



**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

THIRD YEAR, TRIMESTER II EXAMINATIONS

FOR THE DEGREE

OF

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

COURSE CODE: BSP 315

COURSE TITLE: EXERCISE PHYSIOLOGY

DATE: THURSDAY 21ST April 2022

TIME: 8:00-11.00 AM

INSTRUCTIONS TO CANDIDATES

Answer all Questions

Sec A: Multiple Choice Questions

(MCQ) 20 Marks

Sec B: Short Answer Questions

(SAQ) (40 marks)

Sec C: Long Answer Questions

(LAQ) (40 marks)

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

SECTION A: MULTIPLE CHOICE QUESTIONS

(20 Marks)

- The rate at which Ca^{2+} is sequestered by the sarcoplasmic reticulum of skeletal muscle during a twitch is directly related to:
 - The rate of tension development
 - The height of the action potential
 - The rate of ATP hydrolysis by myosin
 - The rate of relaxation
- Which of the following characteristics of skeletal muscles make tetanic contraction possible?
 - The motor neurons to skeletal muscles have a short refractory period and are therefore capable of delivering a high frequency of stimuli to a muscle fibre
 - The cell membrane of the skeletal muscle fibre recovers its excitability well before the cell ceases its contraction
 - Both (a) and (b) are correct
 - The prolonged exposure of the muscle endplate to high concentrations of acetylcholine throughout the tetanus
- If the permeability of a resting skeletal muscle cell to K^{+} is increased while the permeability of the cell to Na^{+} stays constant, then:
 - The transmembrane potential would decrease.
 - The cell would become more excitable.
 - The cell would become more excitable because of a decrease in the transmembrane potential.
 - The transmembrane potential would increase.
- Contractile response in skeletal muscle
 - Does not require action potential
 - Starts before action potential
 - Starts after action potential is over
 - Lasts longer than action potential
- As compared to slow twitch muscle fibres, fast twitch fibres have more:
 - Mitochondria
 - Myoglobin
 - Enzymes of the phosphogen -- lactic acid system
 - Capillary density
- Fatigue in muscle is due to the following factors EXCEPT
 - Exhaustion of ATP
 - Accumulation of metabolic wastes
 - Exhaustion of neurotransmitter
 - Excessive release of neurotransmitter
- During the process of excitation-contraction coupling in skeletal muscle, calcium is released from the sarcoplasmic reticulum by
 - Inositol triphosphate (IP_3)
 - Protein Kinase A
 - An increase in intracellular calcium concentration
 - Membrane depolarization
 - An increase in intracellular sodium concentration

8. Which of the following words or phrases is most closely associated with an end-plate potential at the neuromuscular junction?
- “All – or – none response”
 - Depolarization
 - Hyperpolarization
 - Action potential
 - Electrically excitable gates
9. In a nerve, the magnitude of the action potential overshoot is normally a function of the
- Magnitude of the stimulus
 - intracellular potassium concentration
 - Extracellular sodium concentration
 - Resting membrane potential
 - Diameter of the axon
10. During skeletal muscle contraction there is a change in width of
- A band
 - M band
 - I band
 - H band
11. If Fred is 20 years old and has a resting heart rate of 60 beats per minute, then his expected age-related maximal heart rate is:
- 200 beats per minute
 - 180 beats per minute
 - 160 beats per minute
 - 140 beats per minute
12. Which of the following is a cardiovascular or aerobic activity?
- Softball
 - Weightlifting
 - Sprinting (100 meters)
 - Jogging
13. The recommended number of pounds lost per week for safe weight reduction should not exceed:
- 0-1 pounds.
 - 1-2 pounds.
 - 2-3 pounds.
 - 3-4 pounds.
14. The training heart rate is directly related to:
- Exercise frequency.
 - Exercise mode.
 - Exercise intensity.
 - Exercise time.
15. Saturated fats are derived primarily from:
- Vegetable oils.
 - Corn oil.
 - Soybean oil.
 - Dairy products, hydrogenated oils and meat products.
16. Blood pressure is:
- The amount of blood pumped out of the heart in one stroke.
 - The amount of blood pumped circulating through the body.
 - The amount of pressure on the heart walls.
 - The amount of pressure exerted by the blood on the inner walls of the arteries.
17. When setting short term goals it is recommended that an individual should:
- Set a goal at least two fitness levels above their current status.

- B. Set a goal one fitness level above their current status.
 - C. Set a goal for one fitness level below their current status.
 - D. Maintain their current fitness level if it is a fair rating.
18. Physiological changes that occur after a 6-month training period are chronic adaptations. One of these training effects or adaptations
- A. Decreased fat utilization.
 - B. Increased resting heart rate.
 - C. Decreased resting heart rate.
 - D. Increased body fat.
19. A training effect or adaptation that one may expect from a 6-month training period is:
- A. Increased resting heart rate.
 - B. Increased blood levels of cholesterol and triglycerides.
 - C. During maximal exercise decreased Oxygen consumption.
 - D. Decreased body fat.
20. A Cardiovascular risk factor is:
- A. Low flexibility.
 - B. High percent body fat.
 - C. Low blood cholesterol levels.
 - D. Low upper body strength.

SECTION B: SHORT ANSWER QUESTIONS

(40 Marks)

1. Describe the electron transport system and how ATP is produced
2. Exercise physiology and health care are often interrelated. What are the driving forces responsible for the bridge between the two practices in today's health care?
3. Write on the factors that affect haemoglobin-oxygen saturation during exercise.
4. Compare and contrast sex differences in the cardiovascular system.
5. Describe the cardiorespiratory adaptations to exercise training that occurs at rest.
6. Reflect on the possible neural mechanisms for acute muscle fatigue.
7. Explain the major endocrine system adaptations experienced because of chronic exercise training.
8. Provide strategies to help individuals acclimate to hot and cold environments.

SECTION C: LONG ANSWER QUESTIONS

(40 Marks)

1. Reflect on how a person who is lacking in all the health-related components of physical fitness might be affected in his or her daily activities
2. Write how regular physical activity benefits to obese individuals even if it does not result in weight loss