K.C.S.E BIOLOGY PAPER 231/1 2000

SECTION A (25 marks)

Answer all the questions in this section in the spaces provided.

1. What is the function of the following cells in the retina of the human eye? (2 marks)
   (a) Cones

   .....

   (b) Rods

   .....

2. Give a reason why two species in an ecosystem cannot occupy the same niche (2 marks)

   .....

   .....

3. State two characteristics features of members of phylum Bryophyta (2 marks)

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   .....

4. State two ways in which some fungi are beneficial to humans (2 marks)

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5. State the importance of osmo-regulation in organisms

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6. Give a reason why lumbar vertebrae have long and broad transverse processes (2 marks)

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7. Give a reason why each of the following is important in the study of evolution
   (a) Fossil records (1 mark)

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   .....

(b) Comparative anatomy. (1 mark)

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8 Why is oxygen important in the process of active transport in cells? (2 marks)

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9 State two advantages of metamorphosis to the life of insects. (2 marks)

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10 Explain how birds of prey are adapted to obtaining their food. (2 marks)

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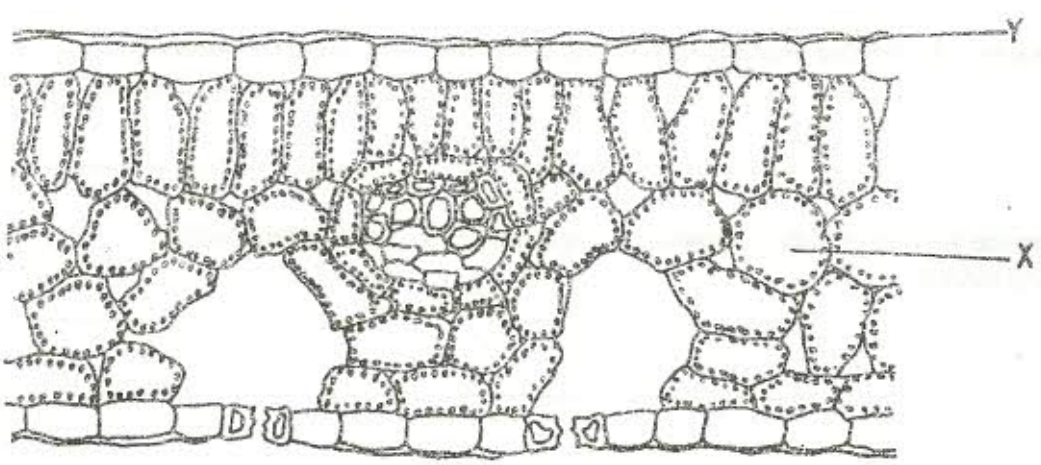
SECTION B (40 marks)

Answer all the questions in this section in the spaces provided.

11 The diagram below represents a section of a leaf.



(a) Name the parts labelled X and Y. (2 marks)

X

.....

Y

.....

(b) Using arrows, indicate on the diagram the direction of flow of water during the transpiration stream. (2 marks)

(c) State two ways in which the leaf is suited to gaseous exchange. (4 marks)

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12 The chart below represents the results of successive crosses, starting with red-flowered plants and white-flowered plants and in which both plants are pure breeding.

Parental genotypes: Red flowers x White flowers

↓

First filial generation

↓ Selfed

Second filial generation
3 Red flowers: 1 White flower
3: 1

(a) What were parental genotypes? Use letter R to represent the gene for red colour and r for white colour. (2 marks)

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(b) (i) What was the colour of the flowers in the first filial generation? (1 mark)

.....

(ii) Give a reason for your answer in (b)(i) above. (1 mark)

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(c) If 480 red flowered plants were obtained in the second filial generation, how many F_2 plants had white flowers? Show your working. (4 marks)

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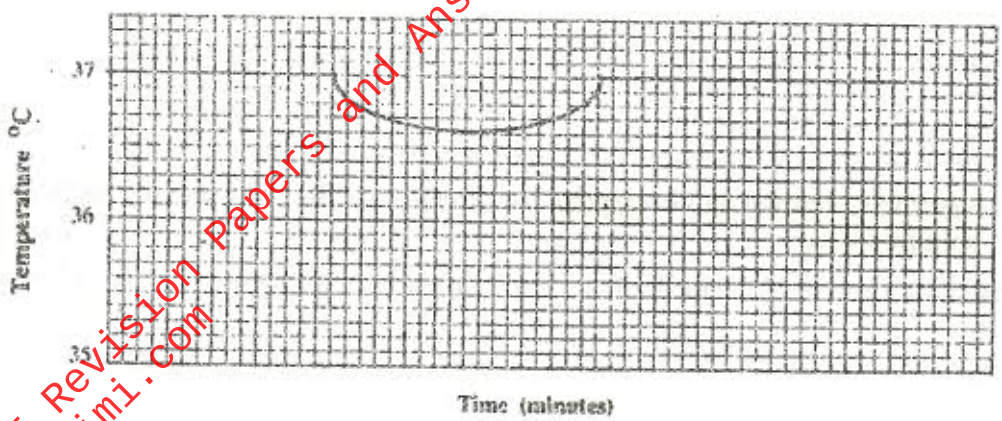
13 The temperature of a person was taken before, during and after taking a cold bath. The results are shown in the graph below.



