UNIVERSITY OF BOLTON

SPORT AND BIOLOGICAL SCIENCES

FOUNDATION YEAR SPORT

SEMESTER TWO EXAMINATIONS 2018/2019

INTRODUCTION TO HUMAN PHYSIOLOGY

MODULE NO: SRB3008

Date: Monday 20 May 2019 **Time: 10.00 am – 12.00 noon**

INSTRUCTIONS TO CANDIDATES:

There are 60 questions on this paper. There are 50 questions in section A, 5 questions in section B and 5 questions in section C

Answer all question in sections A and B, and 2 questions from section C.

Write your answers in the answer book provided NOT on the question paper.

The examination carries a total of 100 marks

Electronic calculators may be used provided that data and programme storage memory is cleared prior to the examination.

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

Section A: Answer all questions in this section.

1. Approximately how much energy does one gram of carbohydrate contain?

    a. 9 kcal
    b. 18 kcal
    c. 12 kcal
    d. 4 kcal

(1 mark)

2. The first bioenergetic pathway to become active at the onset of exercise is?

    a. glycolysis
    b. the ATP – PC system
    c. the Krebs cycle
    d. the electron transport chain

(1 mark)

3. A “normal” resting cardiac output would be?

    a. 1.2 L/min
    b. 80 L/min
    c. 60 L/min
    d. 5 L/ min

(1 mark)

4. Total Peripheral Resistance is defined as

    a. the number of heart beats per minute
    b. the resistance of the arteries to blood flow
    c. the amount of blood ejected on each heart contraction
    d. the average force exerted by the blood against the arterial walls

(1 mark)

5. Which of the following would occur in response to elevated blood glucose to maintain homeostasis?

    a. decreased insulin secretion from the pancreas
    b. increased uptake of glucose by cells
    c. continued elevation of blood glucose
    d. all of the above

(1 mark)

PLEASE TURN THE PAGE

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

6. Which classification of carbohydrate is made up of 10 to thousands of sugar molecules linked together?

   a. Monosaccharides
   b. Disaccharides
   c. Polysaccharides
   d. Oligosaccharides

(1 mark)

7. Which of the following about blood pressure response to submaximal exercise is true

   a. systolic and diastolic pressure both increase
   b. systolic increases and diastolic stays the same
   c. systolic and diastolic pressure both decrease
   d. systolic stays the same and diastolic increases

(1 mark)

8. What is the name of “bad cholesterol”?

   a. High Density Lipoproteins (HDL)
   b. Low Density Lipoproteins (LDL)
   c. Very Low Density Lipoproteins (VLDL)
   d. Chylomicrons

(1 mark)

9. A respiratory quotient (RQ) of 0.95 during steady state exercise is suggestive of,

   a. a high rate of carbohydrate metabolism.
   b. a high rate of fat metabolism.
   c. an equal rate of fat and carbohydrate metabolism.
   d. a high rate of protein metabolism.

(1 mark)

10. How is most of the oxygen transported in the blood?

   a. bound to haemoglobin
   b. bound to carbohydrates
   c. dissolved in blood plasma
   d. bound to fats

(1 mark)

PLEASE TURN THE PAGE

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

11. Which of the following is a water soluble vitamin?

    a. Vitamin A
    b. Vitamin E
    c. Vitamin B
    d. Vitamin D

(1 mark)

12. The simplest and most rapid method to produce ATP during exercise is through

    a. glycolysis.
    b. the ATP – CP system.
    c. aerobic metabolism.
    d. glycogenolysis.

(1 mark)

13. The general components of a biological control system are the

    a. receptor, control center, and response.
    b. receptor, control center, and effector.
    c. effector, remote control, and stimulus.
    d. receptor and integrating center.

(1 mark)

14. The precision with which a biological control system maintains homeostasis is termed

    a. positive feedback
    b. negative feedback
    c. set point
    d. gain

(1 mark)

15. “Normal” Resting heart rates in adults tends to be between

    a. 80 – 100 bpm
    b. 30 – 40 bpm
    c. 50 – 60 bpm
    d. 60 - 85 bpm

(1 mark)

16. Aerobic production of ATP occurs in

    a. the mitochondria in a process called glycolysis.
    b. the mitochondria in a process called oxidative phosphorylation.
    c. the mitochondria in a process called beta oxidation.
    d. the cytoplasm.

