Examination Period 3: 2016/17

SLS100617N

Module Title: Introduction to Physiology
Level: Four
Time Allowed: Two hours

Instructions to students:
- Enter your student number **not** your name on all answer books.
- Answer **all** questions from **Section A** on the exam paper and **one** question from **Section B** in a separate answer book.
- Where a question is in parts the weightings are indicated.
- Insert your student number in the space below:

  **Student Number**…………………………………………….

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Section A

Answer all questions in this section on the exam paper.

1. Label the major regions of the brain. (6 marks)

   a.

   b.

   c.

   d.

   e.

   f.
2. Which region of the brain is involved in the timing and planning of movement?
   (1 mark)
   a. Basal ganglia
   b. Brainstem
   c. Cerebellum
   d. Cerebral hemisphere
   e. Spinal cord

3. Which of the following are functions of the hypothalamus? Answer; true or false (1 mark for each correct answer)
   a. Ensures smooth and balanced movements True / False
   b. Mediates sensation and motor activities True / False
   c. Recognition of anger and fear True / False
   d. Regulation of body temperature True / False
   e. Regulation of food intake True / False

4. Why is the trachea lined with mucus? (1 mark)
   a. The mucus helps trap foreign particles before they can enter the lungs
   b. To aid peristalsis
   c. To assist with swallowing
   d. To increase blood flow to the area
   e. To aid gas exchange

5. Which of the following is a correct statement about the respiratory system? (1 mark)
   a. At the end of an expiration, the alveoli are largely empty of air
   b. By the time air reaches the lower respiratory tract, it is warmed to body temperature and fully saturated with water
   c. Flow in the upper respiratory tract is predominantly streamlined
   d. Following a tracheotomy, as much as 50% of the resistance to airflow occurs in the upper respiratory tract
   e. Respiration is controlled by the thalamus
6. Which of these neurotransmitters is always used at the preganglionic-postganglionic synapses in the parasympathetic nervous system?  
   (1 mark)
   a. Norepinephrine (noradrenaline)
   b. Epinephrine (adrenaline)
   c. Acetylcholine
   d. Glutamate
   e. Serotonin (5-HT)

7. Are the following statements concerning the parasympathetic nervous system true or false?  
   (1 mark for each correct answer)
   a. Constricts pupils  True/False
   b. Dilates bronchi  True/False
   c. Relaxes bladder  True/False
   d. Restricts peristalsis  True/False
   e. Slows heartbeat  True/False

8. Briefly explain how the membrane potential in a nerve cell is created?  
   (5 marks)
9. With reference to the nervous system briefly explain the terms:
   a. Spatial summation (4 marks)
   b. Temporal summation (3 marks)

10. Explain what is a motor unit. (2 marks)

11. Which type of blood vessel contains the greatest amount of elastin?
    a. Arterioles
    b. Conducting arteries
    c. Distributing arteries
    d. Large veins
    e. Capillaries (1 mark)

Section A continues overleaf
12. The following is a diagram of the gradient in blood pressure through the systemic circulation.

![Diagram of blood pressure gradient](image)

Complete the missing labels: (5 marks)

a. 

b. 

c. 

d. 

e. 

13. Which of the following are detectable on an ECG trace? (1 mark)

a. Cardiac output 

b. Stroke volume 

c. Early stage hypertension 

d. Myocardial infarction 

e. Blood Oxygen saturation
14. The middle layer of a blood vessel is called the:
   a. Tunica adventitia
   b. Tunica intima
   c. Tunica media
   d. Basal lamina
   e. Endothelium

15. According to Starling's law, the strength of ventricular contraction will adjust to match venous return. This is determined by which of the following?
   a. Heart rate
   b. Coronary blood flow
   c. Peripheral resistance
   d. The amount of blood returning to the right atrium
   e. The size of the left ventricle

16. Read through the short paragraph below and fill in the missing words from the selection below. Write the letter that corresponds to the correct answer in the relevant space.
   (8 marks)

   The striated appearance of ______ muscle is created by the regular arrangement of actin and myosin filaments in myofibrils. The protein filaments form a functional unit called the ______. The actin filament combines with two regulatory proteins (troponin and tropomyosin). ______ binds to ______ and pulls ______ off the binding sites of the actin filament. This allows the myosin head to attach to the actin filament forming a ______. The myosin head binds with ATP which splits this to ADP & phosphate. This changes the shape of ______ molecule which is termed the ______

   Note; not all the words are used.

   a. Calcium
   b. Crossbridge
   c. Myofibril
   d. Myosin
   e. Phosphate
   f. Power-stroke
   g. Sarcomere
   h. Skeletal
   i. Smooth
   j. Tropomyosin
   k. Troponin
Section B

Answer one question in a separate answer book.

17. Describe the electrical events in the heart and how they relate to the pumping of blood in the circulation.

18. With reference to the carriage of oxygen, give an account of the journey of a red blood cell in the circulation.

19. Describe the processes of neurochemical transmission and how neurotransmitters influence the excitability of neurones.

End of Section B
End of Paper