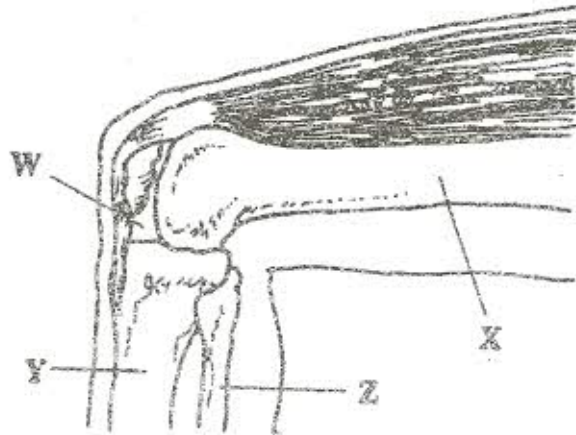


**K.C.S.E. BIOLOGY PAPER 231/2 2006**

**SECTION A (40 marks)**

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

1 The diagram below represents bones at a joint found in the hind limb of a mammal.



(a) Name the bones labelled X, Y and Z. (3 marks)

X .....

Y .....

Z .....

(b) (i) Name the substance found in the place labelled W. (1 mark)

.....

(ii) State the function of the substance named in (b) (i) above. (1 mark)

.....

(c) Name the structure that joins the bones together at the joint. (1 mark)

.....

(d) State the difference between ball and socket joint and the one illustrated in the diagram above. (1 mark)

.....

(e) Name the structure at the elbow that performs the same function as the patella. (1 mark)

.....

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2 (a) Name two disorders in humans caused by gene mutation. (2 marks)

.....  
.....

(b) Describe the following chromosomal mutations: (2 marks)

(i) inversion  
.....  
.....

(ii) translocation.  
.....  
.....

(c) In mice the allele for black fur is dominant to the allele for brown fur. What percentage offspring would have brown fur from a cross between heterozygous black mice and brown mice? Show your working.

Use letter B to represent the allele for black colour. (4 marks)

3 (a) Distinguish between pyramid of numbers and pyramid of biomass. (2 marks)

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.....  
.....

(b) Give three reasons for loss of energy from one trophic level to another in a food chain. (3 marks)

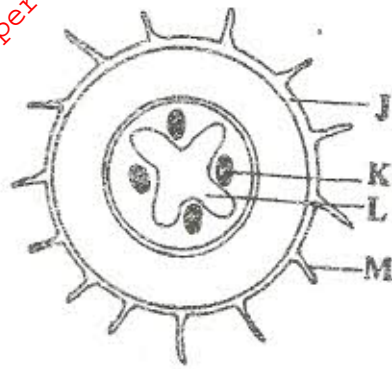
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(c) Describe how the belt transect can be used in estimating the population of a shrub in a grassland. (3 marks)

.....  
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4

The diagram below represents a transverse section through a plant organ.



(a) From which plant organ was the section obtained? (1 mark)

.....

(b) Give two reasons for your answer in (a) above. (2 marks)

.....  
.....

(c) Name the parts labelled J, K and L. (3 marks)

J .....

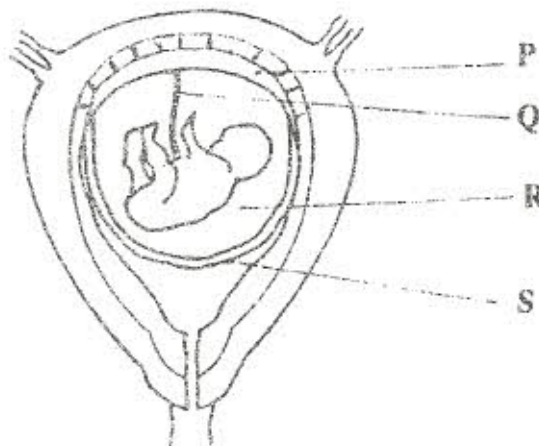
K .....

L .....

(d) State two functions of the part labelled M. (2 marks)

.....  
.....

The diagram below represents a human foetus in a uterus.



(a) Name the part labelled S. (1 mark)

.....

- (b) (i) Name the types of blood vessels found in the structure labelled Q. (2 marks)

.....  
.....

- (ii) State the difference in composition of blood found in the vessels named in (b) (i) above. (2 marks)

.....  
.....

- (c) Name two features that enable the structure labelled P carry out its function. (2 marks)

.....

- (d) State the role of the part labelled R. (1 mark)

.....

### SECTION B (40 marks)

Answer question 6 (compulsory) in the spaces provided and either question 7 or 8 in the spaces provided after question 8.

- 6 An experiment was carried out to investigate the effect of hormones on growth of lateral buds of three pea plants.

The shoots were treated as follows:

Shoot A - Apical bud was removed.

Shoot B - Apical bud was removed and gibberellic acid placed on the cut shoot.

Shoot C - Apical bud was left intact.