(a) Explain why the temperature fell during bath. (3 marks)

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(b) What changes occurred in the skin that enabled the body temperature to return to normal? (4 marks)

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14 (a) Name the crop infested by *Phytophthora infestans* and the disease it causes. (2 marks)

Crop

.....

Disease

.....

(b) State four control measures against the disease. (4 marks)

.....

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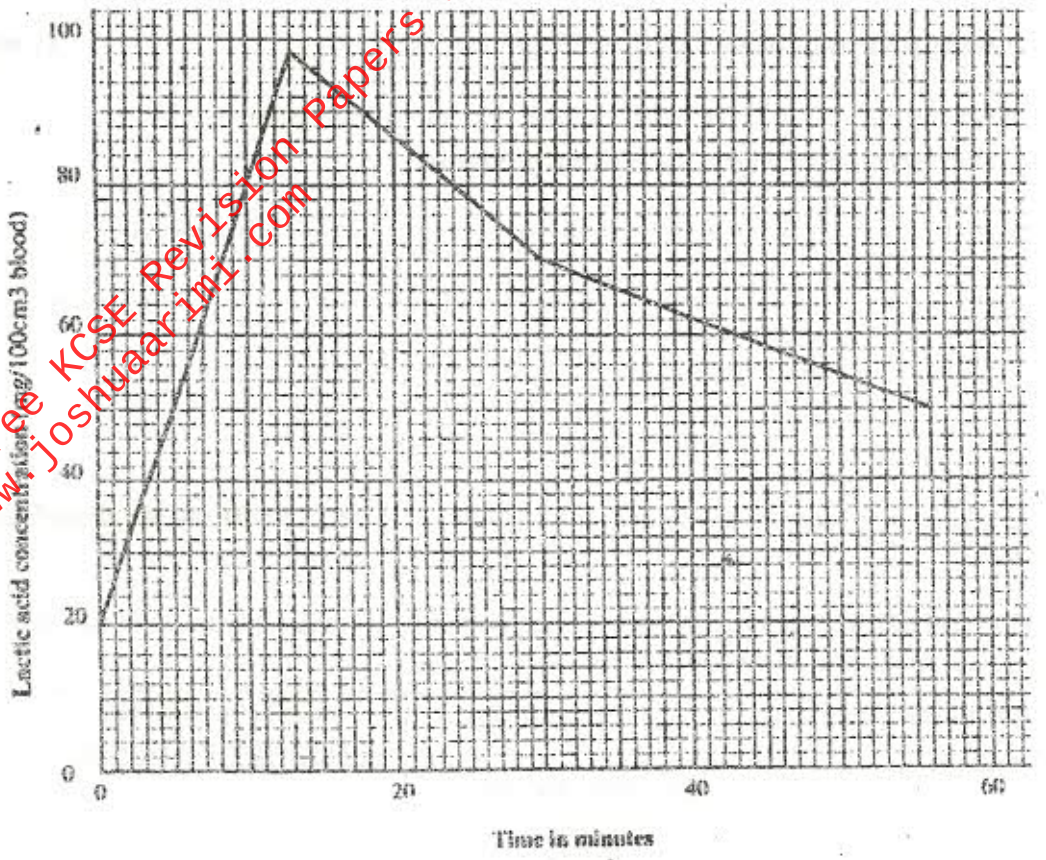
15 The concentration of lactic acid in blood during and after an exercise was determined. The results are shown in the graph below:



(a) (i) By how much did the lactic acid increase at the end of 13 minutes? (1 mark)

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(ii) After how many minutes was the lactic acid concentration 71mg/ $100cm^3$? (2 marks)

.....

(iii) What would be the concentration of lactic acid at the 60^{th} minute? (1 mark)

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(b) Give a reason for the high rate of production of lactic acid during the exercise. (2 marks)

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(c) Give a reason for the decrease in the concentration of lactic acid after the exercise. (1 mark)

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16 (a) What is the significance of sexual reproduction? (1 mark)

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(b) State three advantages of asexual reproduction. (3 marks)

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SECTION C (40 marks)

Answer question 17 (compulsory) and either question 18 or 19 in the spaces provided after question 19.

17 The numbers of different types of animals supported by a square kilometre in two terrestrial ecosystems are shown in the table below.

Type of ecosystem	Type of animal	Number of animals supported per sq. km
Acacia savannah	**Domestic animals**	
	Cattle	7
	Goats	30
	Sheep	10
	Wild game	
	Thomson's gazelles	450
	Eland	20
	Wildebeest	60
Bushland	**Domestic animals**	
	Cattle	2
	Goats	15
	Sheep	5
	Wild game	
	Thomson's gazelles	200
	Eland	12
	Wildebeest	10

(a) (i) Which domestic animal is better adapted to both ecosystems? (1 mark)

.....

(ii) Give a reason why the animal named in (a)(i) above is better adapted to the two ecosystems. (1 mark)

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