(1 mark)

17. By definition, an endergonic reaction is

    a. a chemical reaction that requires energy to be added to the reactants before the reaction will take place.
    b. a chemical reaction that gives off energy.
    c. an enzyme-catalyzed reaction.
    d. a chemical reaction that results in products containing less free energy than the original reactants.

(1 mark)

18. Systole refers to

    a. the contraction phase of the cardiac cycle
    b. the relaxation phase of the cardiac cycle
    c. the entire duration of the cardiac cycle
    d. the time in between consecutive heart beats

(1 mark)

19. Endocrine signalling involves the release of _____ into the bloodstream.

    a. heat shock proteins
    b. neurotransmitters
    c. hormones
    d. transcription factors

(1 mark)

20. Which is the formula for Glucose?

    a. $C_2H_{12}O_6$
    b. $H_{10}C_6O_2$
    c. $H_{12}C_{12}O_6$
    d. $C_6H_{12}O_6$

(1 mark)

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

21. How long would it take for most individuals to reach a steady state heart rate?

a. 2 mins
b. 5 mins
c. 10 mins
d. 40 mins

(1 mark)

22. Which of these occurs in response to exercise in the heat?

a. sweat rate increases
b. blood is directed towards the core of the body
c. stroke volume gradually increases
d. all of the above

(1 mark)

23. Typically blood plasma makes up how much of total blood volume?

a. 10%
b. 25%
c. 55%
d. 85%

(1 mark)

24. Which of these circuits transports oxygenated blood away from the heart?

a. systolic circuit
b. venous circuit
c. ventricular circuit
d. systemic circuit

(1 mark)

25. 38% of the body's water occurs

a. Intracellularly
b. Extracellularly

(1 mark)

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

26. Which of the following defines Anabolism?

a. The sum of all decomposition reactions
b. The sum of all synthesis reactions
c. The sum of all chemical reactions that take place in the body
d. The sum of all chemical reactions that take place outside the body

(1 mark)

27. Which of these is an adaptation to aerobic training?

a. change to muscle blood supply
b. increased efficiency of energy production
c. increase in the number of mitochondria
d. all of the above

(1 mark)

28. Energy to run a maximal 400-meter race (i.e., 50 to 60 seconds) comes from

a. aerobic metabolism exclusively.
b. mostly aerobic metabolism with some anaerobic metabolism.
c. a combination of aerobic/anaerobic metabolism, with most of the ATP coming from anaerobic sources.
d. the ATP-CP system exclusively.

(1 mark)

29. What takes longer to recover following submaximal exercise?

a. Cardiac Output
b. Stroke Volume
c. Heart Rate
d. Breathing Rate

(1 mark)

30. How is cardiac output calculated?

a. stroke volume divided by heart rate
b. stroke volume multiplied by heart rate
c. heart rate divided by stroke volume
d. none of the above

(1 mark)

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

31. Which is the primary mode of heat transfer during exercise

a. radiation
b. convection
c. conduction.
d. evaporation

(1 mark)

32. The amount of carbon dioxide in expired air would be

a. the same as the inspired air
b. less than the inspired air
c. greater than the inspired air
d. impossible to measure

(1 mark)

33. Acetylecholine (Ach) is…

a. one of the major waste products generated by muscle contraction
b. the neurotransmitter that is released from motor nerves
c. the chemical energy source for muscle contraction
d. the enzyme that catalyses the splitting of ATP in a muscle fibre

(1 mark)

34. Which lines separate one sarcomere form the next?

a. A-line.
b. Z-line.
c. I-line
d. H-line.

(1 mark)

35. The 3 forms of biological work in humans are?

a. Chemical, Transport, Biological.
b. Chemical, Mechanical, Transport.
c. Transport, Mechanical, Physiological.
d. Transport, Physiological, Biological.

