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Exam

2404/304
BIOCHEMISTRY, ANATOMY AND PHYSIOLOGY
Oct./Nov. 2018
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN APPLIED BIOLOGY
BIOCHEMISTRY, ANATOMY AND PHYSIOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Non-programmable scientific calculator.

This paper consists of TWO sections; A and B.

Answer ALL the questions in section A and any THREE questions from section B.

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.

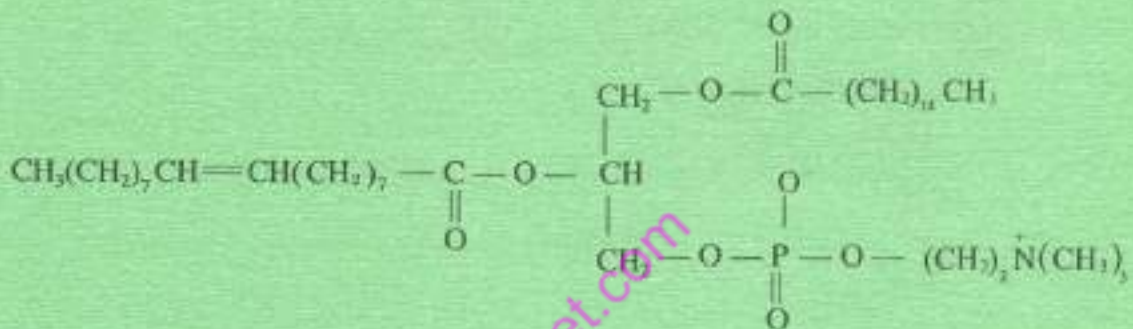
This paper consists of 4 printed pages.

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)

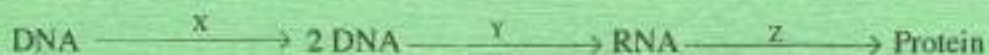
Answer ALL the questions in this section.

1. (a) (i) What are essential fatty acids? ($\frac{1}{2}$ mark)
 (ii) Give any **two** essential fatty acids. (1 mark)
 (b) The structure below is of a phospholipid.



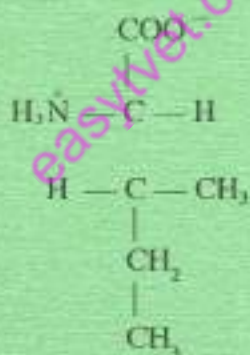
Give its constituent components.

2. (a) What is an invert sugar? (2 marks)
 (b) State the difference between cellobiose and maltose. (2 marks)
 3. (a) What is seed dormancy? (1 mark)
 (b) List the factors that cause dormancy in seeds. (3 marks)
 4. Name any **four** secretory structures in plants. (4 marks)
 5. (a) Name the process X, Y, and Z in the following reactions



($1\frac{1}{2}$ marks)

- (b) (i) Explain why RNA is readily hydrolysed by alkali, whereas DNA is not. (2 marks)
- (ii) State the general function of nucleic acids. ($\frac{1}{2}$ mark)
6. (a) What is a balanced diet? (1 mark)
- (b) List any **three** factors that determine energy requirements in man. (3 marks)
7. (a) Explain the significance of photosynthetic bacteria living in organic mud at the bottom of lakes and ponds. (2 marks)
- (b) Give any **two** differences between photosynthetic green plants and photosynthetic bacteria. (2 marks)
8. Distinguish between periosteum and perichondrium. (4 marks)
9. Below is the structure of L-Iso-Leucine (Ile).



- Write all the perspective formulae of its optical isomers. (4 marks)
10. The fatty acids below have the following melting points:
- Stearic acid, 69.6°C
 Oleic acid, 13.4°C
 Linoleic acid, -5°C
 Linolenic acid, -11°C
- Explain the correlation of their structure with the melting points. (4 marks)

SECTION B (60 marks)

Answer any **THREE** questions from this section.

11. Outline the process of triacylglycerol synthesis. (20 marks)
12. Illustrate the principle of 'hair pin counter current multiplier' of the loop of Henle. (20 marks)
13. (a) Distinguish between mitosis and meiosis stating their significance in reproduction. (6 marks)
- (b) Which hormones in mammals are responsible for:
- (i) development of testis;
 - (ii) secretion of thyroxine;
 - (iii) hypocalcemia;
 - (iv) development of mammary glands? (4 marks)
- (c) Describe how fructose is converted to glucose in the liver. (10 marks)
14. (a) Define the following terms:
- (i) transamination;
 - (ii) glycolysis;
 - (iii) gluconeogenesis;
 - (iv) sub-cellular fractionation;
 - (v) oxidative deamination. (5 marks)
- (b) Explain how the ammonia produced from metabolism of amino acids is transported to the liver. (15 marks)
15. (a) What is a respiratory surface? (1 mark)
- (b) Identify any **three** respiratory surfaces in a frog, *Rana temporaria*. (3 marks)
- (c) How are the gills of fish adapted to their function? (6 marks)
- (d) Describe gaseous exchange in an insect. (10 marks)



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