

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF MEDICINE

MEDICAL SCHOOL

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY DEGREE
PART I EXAMINATIONS

(MCM 1101) : BIOMOLECULES & CELL BIOLOGY

DATE : DECEMBER 2005

TIME : 3 HOURS

Instructions to Candidates

Answer **all** questions

SECTION A

1. With the aid of diagrams give a detailed account of the buffering capacity of blood. (20)
 2. Explain the fluid mosaic model of the plasma membrane. In your explanation give details of the major components of the membrane, its asymmetry, its functions as well as the modulation of its fluidity. (20)
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SECTION B

1. Explain the following terms:
 - a) solvation effect of water (3)
 - b) isoelectric point of a protein (3)
 - c) mutarotation (3)
 - d) hyperchromic effect of DNA (2)
 - e) derived lipids (2)
2. Name the basic functions of triacylglycerols in animals. (2)

3. In addition to structural rigidity, what are the other cellular functions of glycolipids? (2)
4. Explain how histones contribute to the stabilization of DNA structure. (4)
5. Explain the chemical reactions of the catalytic residues in the active sites of enzymes. (8)
6. With the aid of a diagram, illustrate pure non-competitive inhibition. (3)
7. Identify the major roles of the following cell organelles:
 - a) peroxisomes (2)
 - b) the rough endoplasmic reticulum (2)
 - c) mitochondria (2)
8. Identify the major roles of glycolysis. (2)
9. Describe the characteristics of the following major stages of metabolism:
 - a) stage 1 (2)
 - b) stage II (3)
 - c) stage III (3)
10. What is the biochemical explanation of muscle fatigue? (5)
11. Draw an annotated diagram that depicts the cell cycle. (7)

END OF EXAMINATION