



**GAE-430**

Seat No. \_\_\_\_\_

**B. Sc. (Sem. III) Examination**

November/December - 2015

**CC-301 : Biotechnology : Paper - III  
(Basic Aspects of Cellular Metabolism-I)**

Time : 3 Hours]

[Total Marks : 70

- 1 MCQ AND FILLING THE BLANKS : 15
- 1) The maximum number of substrate molecules that one enzyme molecule can act on in a given unit time is the
    - A) Turnover number.
    - B) Equilibrium constant.
    - C) Catalytic multiplier.
    - D) Rate constant.
  - 2) The enzymes of TCA cycle are found in
    - A) Mitochondria
    - B) Cytosol
    - C) Golgi apparatus
    - D) Nucleus
  - 3) Noncompetitive inhibition can be overcome by
    - A) Increasing the concentration of substrate.
    - B) Decreasing the concentration of inhibitor.
    - C) Decreasing the concentration of products.
    - D) Decreasing the concentration of substrate.

- 4) If a covalent bond forms between an enzyme and an inhibitor the reaction catalyzed by this enzyme will have undergone\_\_\_\_\_.
- A) Genetic control  
B) noncompetitive inhibition  
C) competitive inhibition  
D) irreversible inhibition
- 5) When substrate molecules occupy all of the active sites in the enzyme available for a particular reaction, the enzyme is said to be
- A) activated.                      B) inhibited.  
C) saturated.                      D) denatured.
- 6) The theory of enzyme mechanism that suggests a flexible molecule whose shape is altered by the reaction conditions is the \_\_\_\_\_ model.
- A) lock-and-key  
B) induced-fit  
C) substrate specific  
D) active site
- 7) Transaminase can be classified as a(an) \_\_\_\_\_ because its function is moving an amine group from one molecule to another.
- A) ligase                              B) oxidoreductase  
C) isomerase                      D) transferase
- 8) The tertiary structure of most enzymes is
- A)  $\beta$ -pleated sheet.  
B) globular.  
C) an  $\alpha$ -helix.  
D) fibrous.
- 9) The most important goal of glucose metabolism is
- A) Production of ATP as an energy source for all cells.  
B) production of acetyl-S-CoA for synthesis of lipids.  
C) Synthesis of glycogen for later use.  
D) synthesis of oxidized coenzymes.

- 10) When a cell's need for NADPH or ribose-6-phosphate exceeds its need for ATP, glucose-6-phosphate is metabolized by
- A) glycogenesis.
  - B) glycolysis.
  - C) the pentose phosphate pathway
  - D) gluconeogenesis.
- 11) When energy is needed and adequate oxygen is available, pyruvate is converted to \_\_\_\_\_.
- A) glucose
  - B) ethanol
  - C) lactate
  - D) acetyl-SCoA
- 12) In the first step of glycolysis, the conversion of glucose to glucose 6-phosphate is known as
- A) phosphorylation.
  - B) isomerization.
  - C) dehydration.
  - D) reduction
- 13) In a normal biochemical system, the rate of a specific reaction is determined by
- A) Enzyme efficiency and substrate concentration.
  - B) pH and temperature
  - C) temperature and substrate concentration
  - D) pH and enzyme efficiency
  - E) temperature and enzyme efficiency.
- 14) When a molecule other than the correct substrate interacts with some part of an enzyme to alter the shape of the active site, the process is called
- A) irreversible inhibition.
  - B) covalent modification.
  - C) activation.
  - D) noncompetitive inhibition
  - E) competitive inhibition

- 15) In the pentose phosphate pathway, the major products are which of the followings ?
- A) Ribulose and ATP
  - B) Ribulose and NADPH
  - C) Ribose and NADH
  - D) Ribose and  $\text{NAD}^+$

2 ANSWERS THE FOLLOWING. (ANY five) : 15

- 1) Define Enthalpy, Free energy and Entropy
- 2) Write a Full name ATP, NAD and FAD
- 3) Define Holoenzyme, Apoenzyme and coenzyme
- 4) Draw the pathway of anaerobic fermentation of glucose
- 5) Define  $K_m$  and  $V_{max}$ ?
- 6) Endergonic and Exergonic reaction
- 7) Explain Thermodynamics first law with significance.

3 ANSWER THE FOLLOWING. (ANY FOUR) : 20

- 1) Explain Gluconeogenesis pathway in the cell
- 2) Explain transition state theory with enzyme work mechanism
- 3) Explain Allosteric Enzyme
- 4) Explain anaerobic metabolism of glucose in the cell?
- 5) Write a note inhibition of enzyme
- 6) Explain ATP as energy currency.

4 ANSWER THE FOLLOWING. (ANY Two) 20

- 1) Write a note on Enzyme nomenclature and classification
- 2) Write a note on of central metabolic pathway
- 3) Explain M.M equation. with its significance
- 4) Write a Note on TCA cycle.