

2025

PHYSIOLOGY OF EXERCISE

Course : MPCC-102

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Describe the structure of a neuromuscular junction. Explain the process of neuromuscular transmission. Write down the energy system used for short duration high intensity exercise. 5+5+5

Or

What is sarcomere? Describe the structure and function of myofilaments with proper diagram. Explain different types of heat generation by muscles during muscular contractions. 3+6+6

2. What is conduction system of the heart? What are the possible effects of aerobic training on cardiovascular system? 6+9

Or

What is cardiac output? Describe the factors affecting cardiac output. How can cardiac output be calculated? What is atherosclerosis? 3+5+4+3

3. Describe the mechanism of breathing. What is pulmonary ventilation? Discuss the effects of exercises on respiratory system. 6+4+5

Or

Write down the effects of hot environment on sports performance. Explain the importance of VO_2 max in sports performance. What is EPOC? 7+5+3

4. Write notes on (*any two*) : $7\frac{1}{2} \times 2$

- (a) Heart Rate
- (b) Aerobic metabolism
- (c) Ergogenic aids
- (d) Process of skeletal muscle contraction.

Please Turn Over

(3814)

5. Answer the following MCQs by choosing the right option given below and writing it on your answer script (*any ten*) :

1×10

- (a) Types of troponin protein found in the skeletal muscles is/are
- (i) 1 (ii) 3
(iii) 4 (iv) 8.
- (b) The main centre of the brain that regulates the respiration rate is located in
- (i) midbrain (ii) hypothalamus
(iii) medulla oblongata (iv) forebrain.
- (c) Hypoxia is a condition where
- (i) the airway becomes partially obstructed
(ii) the blood does not clot properly
(iii) the blood oxygen levels are abnormally low
(iv) the blood carbon dioxide levels are abnormally high.
- (d) Narcotics can significantly affect
- (i) kidneys (ii) artery walls
(iii) brain (iv) stomach.
- (e) Vital capacity is measured in terms of
- (i) Litres (ii) Millimetres
(iii) Millilitres per beat (iv) mmHg.
- (f) Blood corpuscles which are responsible for antibody production are
- (i) Platelets (ii) Leucocytes
(iii) Erythrocytes (iv) Monocytes.
- (g) Which one of the following proteins binds to tropomyosin during muscular contraction?
- (i) Troponin C (ii) Troponin T
(iii) Troponin I (iv) None of these.
- (h) Athlete's heart is associated with
- (i) cardiac hypertrophy (ii) low resting heart rate
(iii) cardiomegaly (iv) All of these.
- (i) The extra amount of air that can be inhaled after a normal breath is called
- (i) vital capacity (ii) inspiratory reserve volume
(iii) inspiratory capacity (iv) functional residual capacity.

- (j) In excitation-contraction coupling phase
- (i) The muscle action potential propagates along the sarcolemma and down the transverse tubules.
 - (ii) Ca^{2+} released from the sarcoplasmic reticulum binds to tropomyosin.
 - (iii) Troponin blocks binding of myosin heads to actin filaments.
 - (iv) Relaxation occurs when Ca^{2+} is excreted from the muscle fibre.
- (k) Acetyl choline receptors are present at
- (i) the presynaptic membrane of neuromuscular junction
 - (ii) the postsynaptic membrane of neuromuscular junction
 - (iii) the nucleus
 - (iv) the myosin protein.
- (l) TCA cycle occurs at
- (i) cell membrane
 - (ii) mitochondria
 - (iii) nucleus
 - (iv) cytoplasm.
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