Name: _____ Index No: _____/_____

2404/304
BIOCHEMISTRY, ANATOMY AND PHYSIOLOGY
Oct./Nov. 2014
Time: 3 hours

Candidate's Signature: _____

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.
*Do **NOT** remove any pages from this booklet.*
Candidates should answer the questions in English.

For Examiner's Use Only

SECTION A

Question	1	2	3	4	5	6	7	8	9	10	TOTAL SCORE
Candidate's Score											

SECTION B

Question	11	12	13	14	15	TOTAL SCORE
Candidate's Score						

GRAND TOTAL

This paper consists of 16 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 (40 marks)

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

1. (a) Define the term nucleosides. (1 mark)

(b) State any **three** roles of nucleotides in living organisms. (3 marks)

2. (a) Name **four** non-carbohydrate precursors of glucose in gluconeogenesis. (2 marks)

(b) Distinguish between feedback inhibition and feed forward activation. (2 marks)

3. Draw structures of each of the following molecules:

(a) tyrosine. (2 marks)

(b) glyceraldehyde-3-phosphate. (2 marks)

4. (a) Name any **two** principal salivary glands. (2 marks)

(b) State any **four** functions of the tongue. (2 marks)

5. State the role of hormones involved in selective reabsorption in kidneys. (4 marks)

6. Draw a diagram to illustrate the basic structure of a lumbar vertebrae. (4 marks)

7. State the functions of each of the following parts of the mammalian eye:

(a) vitreous humour; (2 marks)

(b) choroid. (2 marks)

8. (a) Distinguish between classical and non-classical competitive inhibitions. (2 marks)

(b) Enzymes with k_{cat}/k_m values approaching upper limits are said to have reached "catalytic perfection". Explain. (2 marks)

9. List any **four** characteristics of the xylem tissue which made it suitable for long-distance transport of water and solutes. (4 marks)

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10. Give **four** differences between nervous and hormonal controls in animals. (4 marks)

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SECTION B (60 marks)

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

11. (a) Draw molecular structures to show the positions of the six glucose carbons in the two lactate molecules formed by anaerobic glycolysis (4 marks)

(b) Describe the reactions of the urea cycle. (16 marks)

12. Draw a flow chart to show synthesis of glucose from pyruvate. (20 marks)

13. Compare and contrast between photosynthesis and aerobic respiration. (20 marks)

14. (a) Define the following terms in relation to ventilation:

(i) pleural pressure; (2 marks)

(ii) vital capacity. (2 marks)

(b) Describe the nervous control of breathing in mammals. (16 marks)

15. (a) Draw a labelled diagram of a mature pollen grain. (4 marks)

(b) Describe the hormonal control of spermatogenesis. (16 marks)