

Name: \_\_\_\_\_ Index No: \_\_\_\_\_

Candidate's Signature: \_\_\_\_\_

2404/304

**BIOCHEMISTRY, ANATOMY AND  
PHYSIOLOGY**

Oct./Nov. 2013

Time: 3 hours

Date: \_\_\_\_\_



**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**DIPLOMA IN APPLIED BIOLOGY**

**BIOCHEMISTRY, ANATOMY AND PHYSIOLOGY**

**3 hours**

**INSTRUCTIONS TO CANDIDATES**

*Write your name and index number in the spaces provided above.*

*Sign and write the date of examination in the spaces provided above.*

*You should have a Scientific Calculator for this examination.*

*This paper consists of TWO sections; A and B.*

*Answer ALL the questions in section A and any THREE questions from section B in the spaces provided in this question paper.*

*Each question in section A carries 4 marks while each question in section B carries 20 marks.*

*Maximum marks for each part of a question are indicated.*

*Candidates should answer the questions in English.*

**For Examiner's Use Only**

Section	Questions	Maximum Score	Candidate's Score
A	1-10	40	
B		20	
		20	
		20	
<b>TOTAL SCORE</b>		<b>100</b>	

**This paper consists of 20 printed pages.**

**Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

**SECTION A: BIOCHEMISTRY, ANATOMY AND PHYSIOLOGY**

*Answer ALL the questions in this section in the spaces provided.*

1. (a) Define the following terms:

(i) Mutualism.

(1 mark)

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(ii) Osmoregulation.

(1 mark)

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(b) Distinguish between photoautotrophic and chemoheterotrophic organisms

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(2 marks)

2. (a) Distinguish between an exocrine and an endocrine gland.

(1 mark)

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(b) State **three** factors that control the release of hormones by glands. (3 marks)

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3. State **four** adaptations for preventing water loss in insects. (4 marks)

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4. State the factors that affect the efficiency of diffusion of gases at the alveoli. (4 marks)

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5. Draw a labelled diagram of the cardiac muscle.

(4 marks)

6. (a) State the structural variations in purines and pyrimidines.

(2 marks)

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(b) Draw the molecular structure of the deoxyribose sugar.

(2 marks)

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7. (a) Define the Michaelis Constant ( $K_m$ ). (1 mark)

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(b) State **three** significances of  $K_m$  in enzyme-controlled reactions. (3 marks)

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8. Distinguish between:

(a) Isomerism and stereo-isomerism. (2 marks)

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(b) Isoenzymes and allosteric enzymes. (2 marks)

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9. (a) Define the term cell fractionation. (1 mark)

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(b) Explain the tissue homogenization.

(3 marks)

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10. Draw the molecular structure of adenosine Triphosphate (ATP)

(4 marks)

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**SECTION B**

*Answer any **THREE** questions from this section in the spaces provided after question 15.*

11. (a) (i) Using molecular structures, illustrate the amphoteric nature of amino acids. (3 marks)
- (ii) State the functions of proteins in living systems. (7 marks)
- (b) (i) State the general functions of the skeleton in mammals. (4 marks)
- (ii) Draw a labelled diagram of a generalized cervical vertebra. (6 marks)
12. Outline the process of photophosphorylation. (20 marks)
13. Describe the pathways of water and solute movement through a leaf. (20 marks)
14. Discuss the control of gastric juice secretion. (20 marks)
15. (a) State **four** advantages of thin layer chromatography (TLC) over column chromatography. (4 marks)
- (b) Explain the process of paper chromatography. (16 marks)

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