K.C.S.E BIOLOGY PAPER 231/1 2004

SECTION A (20 marks)

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

1. (a) Name the cartilage found between the bones of the vertebral column. (1 mark)

   (b) State the function of the cartilage named in (a) above. (1 mark)

2. Distinguish between natural and acquired immunity (2 marks)

3. How is aerenchyma tissue adapted to its function? (2 marks)

4. Other than carbon dioxide, name the other products of anaerobic respiration in plants. (2 marks)

5. During which phase of mitosis does crossing over occur? (1 mark)

6. The diagram below shows the position of an image formed in a defective eye.

   (a) Name the defect. (1 mark)

   (b) Explain how the defect named in (a) above can be corrected. (2 marks)

7. State the functions of the following organelles

   (a) lysosomes (1 mark)

   (b) golgi apparatus (2 marks)

8. Name the class in the phylum arthropoda which has the largest number of individuals (1 mark)

9. Name two mineral elements that are necessary in the synthesis of chlorophyll. (2 marks)

10. How are xylem vessels adapted for support? (1 mark)

11. Fruit formation without fertilization is called ..... (1 mark)

SECTION B (40 marks)

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

12. A cross between a red flower plant and white flowered plant produced plants with pink flowers. Using letter R to represent the gene for red colour, and W for white colour,

(a) .. What were the parental genotypes? ..... (1 mark)

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(b) Work out a cross between F_1 plants. (4 marks)

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(c) Give the

(i) Phenotypic ratio of F_2 plants. (1 mark)

.....

(ii) Genotypic ratio of F_2 plants. (1 mark)

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(d) Name a characteristic in humans which is controlled by multiple alleles. (1 mark)

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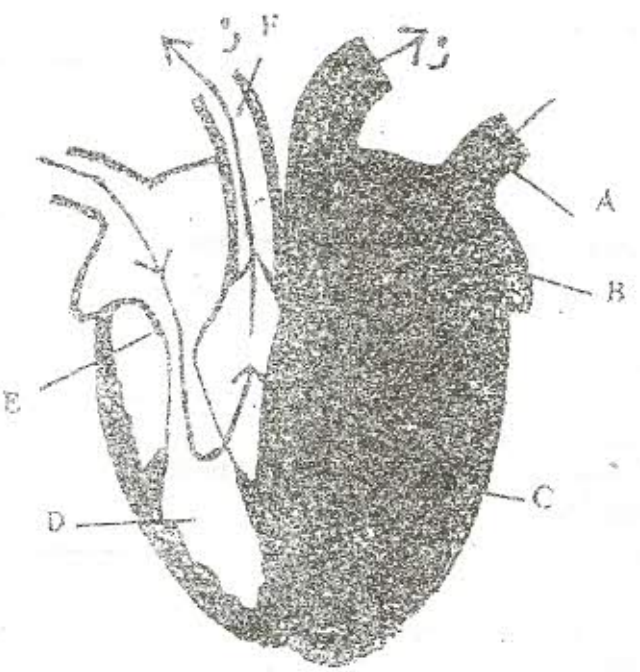
13. The diagram below shows a vertical section through a mammalian heart.



(a) Name the parts labelled A, B, E and F (4 marks)

A .....

B .....

E .....

F .....

(b) Use arrows to show the direction in which blood flows in the heart. (2 marks)

(c) Give a reason why the wall of chamber C is thicker than chamber D (2 marks)

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14. (a) What is the difference between Darwinian and Lamarckian theories of evolution? (2 marks)

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(b) What is meant by the following terms? Give an example in each case.

(i) Homologous structures (1 mark)

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Example (1 mark)

.....

(ii) Analogous structures. (1 mark)

.....

Example. (1 mark)

.....

(iii) Vestigial structures. (1 mark)

.....

Example. (1 mark)

.....

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15. (a) Give the difference between the following structures in wind and insect pollinated flowers (3 marks)

(i) Anther.

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(ii) Pollen grains.

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(iii) Stigma.

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(b) What is the importance of cross pollination? (1 mark)

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(c) Explain how a seed is formed after an ovule is fertilized. (4 marks)

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16. (a) What is diffusion? (2 marks)

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(b) How do the following factors affect the rate of diffusion?

