UNIVERSITY OF JOHANNESBURG

PROGRAM	:	**B. OPTOM & B. CUR**
SUBJECT	:	**HUMAN PHYSIOLOGY II**
CODE	:	**Optometry: HPH 02A2** **Nursing : HPH 2A10 & HPH 2A20**
DATE	:	JUNE EXAMINATION 3 JUNE 2017
TIME	:	8h30
DURATION	:	180 minutes
WEIGHT	:	50: 50
TOTAL MARKS	:	50 x 2 =100

EXAMINER	:	P.C. DE LANGE- JACOBS
MODERATOR	:	S. EAGLETON
NUMBER OF PAGES	:	7 PAGES

REQUIREMENTS	:	2 X EXAMINATION SCRIPT

2/…

INSTRUCTIONS TO CANDIDATES:

1. THIS QUESTION PAPER MUST BE RETURNED WITH YOUR EXAMINATION ANSWER SCRIPTS.
2. PLEASE ANSWER SECTION A & B in SEPARATE BOOKS.

SECTION A

Optometry: HPH 02A2 **MARKS : 50**
Nursing : HPH 2A10 **DURATION: 90 minutes**

QUESTION 1

Lipids form essential structural components of all cells and are important as energy reserves.

1.1 **Name and define** the special property of water that is involved in the formation of triglycerides and describe the formation of triglycerides. 6 x ½ = (3)

1.2 Distinguish between saturated and unsaturated fatty acids. (1)

1.3 How are phospholipids different from triglycerides mentioned in 1.1? (1)

1.4 Explain what the result and significance are when phospholipid molecules come in contact with water. 4 x ½ = (2)

1.5 Explain, with reference to relevant examples, the significance of **only the phospholipids as part of the plasma membrane** in the transport of substances through the plasma membrane. 4 x ½ = (2)

1.6 Name **two** other types of lipids that are also part of the plasma membrane and provide a function for each relevant to the plasma membrane. 4 x ½ = (2)

[11]

QUESTION 2

The skin and other tissue membranes:

2.1 Name the two main tissue types of these membranes. 2 x ½ = (1)

2.2 Name **two** tissue membranes of the human body **other than the skin** and indicate their location in the body. 4 x ½ = (2)

2.3 What is in pleurisy (pleuritis)? (1)

2.4 Three of the important characteristics of epithelial tissue are *avascularity, polarity and regeneration.*

Define and explain each of these concepts by referring to applicable aspects of the skin.

3 x 2 = (6)

[10]

QUESTION 3

3.1 Explain to a patient the importance of exercise and nutrients for healthy bone growth and development 3 x 1= (3)

3.2 Describe in detail ossification at the primary ossification site of a typical long bone during fetal development. 8 x 1= (8)

[11]

QUESTION 4

4.1 Describe excitation-contraction coupling in detail. (4) Also refer to the structure of the myofilaments involved (3) 14 x ½ = (7)

4.2 ATP manufactured during aerobic and anaerobic respiration provides the energy needed for muscle contraction

4.2.1 **Name** the main processes in anaerobic respiration, then indicate the site of the process, the substrate and net gain in energy (ATP production).

4 x ½ = (2)

4.2.2 Explain the pattern of energy production and use during **peak levels** of muscular activity. 4 x ½ = (2)

[11]

Question 5

5.1 Explain the underlying **physiological cause(s)** for the following disorders/diseases:

5.1.1 Botulism (1)

5.1.2 Vitiligo (1)

5.1.3 Osteopenia/osteoporosis (1)

5.2 Distinguish between treppe and wave summation during tension production by muscle fibres 2 x ½ = (1)

5.3 Describe the possible fate (pathways) of products after packaging and modifications in the Golgi apparatus. 3 x 1 = (3)

[7]

SECTION A: TOTAL MARKS: 50

SECTION B
Optometry: HPH 02A2 MARKS : 50
Nursing : HPH 2A20 DURATION: 90 minutes

Answer this section in a separate book

QUESTION 1

Acetylcholine (Ach) is released at neuromuscular junctions **in the heart**. Use only diagrams to explain what the effect will be on the postsynaptic membrane. 12 x ½ = **[6]**

QUESTION 2

Myelinated axons are important to relay electrical impulses through the body.

2.1 Describe the myelination of axons in the CNS and explain the effect. 2 x 1= (2)

2.2 Discuss saltatory propagation. 4 x ½ = (2)

2.3 What is demyelination and what are the basic symptoms? 2 x 1 = (2)

2.4 Name **two** disorders where the symptoms are due to demyelination. 2 x ½ = (1)

[7]

QUESTION 3

The sensory processing and perception of pain are of the utmost importance for homeostasis and survival.

