

2015

**CHEMISTRY**

Paper : 104 (Old Course)

**BIOCHEMISTRY**

Full Marks : 80

Time : 3 hours

*The figures in the margin indicates full marks for the questions*

1. Answer the following questions
- (a) Glycolysis is an anaerobic/aerobic pathway.  
*(Choose the correct answer)* 1
  - (b) Distinguish between catabolism and anabolism. 2
  - (a) Distinguish between Prokaryotic and an Eukaryotic cell. 3
  - (b) Write a short note on Lipids 3
  - (c) Explain Kreb's cycle with a schematic pathway. 6

Or

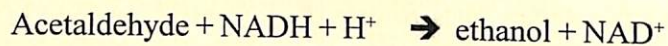
Write the schematic pathway of glycolysis.

2. Answer the following questions
- (a) How many ATP molecules are produced in pyruvate oxidation process? 1
  - (b) Distinguish between the followings 4+4

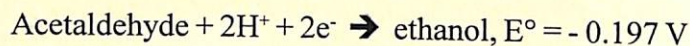
( 1 )

**P.T.O.**

- (i) Tertiary structure of protein
- (ii) Flory-Huggins theory of polymer solution
- (c) "A spontaneous reaction may drive a non-spontaneous reaction". Explain with example. 4
- (d) What is Creatine kinase? 1
- (e) Give two examples of "free energy currency" molecule those are characterized with very high negative standard free energy ( $\Delta G^\circ < -40 \text{ KJmol}^{-1}$ ). 2
- (f) Consider the follow redox reaction 4



The half reactions are:



What would the free energy change if  $[\text{Acetaldehyde}] = 0.1\text{M}$ ,  
 $[\text{NADH}] = 0.1\text{M}$ ,  $[\text{ethanol}] = 0.01 \text{ M}$  and  
 $[\text{NAD}^+] = 0.01 \text{ M}$ ?

3. Answer the following questions
- (a) What is the name of pentose sugar present in RNA molecule? 1
  - (b) Write notes on nucleoside and nucleotide? 3
  - (c) What are the functions of DNA molecule? 2
  - (d) Name the main classes of enzymes and the reactions they catalyse. 3
  - (e) Name two inhibitors which form covalent linkages with the functional group present in enzyme. 1

- (f) What are the factors those affect the enzyme activity? 3
- (g) What is coenzyme? Give two example of coenzyme those involved in biological redox reactions. 2
- (h) Briefly discuss the double helix structure of DNA. 5

Or

Write briefly about replication of DNA molecule.

4. Answer the following questions
- (a) Write two reactions catalysed by vitamin B<sub>12</sub>. 2
  - (b) Write short note on use of gold compounds as drugs. 4
  - (c) Why is cis-platin effective against tumor but not trans-platin? 5
  - (d) What is the active centre of the cytochromes? Draw the active centre of cytochrome c. 1+3
  - (e) Draw the structure of rubredoxin and two common forms of ferredoxin. 5
  - (f) Mention the role of the following metals in biology. 5  
 Cu, Mn, Mo, V, Zn

\_\_\_\_\_ × \_\_\_\_\_