NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

SSC2206

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE EXAMINATIONS

DEPARTMENT OF SPORTS SCIENCE AND COACHING

CONVENTIONAL PROGRAMME

THEORY: SSC2206: EXERCISE PHYSIOLOGY AND BIOCHEMISTRY

APRIL 2014

3 HOURS (100 MARKS)

INSTRUCTIONS

Answer 4 questions only. Each question carries 25 marks. Where a question contains subdivisions, the mark value for each subdivision is given in brackets. Illustrate your answer where appropriate with large clearly labeled diagrams.

1. a) Summarise the roles of carbohydrate in the body **(10 marks**

   b) Outline the dynamics of carbohydrate metabolism during physical activities of various intensities. **(15marks)**

2. a) Outline the time course for oxygen consumption during 10 minutes of moderate intensity exercise. **(8marks**

   b) Discuss the differences in recovery oxygen consumption patterns from moderate to exhaustive exercise. **(12marks)**

   c) What factors account for the excess post exercise oxygen consumption from each form of exercise from (b) above? **(5 marks)**

3. a) Distinguish between steady state and non steady state exercise **(5 marks)**

   b) Outline optimal recovery procedures from steady-rate and non-steady-rate exercise **(8marks)**

   c) Discuss the blood lactate threshold and indicate differences between sedentary and endurance trained individuals. **(12marks)**

4. The measurement of the body's rate of heat production gives direct assessment of metabolic rate. The metabolic rate can also be estimated indirectly.

a) Define direct calorimetry, indirect calorimetry, closed circuit spirometry and open circuit spirometry. **(5 marks)**

b) Define respiratory quotient and discuss its use to quantify energy release in metabolism and the composition of the food mixture metabolised during rest and steady –rate exrcise**.** **(12marks)**

c) Discuss the difference between respiratory quotient and respiratory exchange ratio and factors that affect each. **(8marks)**

5. a) What are the differences between gross energy expenditure and gross energy expenditure. **(4 marks)**
   b) Graph the relationship between running velocity and energy expenditure**.** **(4 marks)**

c) Describe the advantages and disadvantages of ankle and handled weights to increase energy expenditure during walking and running. **(10 marks)**

d) Discuss the influence of body mass, exercise surface, and footwear on energy expenditure during walking and running. **(7marks)**

6. a) What is stroke volume? **(1 mark)**

   b) Discuss two physiological mechanisms that influence exercise stroke volume **(5marks)**

   c) Contrast the components of cardiac output during rest and maximal exercise for sedentary and endurance-trained athletes. **(8marks)**

   d) Outline cardiac output distribution to major body tissues during rest and intense aerobic exercise. **(6marks)**

   e) Outline factors that contribute to expanding the arterio-venous oxygen difference during graded exercise. **(5marks)**

END OF EXAMINATION