3.1 Distinguish between fast pain and slow pain. 6 x ½ = (3)

3.2 Discuss adaptation to pain 4 x ½ = (2)

3.3 Explain the reduction of the perception of pain by certain neuromodulators. 4 x ½ = (2)

3.4 Describe the somatic sensory pathway that carries sensation of pain by means of a flow diagram. 10 x ½ = (5)

[12]

QUESTION 4

4.1. **MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question. Write only the letter and your answer on your answer sheet.

6 x ½ = (3)

4.1.1 Preganglionic fibers leave the CNS and then synapse on

A) postganglionic fibers.

B) visceral reflex responses.

C) motor neurons.

D) ganglionic neurons.

E) afferent neurons.

4.1.2 Ganglionic neurons innervate such things as

A) smooth muscle.

B) cardiac muscle.

C) adipose tissue.

D) glands.

E) All of the answers are correct.

4.1.3 The parasympathetic nervous system is especially active during which physiological state(s)?

A) exertion

B) trauma

C) digestion

D) stress

E) exercise

4.1.4 Each of the following effects is associated with the action of postganglionic sympathetic fibers**, except**

A) increased sweat secretion.

B) reduced circulation to the skin.

C) decreased heart rate.

D) dilation of the pupils.

E) increased blood flow to skeletal muscles.

4.1.5 The statement "its postganglionic axons always use acetylcholine as the neurotransmitter" is

A) true only for the parasympathetic nervous system.

B) true only for the sympathetic nervous system.

C) true for both the parasympathetic and sympathetic nervous systems.

D) not true for either the parasympathetic or sympathetic nervous systems.

E) true only for the somatic nervous system.

4.1.6 Dual innervation refers to an organ receiving

A) two nerves from the spinal cord.

B) both autonomic and somatomotor nerves.

C) both sympathetic and parasympathetic innervation.

D) nerves from both the brain and the spinal cord.

E) both sensory and motor nerves.

4.2 Describe the cellular mechanisms of long-term memory formation. 6 x ½ = (3)

4.3 Explain the physiological basis of biofeedback. 2 x 1= (2)

[8]

QUESTION 5

Describe olfactory reception, transduction and pathway. 14 x ½ = **[7]**

QUESTION 6

6.1 Explain the underlying **physiological cause(s)** for the following disorders/diseases:

6.1.1 Parkinson's disease. (1)

6.1.2 Alzheimer's disease (1)

6.2 Explain the importance of the blood-brain barrier. 2 x ½ = (1)
and the role of astrocytes in maintaining the blood-brain barrier 2 x ½ = (1)

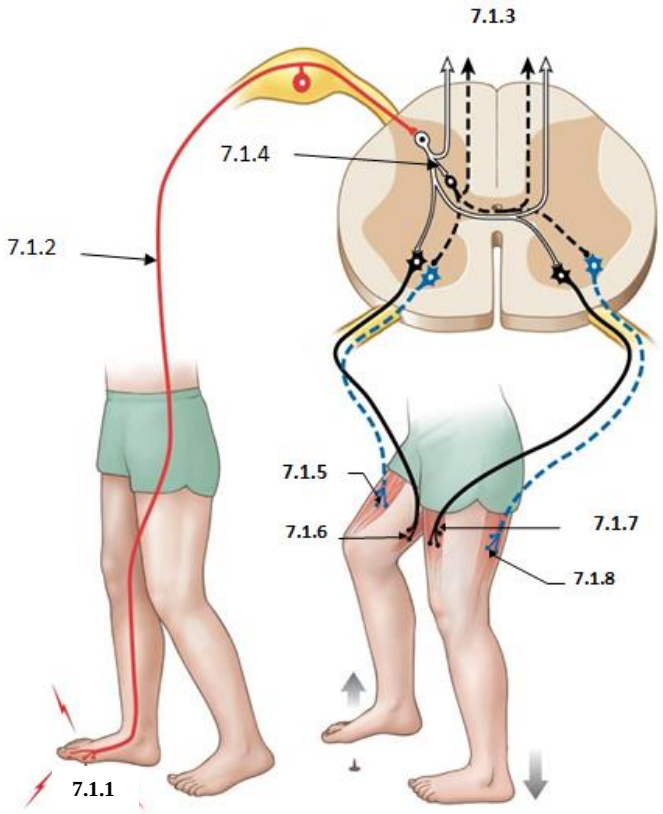
[4]

QUESTION 7

Next page (page 7)

QUESTION 7

7.1 Provide annotations for the numbered blanks on the diagram below.
Write only the number and the answer on your answer sheet. 8 x ½ = (4)



7.2 Name and explain the involvement of a specific type of neural circuit that ensures that the reflex in 7.1 lasts long enough. 2 x 1= (2)

[6]

SECTION B: TOTAL MARKS: 50