

K.C.S.E. BIOLOGY PAPER 231/1 2002

SECTION A (20 marks)

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

- 1 Besides the abdomen, name the other body part of members of Arachnida. (1 mark)
- 2 (a) Name the bacteria found in the root nodules of leguminous plants. (1 mark)
- (b) State the association of the bacteria named in (a) above with the leguminous plants. (1 mark)
- 3 (a) State the function of co-factors in cell metabolism. (1 mark)
- (b) Give one example of a metallic co-factor. (1 mark)
- 4 During germination and early growth, the dry weight of endosperm decreases while that of the embryo increases. Explain. (2 marks)
- 5 State two characteristics that researchers select in breeding programmes. (2 marks)
- 6 In what form is oxygen transported from the lungs to the tissues? (1 mark)
- 7 Explain why the carrying capacity for wild animals is higher than that for cattle in a given piece of land. (2 marks)
- 8 Which type of joint is found at the articulation of:
- (a) pelvic girdle and femur (1 mark)
- (b) humerus and ulna? (1 mark)
- 9 Name the two gaseous exchange structures in higher plants. (2 marks)

10 What happens to excess fatty acids and glycerol in the body? (2 marks)

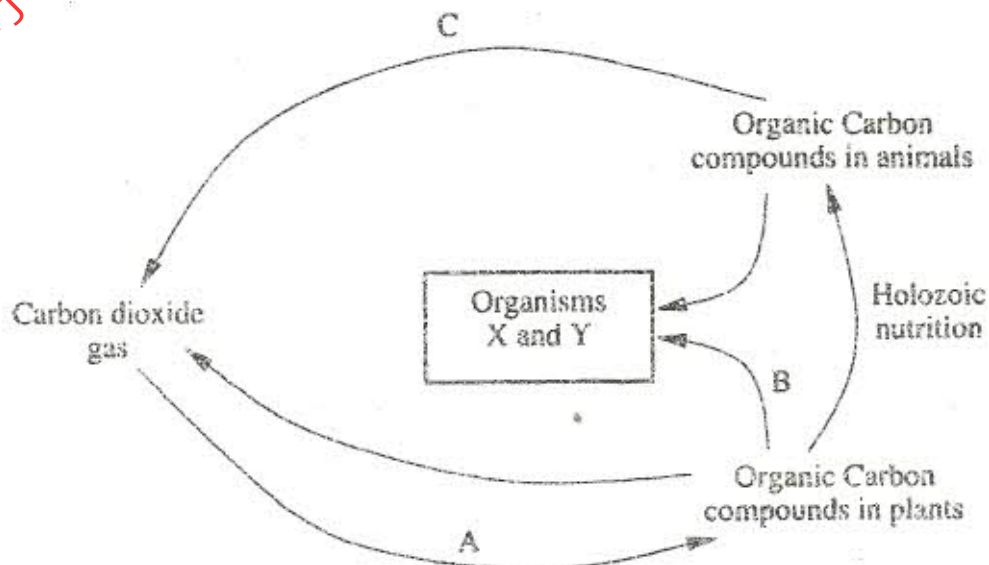
11 Give an example of a sex linked trait in humans on:
Y chromosome. (1 mark)

X chromosome. (1 mark)

SECTION B (40 marks)

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

12 The chart below represents a simplified carbon cycle.



(a) Name the processes labelled A, B and C.

A

B

C

(3 marks)

(b) Name the organisms X and Y.

X

Y

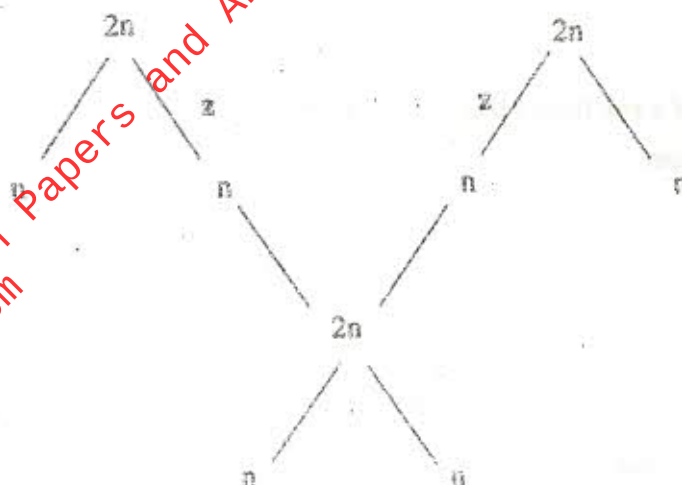
(2 marks)

(c) State the importance of carbon cycle in nature.

