



**AMREF INTERNATIONAL UNIVERSITY**  
**SCHOOL OF MEDICAL SCIENCES**  
**DEPARTMENT OF REHABILITATIVE MEDICINE**  
**BACHELOR OF SCIENCE IN PHYSIOTHERAPY**  
**END OF MAY-AUGUST 2023 SEMESTER EXAMINATIONS**

**UNIT CODE: PHT 215**

**UNIT NAME: EXERCISE PHYSIOLOGY**

**DATE: TUESDAY 8<sup>TH</sup> AUGUST 2023**

**TIME: TWO HOURS**

**START: 9:00 AM STOP: 11:00AM**

**INSTRUCTIONS**

- 1. Attempt all questions as per the instructions in each section**
- 2. This exam is marked out of 70 marks**
- 3. This Examination comprises of Sections A, B and C**

## Section 1 (20 marks)

This section is comprised of 20 multiple choice questions.

1. An athlete runs 800 m in exactly two minutes. Which of the following is true?
  - a) Approximately 75% of the energy would have come from the oxidation of muscle glycogen
  - b) Approximately 75% of the energy would have come from anaerobic pathways.
  - c) Approximately 50% of the energy would have come from oxidative pathways and 50% from anaerobic pathways.
  - d) None of the above
2. All of the following takes place in the mitochondria except:
  - a) Glycolysis.
  - b) Krebs cycle.
  - c) ETC.
  - d) All of the above takes in the mitochondria.
3. Which of the following terms describes a type of contraction in which the muscle builds tension but does not shorten?
  - a) twitch
  - b) isometric contraction
  - c) recruitment
  - d) isotonic contraction
4. Exercise induced asthma (EIA) also called exercise induced bronchoconstriction usually PEAKS when?
  - a) First few minutes
  - b) About 15 minutes into exercises
  - c) About 5 to 10 minutes after exercise
  - d) 30 minutes after exercise
5. The major physiological difference between Asthma and exercise induced asthma
  - a) There is no inflammation with asthma
  - b) There is no inflammation with EIA
  - c) EIA is a genetic type of asthma
  - d) None of the above

6. In comparison to the ATP-PCr system, glycolysis results in the resynthesis of approximately how many ATP per glucose molecule?

- a) The same
- b) About 2 more yield of ATP
- c) About 2 less yield of ATP
- d) Glycolysis does not directly result in the resynthesis of any ATP

7. Which type of muscle fibre generates the greatest force production?

- a) Type 1
- b) Type IIa
- c) Type IIx
- d) None, they all reach the same peak power at approximately 20% of their peak force

8. In a sport such as soccer or rugby, the energy required to restore muscle PCr stores following a short intense sprint is derived from

- a). The high-energy phosphate system
- b). Anaerobic glycolysis
- c). The oxidation of muscle glycogen
- d). All of the above

9. The continued actin and myosin binding is called

- a) Tetanus
- b) Contraction cycling
- c) Summation
- d) Acto-myosin straining

10. Enzyme that catalyzes the hydrolysis of ATP to ADP, Pi and energy

- a) Creatine kinase
- b) ATPase
- c) Myokinase
- d) Hexokinase

11. The muscle spindle is specifically sensitive

- a) Static changes in contractility
- b) Stretch and speed of stretch
- c) Both A and B
- d) None of the above

12. What is a rate-limiting or allosteric enzyme?

- a) AMP
- b) A modulator such as phosphate
- c) An enzyme that can speed up or slow down reactions in a metabolic pathway
- d) None of the above

13. What is insulin's main function?

- a) promote gluconeogenesis
- b) reduce amount of glucose circulating in the blood
- c) Inhibit glycogenesis
- d) Increase the amount of glucose circulating in the blood

14. An athlete with a maximal exercise heart rate of 195 beats per minute (bpm) and a resting heart rate of 65 bpm wishes to train at 80% of VO<sub>2</sub> max. Her target heart rate would be

\_\_\_\_ bpm.

- a) 127
- b) 142
- c) 156
- d) 169

15. Which of the following is not a way of measuring body composition?

- a) Skinfold measurement
- b) Bioelectrical impedance
- c) Waist circumference
- d) Knee height calliper

16. Describe body composition

- a) The relative proportions of protein, fat, water, and mineral components in the body that make up total body weight
- b) The relative proportions of protein, fat, water (excluding skin and bone) in the body that make up total body weight
- c) The relative proportions of protein, fat (excluding skin and bone and water) in the body that make up total body weight
- d) The relative proportions of water, and mineral components in the body that make up total body weight

17. A heat-acclimatized athlete and an untrained subject are exercising in the same room and at the same absolute power output. Which of the following is true?

- a) To help prevent dehydration, the athlete allows her core temperature to increase to a greater extent than the untrained subject before she begins sweating.
- b) Skin blood flow will increase earlier in the untrained subject than in the athlete.
- c) Sweating and increased skin blood flow will occur earlier in the athlete than in the untrained subject.
- d) None of the above

18. What would be the cardiac output of a person having 72 heart beats per minute and a stroke volume of 50 mL?

- a) 4.6 L/min
- b) 3.6 mL/min
- c) 4.6mL/min
- d) 3.6L/min

19. The ejection fraction

- a) Is a function of cardiac output, divided by the end diastolic volume
- b) Is decreased by exercise and athlete's heart
- c) Will approach 90% in a diseased heart, due to leakage of blood back into atria
- d) Depends on both the pre-contractile filling of the ventricles and strength of ventricular contractility.

20. What is fat free mass and what does it consist of?

- a) Body mass that only takes fat mass into consideration
- b) Body mass that consists of free fatty acids
- c) Body mass that does not take fat mass into consideration (contains water, protein, bone minerals)
- d) Body mass only considering the fat surrounding the abdominal region

## **SECTION B: Structured Answer questions (20 Marks)**

1. State the Starling's law of the heart (1 mark)
2. a) Define total energy expenditure (2 marks)  
  
b) List 4 lab techniques of measuring Total Energy Expenditure (4 marks)
3. Define lactate threshold also referred to as anaerobic threshold (2 marks)
4. Give 2 physiological factors that affect  $\text{VO}_2$  max (2 marks)
5. List the 3 major ways by which an individual can burn calories in their bodies during the day (3 marks)
6. Outline 3 factors that influence the type of energy system utilised by the body for the production of energy (3 marks)
7. List 3 signs and symptoms of Delay Onset Muscle Soreness (DOMS) (3 marks)

## **Section C (30 Marks)**

**This section has three questions, with each having 15 marks. Please choose and attempt 2 of these questions.**

- 24) Diabetes is a chronic lifestyle disease that affects people of all ages
- a) Briefly explain what this condition entails (5 marks)
  - b) Differentiate between the two main types of diabetes (4 marks)
  - c) Propose 2 actions that can be used to improve the health of a person with one of the types of diabetes mentioned in (b) (6 marks)
- 25) Discuss five physiological adaptations that are realised in the cardiovascular system due to prolonged exposure to aerobic training (15 marks)
- 26) Six theories have been proposed to explain the Delayed Onset of Muscle Soreness (DOMS). List those six theories and explain exhaustively 2 of those theories (15 marks)

**THE END**