

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**FACULTY OF MEDICINE****DIVISION OF BASIC MEDICAL SCIENCES****BACHELOR OF MEDICINE AND BACHELOR OF SURGERY DEGREE****PART I FINAL EXAMINATIONS**

MBM 1102 : BIOCHEMISTRY PAPER II

DATE : JANUARY 2013

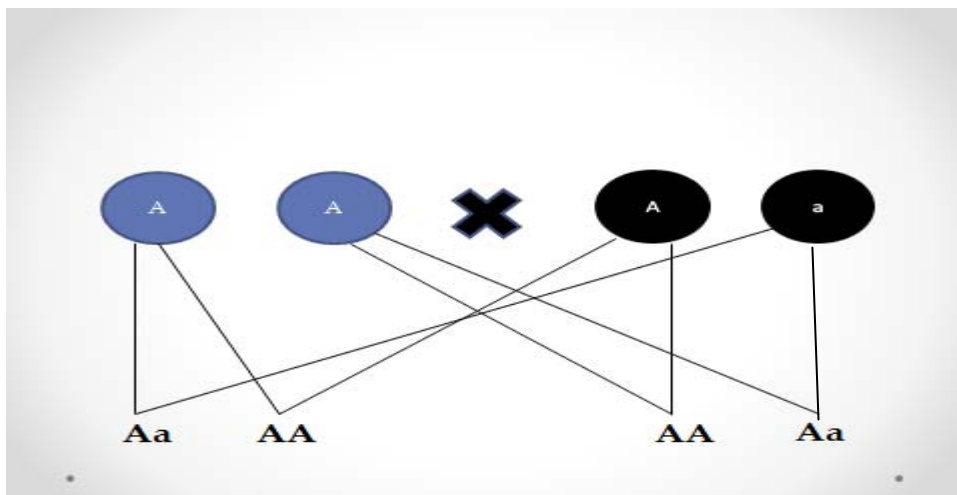
TIME : 3 HOURS

Instructions to Candidates

Answer **all** questions

1. Briefly, describe the intracellular transport mechanisms within a eukaryotic cell. (6)
2. Clearly outline the role of gap junctions in the cell to cell communication mechanisms. (4)
3. Define the different forms of energy expenditure in the human body. (4)
4. Give a brief account of protein digestion within the duodenum and within the small intestines. (5)
5. Briefly, explain the biochemical functions of the following:
 - a. folic acid
 - b. pantothenic acid and
 - c. boron. (6)
6. The standard free energy change of many glycolytic reactions is positive, indicating that these reactions are not spontaneous. Why is it that glycolysis can proceed nevertheless. (4)
7. State **two** (2) signs of hyperammonemia and indicate the prognosis of this disorder if medical interventions are not made. (5)
8. Identify the metabolic roles of glycolysis. (3)

9. Giving **one** (1) example, explain what anaplerotic reactions are. (5)
10. "It is not possible to produce glucose from fatty acids". Comment. (4)
11. Briefly, elucidate the biochemical basis of diabetic ketoacidosis. (5)
12. State the solvent and ionizing properties of water as they are involved in biochemistry. Show how these properties affect other molecules in an aqueous environment. (4)
13. With the aid of diagram, explain the effect of varying the substrate concentration in enzyme kinetics. (4)
14. Describe the process involved in each of the following mechanisms of enzyme inhibition:
 a. competitive inhibition
 b. non competitive inhibition and
 c. irreversible inhibition. (6)
15. a. State the **three** (3) ways in which molecules may cross the cell membranes. (3)
- b. Enzymes and the proteins that transport molecules show some similarities in their characteristic modes of action. Giving examples of molecules that require protein transport across membranes, indicate the similarities between enzymes and the transport proteins. (4)
16. Giving examples, identify the properties that the hemoglobin molecule shares with enzymes. (6)
17. Which law of Mendel is expressed in this pictorial example? Justify your answer. (5)



18. What would you advise to a couple who are both heterozygous HbAS? (5)
19. List the **three** (3) methods for the prenatal diagnosis of congenital malformations.
When, during pregnancy, can these tests be done? (6)
20. Explain the human karyotype. (3)
21. State **three** (3) medical implications of the human genome project. (3)

END OF EXAMINATION