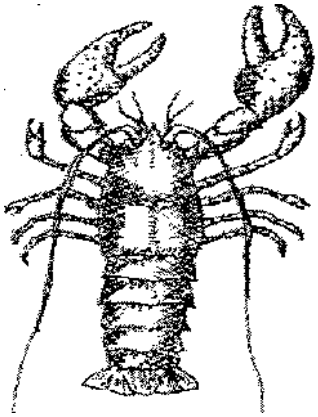
K.C.S.E PAST PAPERS

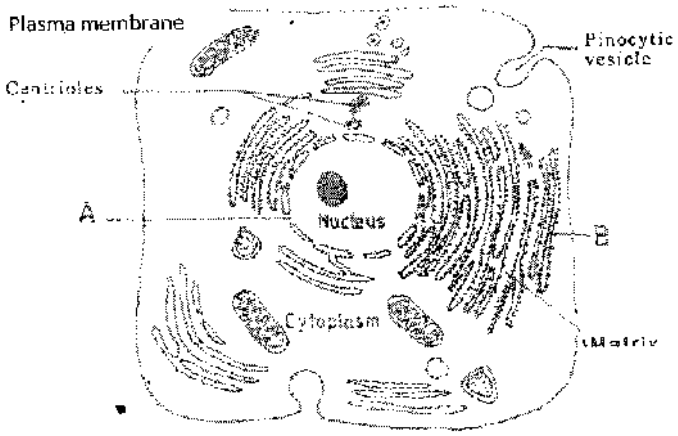
BIOLOGY PAPER 1 2012

1. How does nutrition as a characteristic of living organisms differ in plants and animals?
   (2marks)
2. The diagram below represents a certain organism collected by a student at the sea shore.



   (a) Name the class to which the organism belongs.
   (b) Give three reasons for your answer in (a) above.

3. The figure below is a fine structure of a generalised animal cell as seen under an electron microscope.



(a) Name the parts labelled A and B. (2mks)

A.....

B .....

(b) How is the structure labelled B adapted to its function? (2mks)

4. In an investigation, a student extracted three pieces of paw paw cylinders using a
cut back to 50 mm length and placed in a beaker containing a solution. The results
in the table below. (3 marks)

Feature	Result
Averag ngth of cylinders	56 mm
Stiffne f cylinders	stiff

(a) Account for the results in the table above. (3 marks)

(b) What would be a suitable control set-up for the investigation? (2 marks)

3. The table below shows results of a study of three plants C, D and E growing in different
(1 mark)

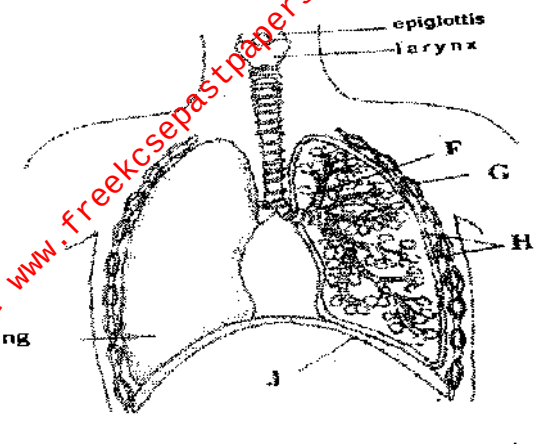
Feature	Plant C	Plant D	Plant E
Number of stomata on upper surface of leaf per	4	20	6
Number of stomata on lower surface of leaf per	6	0	8
Thickness of leaf cuticle	0.4	0.1 .	0.2
Surface area of roots (cm"[1])	2000	1000	1200

(a) Which one of the plants C, D and E grows in an area of relatively low water availability?

(b) Explain your answer in (i) above.

6. The diagram below represents part of the gaseous exchange system in human.

(2 marks)



(a) Name **the parts** labelled F and G.

F.....

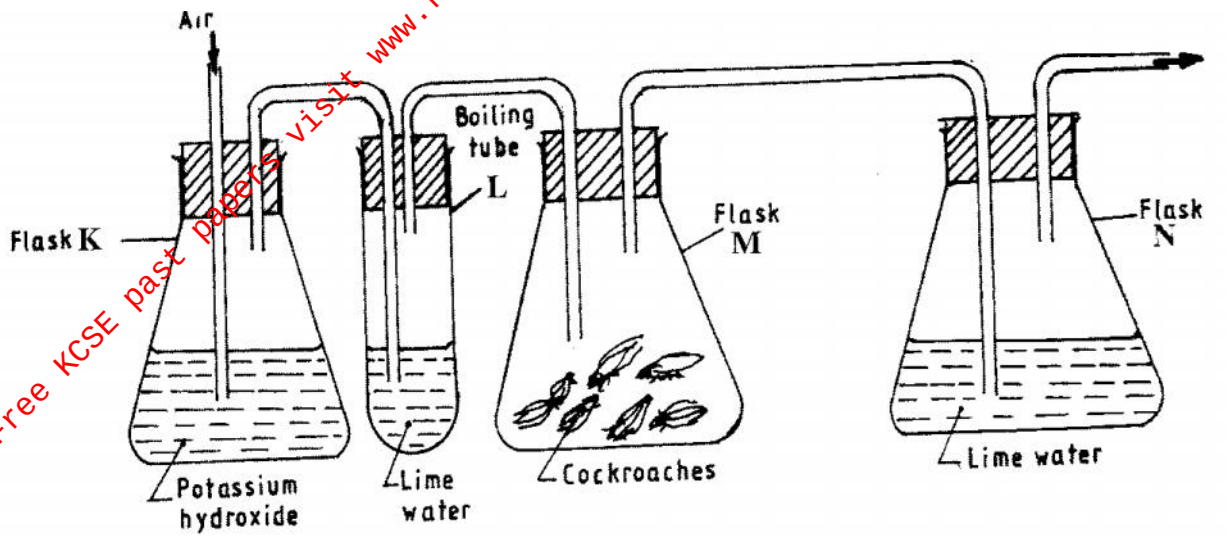
G.....

