NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

SSC2206

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE EXAMINATIONS

DEPARTMENT OF SPORTS SCIENCE AND COACHING

THEORY: SSC2206: EXERCISE PHYSIOLOGY AND BIOCHEMISTRY

MAY 2006

3 HOURS (100 MARKS)

INSTRUCTIONS

Answer any four 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.

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1. a) Discuss the dynamics of carbohydrate balance in exercise. (13 marks)

   b) How is adenosine triphosphate (ATP) made available to the working muscles during:
   (i) Performances of short duration and high intensity. (4 marks)
   (ii) Strenous exercises beyond a brief moment. (4 marks)
   (iii) Vigorous exercises proceeding beyond several minutes duration. (4 marks)

2. a) Why do athletes experience Excess Post-Exercise Oxygen Consumption (EPOC).?(12 marks)
   b) Explain the factors related to lactate levels rising above resting levels during exercise? (4 marks)
   c) Schematically show blood lactate concentration for trained and untrained subjects at different levels of exercise expressed as a percentage of maximal oxygen consumption (VO_{2max}) (9 marks)

3. a) How do the sympathetic and parasympathetic components of the autonomic nervous system regulate the heart and circulation? (10 marks)
   b) Discuss the changes in cardiac output during exercise and how they are brought about. (6 marks)
   c) Write short notes on the following;
   (i) Minute ventilation during rest and exercise. (4 marks)
   (ii) Alveolar ventilation (5 marks)

4. a) How are the physiologic and metabolic adaptive responses that improve an athlete's tolerance to altitude hypoxia achieved in the body? (9 marks)

   b) In what ways is thermoregulation achieved during heat stress? (8 marks)
   c) A half marathon athlete undergoes an endurance training programming lasting twenty weeks. Explain adaptations which her muscles are likely to undergo in response to the training. (9 marks)

5. a) Discuss the consequences to an endurance athlete who fails to heed the normal signs of heat stress. (6 marks)

b) How is information concerning muscular dynamics and limb movement during exercise relayed to conscious and subconscious portions of the central nervous system. (10 marks)

c) Using specific examples show how endocrine glands are controlled by:

(i) Hormonal stimulation (3 marks)

(ii) Humoral stimulation (3 marks)

(iii) Neural stimulation (3 marks)

6. a) What do you understand by the term ergorgenic aids. (1 marks)

b) Discuss the following ergogenic aids with specific reference to their proven effects and risks of use.

(i) Amphetamaines (6 marks)

(ii) Beta blockers (6 marks)

(iii) Androgenic-anabolic steroids (6 marks)

(iv) Erythropoietin (6 marks)

END OF EXAMINATION QUESTION PAPER