2023

PHYSIOLOGY OF EXERCISE

Paper : 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. Discuss the functions of myofilaments during muscle contraction. Explain the process of neuro-muscular transmission. What are the possible changes of muscle fibre after a long period of aerobic training? 3+8+4

Or,

Describe the microstructure of a skeletal muscle with a diagram. Discuss the sliding filament theory of muscular contraction. What is action potential? (5+2)+6+2

2. What is coronary circulation? Explain the effects of exercise on blood flow in human body. Describe the conduction system of the heart with a diagram. 4+4+7

Or,

Describe the mechanism of heart rate regulation in different condition. Discuss the effects of exercise and sports training on cardiovascular system. 6+9

3. Describe the mechanism of respiration. Explain different Lung volumes and capacities and mention the effect of exercise on it. What is spirometry? 5+(4+4)+2

Or,

What is EPOC? Discuss the importance of VO_2 max on sports performance. Discuss the effects of exercises on respiratory system. 3+5+7

4. Write short notes from the following (***any two***) : 7½×2

(a) Effect of high altitude on sports performance

(b) Anaerobic metabolism

(c) Doping and sports performance

(d) Measurement of energy cost of an activity.

Please Turn Over

5. Answer the following questions by choosing the correct option from the given alternatives for each question and write it on your answer script (***any ten***) : 1×10

(a) Number of iron atoms in one haemoglobin molecule is

(i) 1 (ii) 3

(iii) 4 (iv) 8.

(b) The main centre of brain that regulates the respiration rate is located in

(i) Midbrain (ii) Hypothalamus

(iii) Medulla oblongata (iv) Forebrain.

(c) Hypopnea is a condition where

(i) the airway becomes partially obstructed.

(ii) the blood does not clot properly.

(iii) the lungs cannot eliminate the excess carbon dioxide from the body.

(iv) the blood oxygen levels are abnormally low.

(d) Blood pressure is the pressure exerted by blood against _____ .

(i) the Kidneys (ii) the Artery walls

(iii) the Brain (iv) the Stomach.

(e) Oxygen is carried by _____ .

(i) Platelets (ii) Leucocytes

(iii) Erythrocytes (iv) Monocytes.

(f) Which one of the following proteins binds to actin during muscular contraction?

(i) Troponin C (ii) Troponin T

(iii) Troponin I (iv) None of these.

(g) Blood pressure is measured in terms of _____ .

(i) mm Hg (ii) mm

(iii) cm Hg (iv) m Hg.

(h) Left Ventricular hypertrophy occurs due to

(i) effects of sports training on respiratory system.

(ii) effects of exercise on respiratory system.

(iii) effects of sports training on cardiovascular system.

(iv) effects of exercise on cardiovascular system.

(i) After a deep inspiration, the maximum expiration of air from the lungs is called

(i) Vital capacity (ii) Total lung capacity

(iii) Inspiratory capacity (iv) Functional residual capacity.

(j) In excitation-contraction coupling

(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) At the neuromuscular junction

(i) the muscle membrane possesses muscarinic receptors.

(ii) there is a one-to-one transmission of excitatory impulses from the motor neurone to the muscle fibres it innervates.

(iii) the motor nerve endings secrete noradrenaline.

(iv) the typical summed end plate potential (EPP) is usually 10 times the potential necessary to trigger an action potential.

(l) Total molecules of ATP are synthesized from ADP via Glycolysis of a Single Molecule of Glucose —

(i) 36 (ii) 38

(iii) 2 (iv) 4.