NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

BACHELOR OF SCIENCE HONOURS DEGREE

THEORY: METABOLIC PROCESSES II SBB 2212

AUGUST 2009
3 HOURS (100 MARKS)

INSTRUCTIONS

Answer Four (4) Questions. Each question carries 25 marks. Where a question contains subdivisions, the mark value for each subdivision is given in brackets. In multiple choice questions, some questions may have more than one correct answer and in such cases, negative marking will apply to incorrect answers. Illustrate your answer where appropriate with large, clearly labelled diagrams.

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1. (a) Describe one inherited disorder of steroid hormone biosynthesis and the effective therapy for this disorder. (10 marks)

   (b) Discuss the physiological roles of cholesterol and outline the condensation reactions resulting in the synthesis of squalene from isopentenyl pyrophosphate. Your answer should include all enzymes and structures of all intermediates. (15 marks)

2. (a) Explain with formulae, the origins, function and biosynthesis of ketone bodies. (18 marks)

   (b) Briefly describe prokaryotic DNA polymerases I, II and III and their roles in DNA replication. (7 marks)

3. (a) With the aid of a diagram, discuss the transport of triacylglycerols and cholesterol by lipoproteins. (20 marks)
   (b) Outline the committed step in the biosynthesis of pyrimidine nucleotides. (5 marks)

4. Give a detailed account of the initiation phase, the elongation phase and termination phase of protein biosynthesis in prokaryotes. Use diagrams to illustrate your answer.

5. (a) Classify amino acids into 6 biosynthetic families and identify their 7 precursors. (10 marks)
   (b) Discuss the feedback regulation of purine biosynthesis. (7 marks)
   (c) Describe the synthesis of asparagines. Your answer should include all enzymes and structures of all intermediates. (8 marks)

6. (a) Discuss the fate of excess nitrogen in living organisms and classify organisms according to their excretable form of nitrogen. (7 marks)

(b) Describe how excess nitrogen is excreted in terrestrial vertebrates. (15 marks)

(c) Discuss the physiological roles of bile salts. (3 marks)

END OF EXAMINATION