(b) State one function of each of the parts labelled H and J.

H.....

J.....

7. .The diagram below represents a set-up that students used in an investigation.



a) Name-the physiological process that was being investigated. (1 mark)

(b) State the role of potassium hydroxide in flask K. (1 mark)

(c) Account for the observation in boiling tube L and flask N. (2 marks) L.....

N.....

8. What is the probability of a couple with blood group AB getting a child with blood group AB? Show your working.
(4 marks)

9 State the importance of negative phototaxis to termites. (1 mark)

10 What is meant by the term irritability? (1 mark)

11 (a) State two ways in which heart muscles are special. *(2* marks)

(c) Name the muscles found in the following organs; (2 marks)

stomach;.....,.....,.....,.....
.

bone.....

12 (a) Name the part of a light microscope used to bring an image of a specimen into sharp focus. (I mark)

(b) Why is it recommended to keep the stage of the microscope dry? (1 mark)

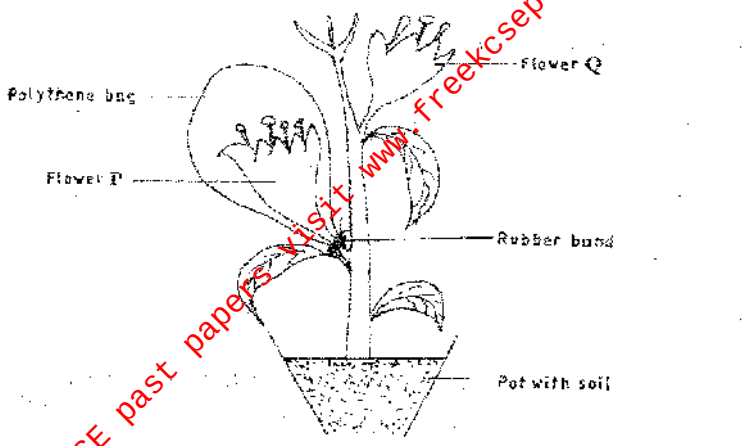
13 State **three** factors that affect the rate of diffusion. (3 marks)

14 (a) Name the type of respiration that is most efficient. (1 mark)

(b) Give a reason for your answer in (a) above (1mks)

15. What name is given to a group of hormones that controls the development of secondary sexual characteristics in a human male?
1 mk)

16.The diagram below represents an experimental set-up used by students to investigate a certain process.



Flower Q produced seeds while P did not. Account for the results.

17. Name two substances that leave the foetal blood through the placenta. (2 marks)

18.Why are plants able to accumulate most of their waste products for long? (1 mark)

19. List **four** symptoms of diabetes mellitus. (4 marks)

20. State **three** aspects that can be used to estimate growth in seedlings. (3 marks)

21. Name the process through which free atmospheric nitrogen is converted into nitrates. (l mark)

22. State the importance of divergent evolution to organisms. (2 marks)

23.Name the strengthening materials found in the following support tissues: (2 marks

(a) collenchyma;.....

(b) xylem.....

24. State four characteristics of apical meristem cells. (4 marks)

25 State the role of the following hormones in the life cycle of insects: (2 marks)

ecdysone hormone; ……„

juvenile hormone……

26 (a) State the theories of evolution proposed by the following scientists. (2 marks

Darwin……

Jean-Baptiste Lamarck……„.,……

(b) State the evidence of evolution based on

Cell

(i)organelles……

……

(ii) fossils……

……

…..