(1 mark)

PLEASE TURN THE PAGE

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

36. Which of these will help in the reduction of Blood Pooling following exercise?

a. Keeping your legs moving
b. Stretching
c. Cool downs
d. All of the above

(1 mark)

37. As exercise intensity increases there is a shift in metabolism of fuel from

a. fat to carbohydrate
b. carbohydrate to fat
c. glucose to glycogen
d. protein to amino acids

(1 mark)

38. Calcium ions, responsible for turning on muscle contraction, are stored in the

a. sarcolemma
b. T tubules
c. cross bridges
d. sarcoplasmic reticulum

(1 mark)

39. Which of these tests would be used to assess aerobic capacity?

a. Hagerman protocol
b. Wingate cycle test
c. Hydrostatic weighing.
d. Vo2 max test.

(1 mark)

40. The lactate threshold is defined as the work rate or oxygen uptake at which there is a systematic

a. rise in blood levels of lactic acid.
b. rise in aerobic metabolism.
c. decrease in blood lactic acid concentration.
d. rise in blood levels of lactate dehydrogenase.

(1 mark)

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

41. The relationship between oxygen consumption, cardiac output and arteriovenous difference is described by

    a. the Frank- Starling law
    b. the first law of thermodynamics
    c. the Fick equation
    d. the Haldane transformation

(1 mark)

42. The connective tissue sheath that surrounds an individual skeletal muscle fibre is called the

    a. perimysium
    b. sarcolema
    c. epimysium
    d. endomysium

(1 mark)

43. The 3 different types of skeletal muscle fibres are termed?

    a. Types I, IIa, IId
    b. Types I, II, III
    c. Types I, IIa, IIX
    d. Types I, IIa, IIb

(1 mark)

44. “Normal” adult resting blood pressure would be?

    a. 90/ 60 mmHg
    b. 180/ 100 mmHg
    c. 140 /90 mmHg
    d. 120/ 80 mmHg

(1 mark)

45. 1-1.5 L of water is lost daily through?

    a. Urine
    b. Skin via perspiration
    c. Water vapour in expired air
    d. Feces

(1 mark)

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

46. Which of the following tests assesses our daily calorie intake needs

a. Bruce Test
b. RMR Test
c. BIA Test
d. BMI Test

(1 mark)

47. VO2 max can be defined as

a. the amount of oxygen needed to maintain performance
b. the amount of oxygen at exhaustive exercise
c. the resting oxygen consumption over a 24 hour period
d. the amount of oxygen contained within arterial blood

(1 mark)

48. Stores of ATP and PCr are sufficient to support maximum muscular effort for approximately

a. 1 to 4 seconds
b. 3 to 15 seconds
c. 30 seconds to 2 minutes
d. More than 10 minutes

(1 mark)

49. Before fat can be metabolised by the muscle cells, it must first be broken down into

a. free fatty acids and glycogen
b. free fatty acids and glycerol
c. triglycerides and glucose
d. amino acids and glycerol

(1 mark)

50. As temperature increases?

a. So does the rate of reaction
b. Very high temperatures denature enzymes.
c. PH values change.
d. All of the above are true.

(1 mark)

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

Section B: Answer ALL 5 questions from this section.

1. List the criteria/steps to be considered when accurately performing Blood Lactate and Blood Glucose Sampling with a subject identifying common results and norms.

(6 marks)

2. List a variety of protocols you could use to predict VO2 max in a subject, please summarise tests based on accuracy.

(5 marks)

3. Explain a range of anaerobic tests you could complete with a subject.

(5 marks)

4. Detail a range of tests to measure strength and muscular endurance

(5 marks)

5. Detail a variety of different methods you could use to measure body composition

(5 marks)

Sport and Biological Sciences
Foundation Year Sport
Semester Two Examination 2018/2019
Introduction to Human Physiology
Module No. SRB3008

Section C: Answer 2 questions from this section.

1. Describe and explain Excitation-Contraction Coupling in human skeletal muscle.

(12 marks)

2. Detail the adaptations that occur in the human body (musculoskeletal and cardiorespiratory systems) due to long-term aerobic training.

(12 marks)

3. Discuss the roles and responsibilities of the Respiratory System during exercise.

(12 marks)

4. What is meant by the terms Homeostasis and Steady State? Use exercise related examples to illustrate your answer.

(12 marks)

5. Describe and illustrate the cycle of blood flow throughout the body taking into account pulmonary and systemic circulation.

(12 marks)

END OF QUESTIONS