(1 mark)

13

The chart below shows the number of chromosomes before and after cell division and fertilisation in a mammal.



(a) What type of cell division takes place at Z? (1 mark)

(b) Where in the body of a female does process Z occur? (1 mark)

(c) On the chart, indicate the position of parents and gametes. (2 marks)

(d) Name the process that leads to addition or loss of one or more chromosomes. (1 mark)

(e) State three benefits of polyploidy in plants to a farmer. (3 marks)

14 (a) What is organic evolution? (1 mark)

(b) State two ways in which *Homo sapiens* differs from *Homo habilis*. (2 marks)

- (c) Distinguish between divergent and convergent evolution giving an example in each case. (4 marks)

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- 15 *Ascaris lumbricoides* is an example of an endo-parasite.

(a) The name *Ascaris* refers to (1 mark)

(b) State the habitat of the organism. (1 mark)

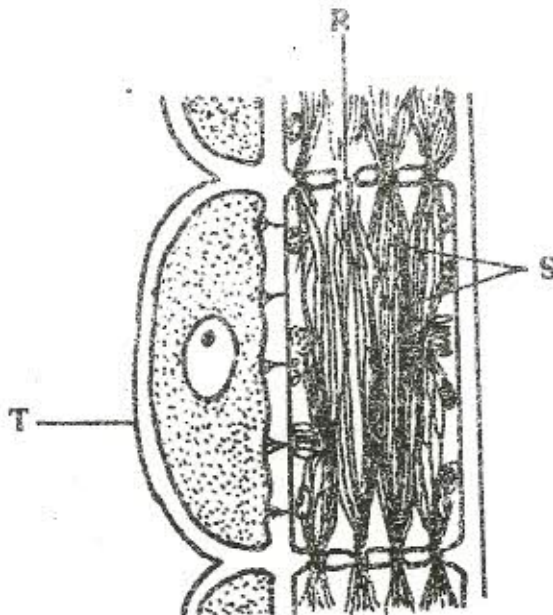
(c) State three ways in which the organism is adapted to living in its habitat. (3 marks)

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- 16 The diagram below represents part of phloem tissue.



(a) Name the structures labelled R and S and the cell labelled T. (3 marks)

R

S

Cell labelled T

(b) State the function of the structure labelled S. (1 mark)

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(c) Explain why xylem is a mechanical tissue. (2 marks)

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(a) What structures are produced by sisal for vegetative propagation? (2 marks)

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(b) Give a reason for grafting in plants. (2 marks)

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(c) State four advantages of vegetative propagation. (4 marks)

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SECTION C (40 marks)