27. What is the function **of** contractile vacuoles in amoeba? (1mark)

28. state two differences between open and closed circulatory systems. (2 marks)

29.Name two nutrients that are absorbed without being digested by enzymes in humans. (2 marks)

30. Name the organelle that is involved in each of the following: (2 marks)

(a) manufacture of lipids ……

(b) formation of lysomes ……

2012 BIOLOGY QUESTIONS

Paper 2

SECTION A (40 marks)

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

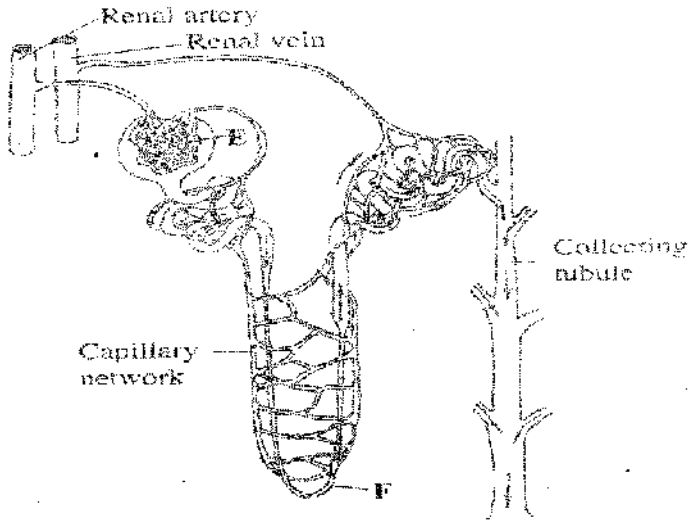
1. In a certain plant species which is normally green, a recessive gene for colour (n) causes the plants to be white in colour. Such plants die at an early age. In the heterozygous state, the plants are pale green in colour but grow to maturity.

(a) Give a reason for the early death of the plants with the homozygous recessive gene. (2 marks)

(b) If a normal green plant was crossed with the pale green plant, what would be the genotype of the first filial generation (F generation)? Show your working. (4 marks)

(c) If heterozygous plants were self-pollinated and the resulting seeds planted,work out the proportion of their offspring that would grow to maturity. (2 marks)

The diagram below illustrates the structure of the kidney nephron.



(a) Name the part labelled E.

(b) How is the part labelled F adapted to its function?

(c) State **three** physiological mechanisms of controlling the human body temperature during a cold day.

(a)In an investigation, equal amounts of water was placed in three test tubes labelled **G, H** and **J.** Pondweeds of equal. length were dropped in each test tube. The test tubes were then placed in identical conditions of light and carbon(IV) oxide at different temperatures for five minutes. After five minutes, the bubbles **produced in each test** tube were counted for one minute. The results were as shown in the table below.

Test tube	Temperature (°C)	Number of bubbles
G	20	28
H	35	42
J	55	10

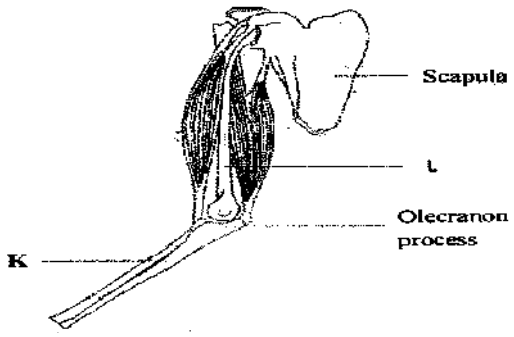
(i) Name **one** requirement for this process that is not mentioned in the investigation. (1 mark)

(ii) Name the gas produced in this investigation. (1 mark)

(iii) Account for the results in test tubes **H** and **J**. (2 marks)

(b) State **two** ways in which the human intestinal villus is adapted to its function. (4marks)

4. (a) The diagram below illustrates the arrangement of bones and muscles in the human arm.



(i) Name the bones labelled K and L. 2marks)

K.....
L.....

(ii) Explain how the upward movement of the lower arm is brought about by the bones and muscles shown in diagram above. (3 marks)

b) State **three** ways in which support is brought about in a leaf. (3 mark)

5. a) Describe the process of inhalation. (4marks)

b) Explain the mechanism of stomatal opening. (4marks)

SECTION B (40 marks)

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

6 The data provided below represent populations of a predator and its prey over a fifty years period.

TIME IN YEARS	POPULATION IN RELATIVE NUMBERS	
	POPULATION OF P	POPULATION OF Q
5 10	24500 30000	17000 20500

15	33500	26000
20	33500	30000
25	31000	33000
30	27000	32000
35 40	25000 29000	30000 27500
45	32500	28000
50	34000	28500

(a) (i) Using the same axes, draw graphs of the relative populations of P and Q against time. (7 marks)

(ii) With a reason, identify the curve that represents the prey.
(2 marks)

(iii) Account for the two populations between 25 and 32 years.
(2 marks)

(iv) Which years were the two populations equal?
(2 marks)

(v) Apart from predation, state **three** biotic factors that may have led to the decline of the prey population. (3 marks)

(b) Describe the hazards of air pollution by Sulphur (IV) Oxide.
(4 marks)

7. Using a relevant example in each case, describe simple and conditional reflex actions. (20 marks)

(a) Using a relevant example, describe how an allergic reaction occurs in a human being. (10 marks)

(b) Describe how environmental factors increase the rate of transpiration in terrestrial plants. (10 marks)