



PROGRAM : B. OPTOM & B. CUR

SUBJECT : HUMAN PHYSIOLOGY II

CODE : Optometry: HPH 02A2 (HPH 10A2 & HPH 20A2)
Nursing : HPH 2A10 & HPH 2A20

DATE : JUNE EXAMINATION
4 JUNE 2016

DURATION : 180 minutes

WEIGHT : 50: 50

TOTAL MARKS : 50 x 2 =100

EXAMINER : P.C. DE LANGE- JACOBS

MODERATOR : S. EAGLETON

NUMBER OF PAGES : 5 PAGES

REQUIREMENTS : 2 X EXAMINATION SCRIPTS

INSTRUCTIONS TO CANDIDATES:

1. THIS QUESTION PAPER MUST BE RETURNED WITH YOUR EXAMINATION ANSWER SCRIPTS.
2. PLEASE ANSWER SECTION A & B in SEPARATE BOOKS
3. **MARK ALLOCATION: ½ MARK PER FACT UNLESS INDICATED OTHERWISE**

SECTION A**Optometry: HPH 02A2 (HPH10A2)****Nursing : HPH 2A10****DURATION: 90 minutes****QUESTION 1**

One of the special properties of water is solubility.

- 1.1. Define and explain: an **aqueous solution**. (2)
 - 1.2 Refer to the structure of water to explain what makes water such an unusually effective solvent. (1)
 - 1.3 Explain, **with reference to relevant examples**, what the result and significance are when inorganic compounds are dissolved in water. (3)
 - 1.4 Explain, **with reference to relevant examples**, what the result and significance are when organic molecules come in contact with water. (2)
 - 1.5 Explain, **with reference to relevant examples**, the significance of the structure of the plasma membrane in the passive transport of **small** hydrophilic and hydrophobic substances through the plasma membrane. (4)
- [12]**

QUESTION 2

- 2.1 Discuss **three** factors that influence skin colour. (6)
 - 2.2. Name **two** diseases that produce secondary effects on skin colour and pigmentation. (1)
- [7]**

QUESTION 3

- 3.1 Discuss why the correct balance in the activities of the different types of bone cells is so important by referring to at least two bone diseases. (2)
- 3.2 Explain to a patient the importance of exercise and nutrients for healthy bone growth and development 2 x 1= (2)
- 3.3 Explain in detail the process of endochondral ossification at the **primary centre** of ossification of a typical long bone. (8) **[12]**

QUESTION 4

- 4.1 Explain how the pattern of energy production and use changes as the level of muscular activity increases. (6)
- 4.2 Compare and contrast the diseases tetanus and botulism. (3)
- [9]**

Question 5

- 5.1 List **four** procedures for the effective treatment of a person who has been severely burnt. (4)
- 5.2 Provide **two** reasons why most cancers developed from epithelial tissue. 2 x 1 = (2)
- 5.3 Provide **two** facts that can be used as evidence to support the endosymbiotic theory. 2 x 1 = (2)
- 5.4 Provide any **two** characteristics of a typical **slow** skeletal muscle fibre. (1)
- 5.5 Name the **two** main tissue types of the mucosa and the serosa. (1)
- [10]**

SECTION A: TOTAL MARKS: 50

SECTION B**Optometry: HPH 02A2 (HPH 20A2)****Nursing : HPH 2A20****DURATION: 90 minutes****Question 1**

1.1 Acetylcholine (Ach) is released at neuromuscular junctions **in the heart**. Use only diagrams to explain what the effect will be on the postsynaptic membrane. (6)

1.2 Explain the refractory period of an action potential. (2)

1.3 Use the information you provided in 1.2 to explain how the CNS can determine whether a particular stimulus is intense or weak. 2 x 1 = (2)

[10]**Question 2**

Use the **patellar reflex** as the example to explain:

2.1 The reflex arch (6)

2.2 The classification of reflexes (4)

[10]**QUESTION 3**

Compare and contrast the lateral spinothalamic tract to the spinocerebellar pathway in table format. **[6]**

QUESTION 4

4.1 Explain Autonomic tone. (1)

4. 2 Define dual innervation. (1)

4.3 Use a suitable visceral organ as an example to explain the interaction between dual innervation and autonomic tone. Include reference to innervation and relevant neurotransmitters. (3)

[5]

Question 5

Olfaction, the sense of smell, is made possible by the paired olfactory organs.

5.1 Explain olfactory reception, transduction and pathway. (7)

5.2 Although the olfactory receptors are very sensitive, it do not guarantee an awareness because of convergence, inhibition and adaptation. Explain the **two underlined** concepts. (2)

5.3 Explain the link between odours and our emotions and memories. 3 x 1 = (3)
[12]

Question 6

6.1 Briefly explain Parkinson's disease. (2)

6.2 Distinguish between aphasia and dyslexia. 2 x 1 = (2)

6.3 Explain the cellular mechanisms of long-term memory formation. (3)
[7]

SECTION B: TOTAL MARKS: 50
