding site of an enzyme
 - c. Natural, inorganic molecule, prepared to recreate the binding site of an enzyme
 - d. Natural, organic molecule, prepared to recreate the active site of an enzyme
9. Biocatalysts
 - a. Inorganic molecule that accelerates the rate of catabolism
 - b. A substance, usually used in large amounts to decrease the rate of reaction in life forms.
 - c. A substance, especially an enzyme, that initiates or modifies the rate of a chemical reaction in a living body
 - d. All of the above
10. Oxygen obviously needs to be transported in aerobic cultivations:
 - a. For direct energetic reasons
 - b. To maintain desired metabolism and avoid fermentation
 - c. To avoid induction of undesirable enzymes
 - d. All of the above
11. A coenzyme or metal ion that is very tightly or even covalently bound to the enzyme is called?
 - a. Holoenzyme
 - b. Prosthetic group
 - c. Apoenzyme
 - d. None of these
12. What is V_{max} ?
 - a. Maximum rate of reaction
 - b. Rate of reaction increase with increase in enzyme concentration
 - c. Both a and b
 - d. None of the above
13. The state which occurs after pre-steady state is called?
 - a. Pro-steady state
 - b. Late pre steady state
 - c. Post steady state
 - d. Steady state

14. A molecular sieve is a material containing tiny pores of a precise and uniform size that is used
- As an adsorbent for gases and liquids
 - As an absorbent for gases and liquids
 - As an adsorbent for solids and liquids
 - As an absorbent for solids and liquids
15. Microbiosensors are based on
- Ions effect
 - Ionsensitive field effect transistor
 - Piezoelectric effect
 - Magnetic effect
16. What are the physical and thermodynamic factors which are responsible for lowering of activation energy?
- Reduction in entropy
 - Increase in entropy
 - Lowers binding energy
 - None of these
17. Which energy is mainly responsible for lowering activation energy?
- Activation energy
 - Transition energy
 - Binding energy
 - None of the above
18. What is the relationship between constant and activation energy?
- No relationship
 - Directly proportional
 - Inversely proportional
 - Can't be determined
19. What is the characteristic of rate limiting step?
- Determines the reaction equilibrium
 - Inhibits reaction
 - Determines the rate of reaction
 - Both a and c
20. The molecule that is bound and acted upon by the enzyme is called?
- Biomolecule
 - Substancee
 - Reactant
 - Substrate

SECTION – B**ANSWER ANY FOUR QUESTIONS, EACH WITHIN 600 WORDS. (4 x 10 = 40)**

21. Explain the applications of computers in fermentation technology
22. What is Solid state fermentation? Add a note on aerobic and anaerobic systems.
23. Explain the merits and demerits of immobilized enzyme systems
24. Explain the physical, chemical and enzymatic method of cell disruption
25. Explain how enzymes are used for diagnostic applications
26. Explain Thermal Death kinetics.

SECTION – C**ANSWER ANY TWO QUESTIONS, EACH WITHIN 1500 WORDS. (2 x 20 = 40)**

27. What are bioreactors? Explain any two types of bioreactors in detail.
28. Explain the different techniques employed for immobilization of enzymes.
29. Briefly explain the isolation and purification of biological products using Chromatographic techniques
30. Explain the following:
 - a. Pre steady state and relaxation kinetics
 - b. King and Altman procedure.