(i) Diffusion gradient. (1 mark)

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(ii) Surface area volume ratio. (1 mark)

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(iii) Temperature. (1 mark)

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(c) Outline three roles of active transport in the human body. (3 mark)

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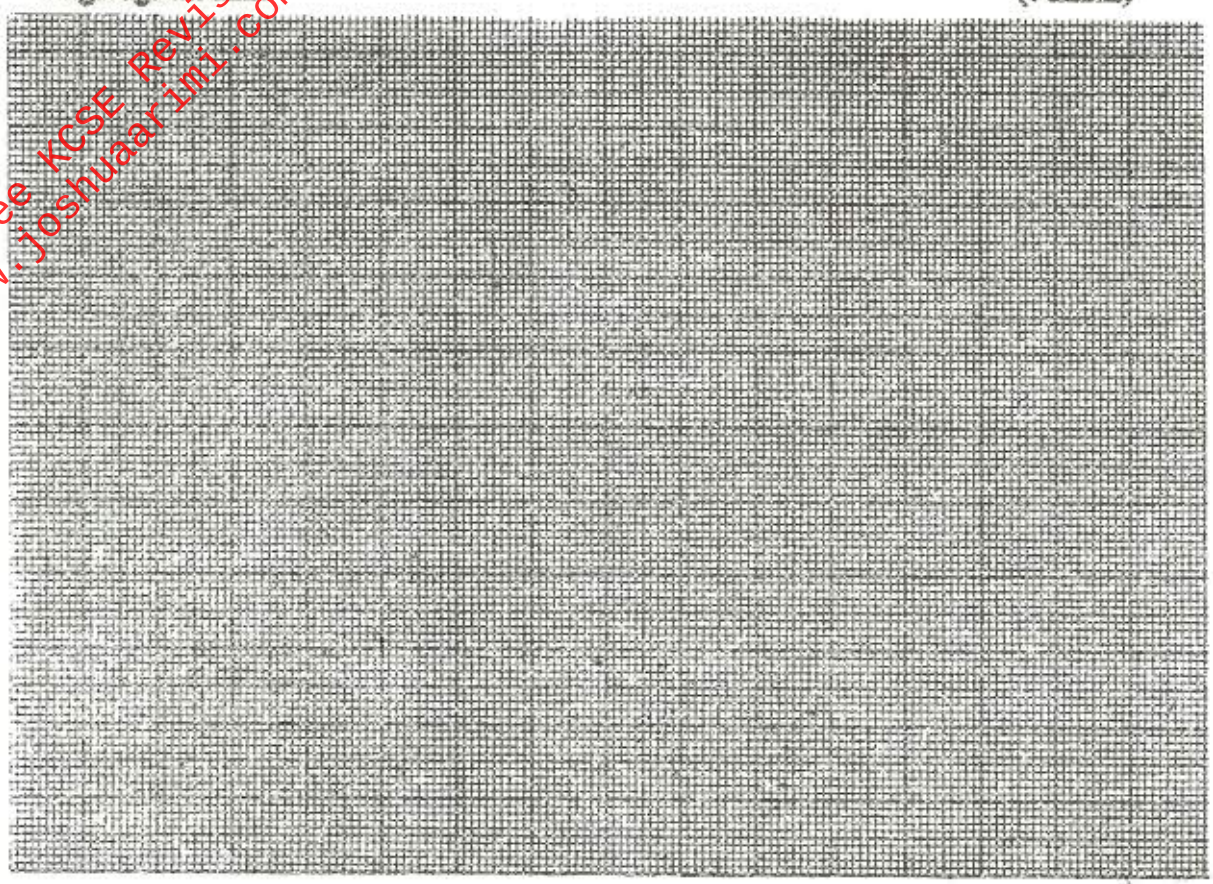
SECTION C (40 Marks)

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

17. During germination and growth of a cereal, the dry weight of endosperm, the embryo and the total dry weight were determined at two day intervals. The results are shown in the table below.

Time after planting (days)	Dry weight of Endosperm (mg)	Dry weight of embryo (mg)	Total dry weight (mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	17	37
8	10	25	35
10	6	33	39

(a) Using the same axis, draw graphs of dry weight of endosperm, embryo and the total dry weight against time. (7 marks)



(b) What was the total dry weight on day 5? (1 mark)

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(c) Account for

(i) decrease in dry weight of endosperm from day 0 to 10 (2 marks)

.....

(ii) increase in dry weight of embryo from day 0 to day 10 (2 marks)

.....

(iii) decrease in total dry weight from day 0 to day 8 (1 mark

.....

(iv) increase in total dry weight after day 8 (1 mark)

.....

(d) State two factors within the seed and two outside the seed that cause dormancy.

(i) Within the seed. (2 marks)

.....

(ii) Outside the seed. (2 marks)

(e) Give two characteristics of the meristematic cells. (2 marks)

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18. How is the mammalian skin adapted to its functions? (20 marks)

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19. Explain how abiotic factors affect plants. (20 marks)

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