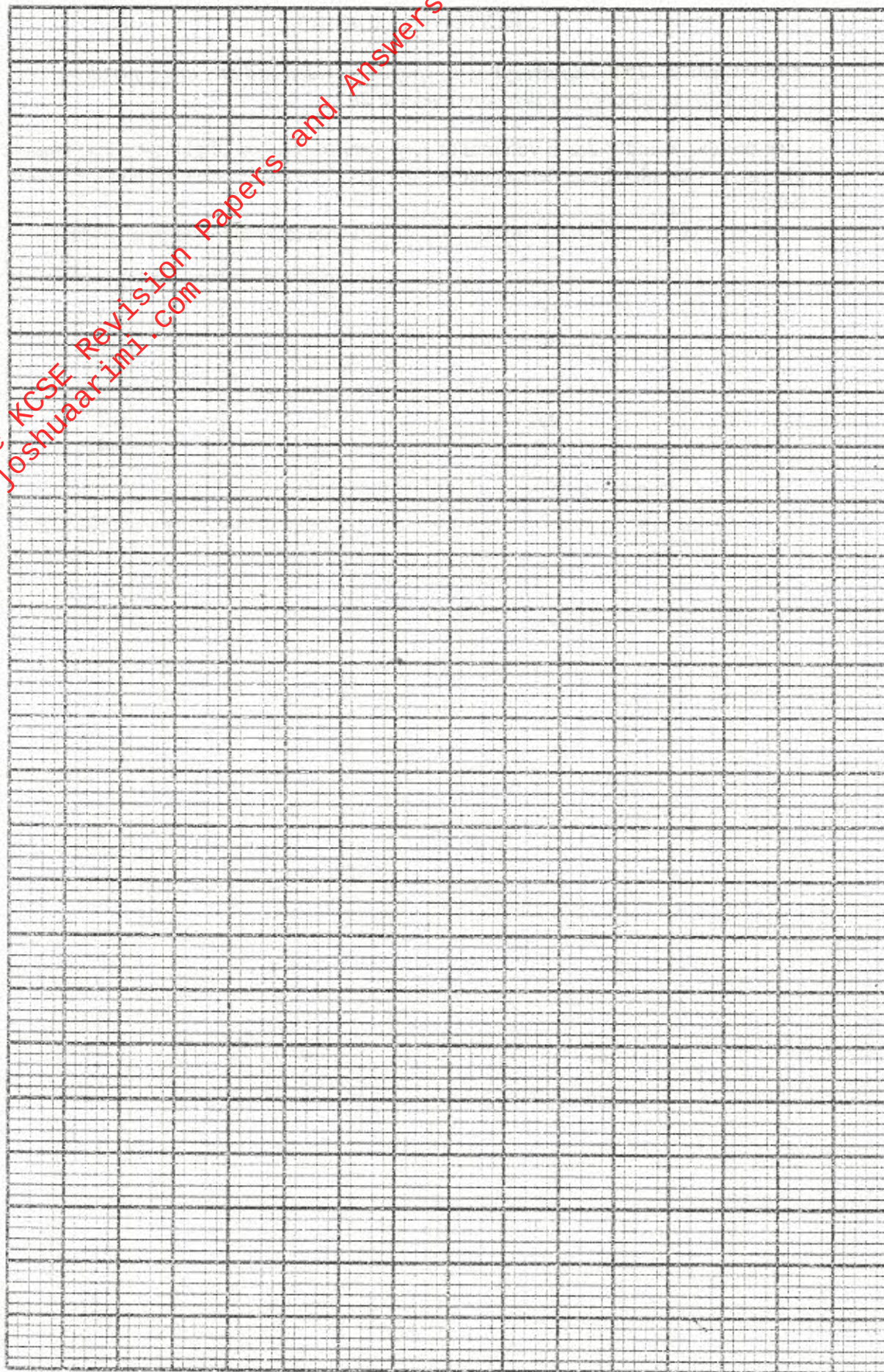
Answer question 18 (compulsory) in the spaces provided and one other question from section C in the spaces provided after question 20.

- 18 Two persons X and Y drank volumes of concentrated solution of glucose. The amount of glucose in their blood was determined at intervals. The results are shown in the table below:

Time (minutes)	Glucose level in blood (mg/1000cm ³)	
	X	Y
0	87	84
15	112	123
30	139	170
45	116	188
60	100	208
90	95	202
120	92	144
150	88	123

- (a) On the grid provided, plot graphs of glucose level in blood against time on the same axes. (7 marks)

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(b) What was the concentration of glucose in the blood of X and Y at the 20th minute? (2 marks)

(c) Suggest why the glucose level in person X stopped rising after 30 minutes while it continued rising in person Y. (2 marks)

(d) Account for the decrease in glucose level in person X after 30 minutes and person Y after 60 minutes. (3 marks)

X

Y

(e) Name the compound that stores energy released during oxidation of glucose. (1 mark)

(f) Explain what happens to excess amino acids in the body. (5 marks)

19 Describe the role of hormones in the growth and development of plants. (20 marks)

20 (a) Name the three types of skeletons found in multicellular animals. (3 marks)

(b) Describe how the cervical, lumbar and sacral vertebrae are suited to their functions. (17 marks)