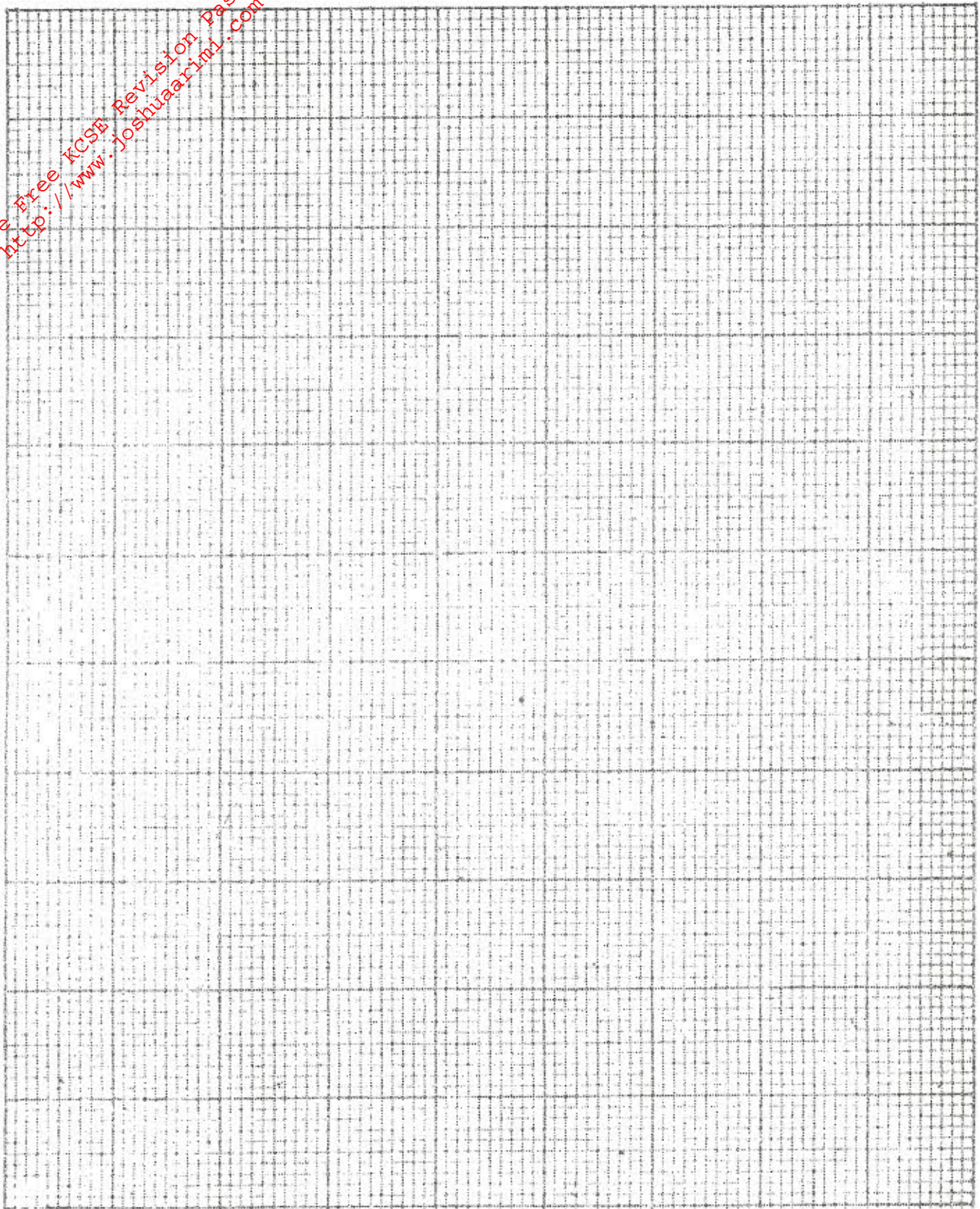
The lengths of the branches developing from the lateral buds were determined at regular intervals.

The results obtained are shown in the table below.

Time in days	Length of branches in millimetres		
	Shoot A	Shoot B	Shoot C
0	3	3	3
2	10	12	3
4	28	48	8
6	50	90	14
8	80	120	20
10	118	152	26

(a) Using the same axes, draw graphs to show the lengths of branches against time.

(8 marks)



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(b) (i) What was the length of the branch in shoot **B** on the 7th day? (1 mark)

.....

(ii) What would be the expected length of the branch developing from shoot **A** on the 11th day? (1 mark)

.....

(c) Account for the results obtained in the experiment. (6 marks)

.....  
.....  
.....  
.....  
.....

(d) Why was shoot **C** included in the experiment? (1 mark)

.....

(e) What is the importance of gibberellic acid in agriculture? (1 mark)

.....

(f) State two physiological processes that are brought about by the application of gibberellic acid on plants. (2 marks)

.....  
.....

7 Describe how the human kidneys function. (20 marks)

8 Describe how water moves from the soil to the leaves in a tree. (20 marks)

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