

BIOLOGY
PAPER 231/2
THEORY
JUNE 2010

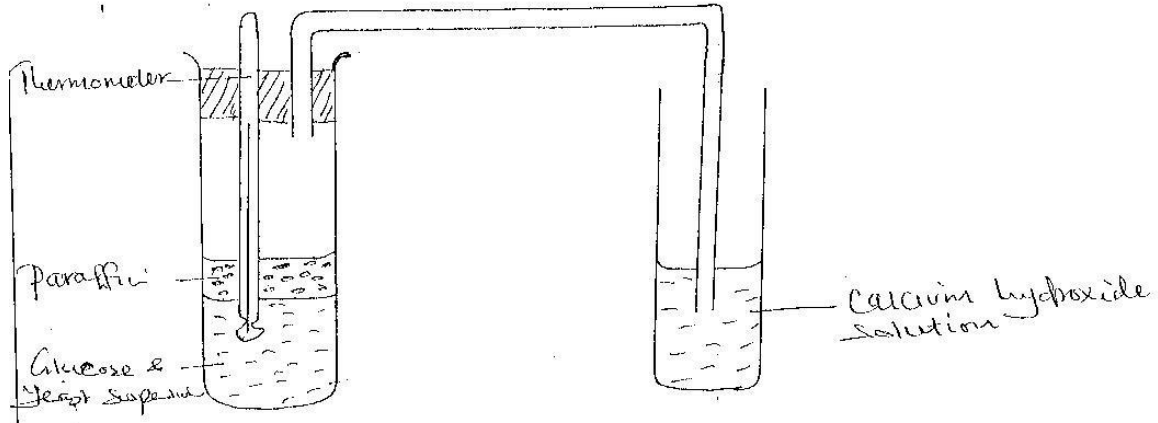
INSTRUCTIONS

This paper contains two sections, section a and b. Answer all the questions in Section a in the spaces provided.

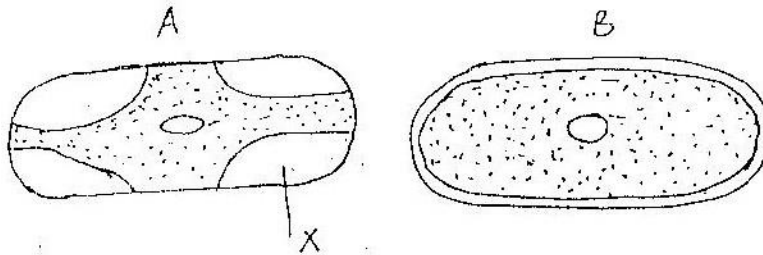
In section B question 6 is compulsory, then choose any one question between 7 and 8.

SECTION A -40 MARKS

1. The set up below illustrates an experiment to demonstrate a certain biological process. Before the addition of yeast the glucose solution was first boiled and then cooled to 40°C

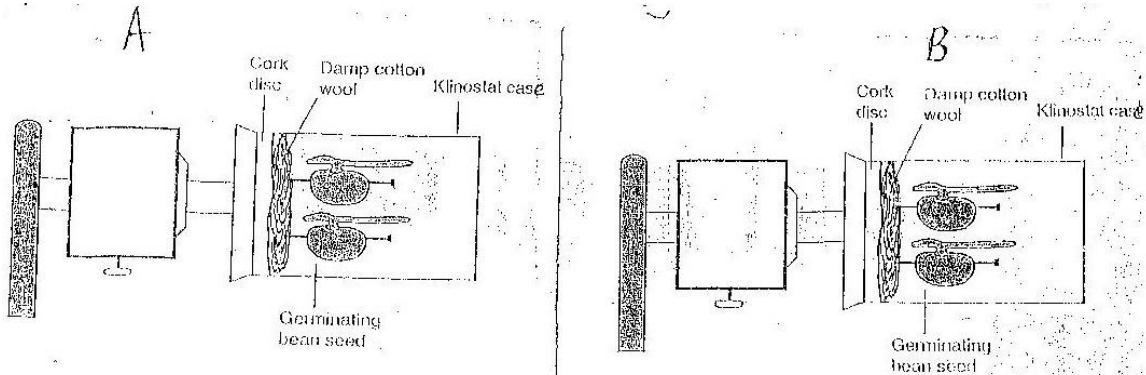


- What was the aim of the experiment (1mk)
 - What observations would you expect to make in the tubes a few minutes after the experiment has began. (2mks)
 - Explain the observations made in (b) above (2mks)
 - Why was glucose solution boiled before cooling to 40°C (1mk)
 - How can you set up a control for the experiment above (2mks)
2. The cells shown below were obtained from two different plant cells which were immersed in 2% and 25% salt solutions.

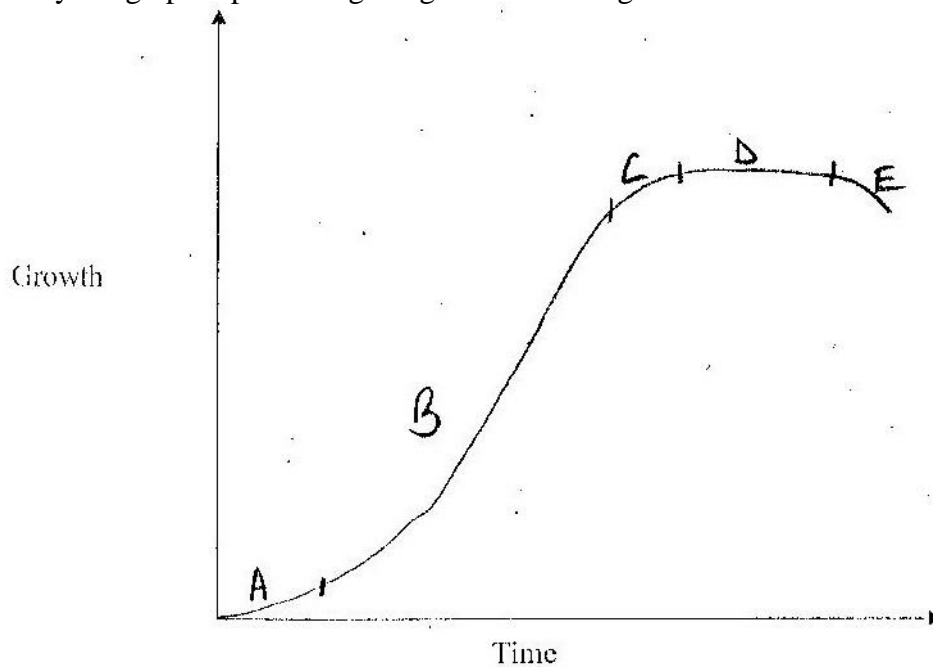


- Which of the two cells A and B, was immerse in 2% salt solution? Give a reason for your answer (2mks)
- Name the substance present in part marked x in cell a explain your answer (2mks)
- Comment on the nature of the 25% salt solution in relation to the cell sap (1mk)
- What biological phenomenon leads to the observations made in A (1mk)
 - State two importance of osmosis in plants (2mks)

3. Study the diagram below and answer the questions that follow, in A the klinostat was rotating at one rotation per hour; in B the klinostat was not rotating at all



- i) State the results of the experiment a and B after 2 days (2mks)
 A
 B
- ii) Explain the results seen in A and B (3mks)
 A
 B
4. Study the graph representing the growth of an organism



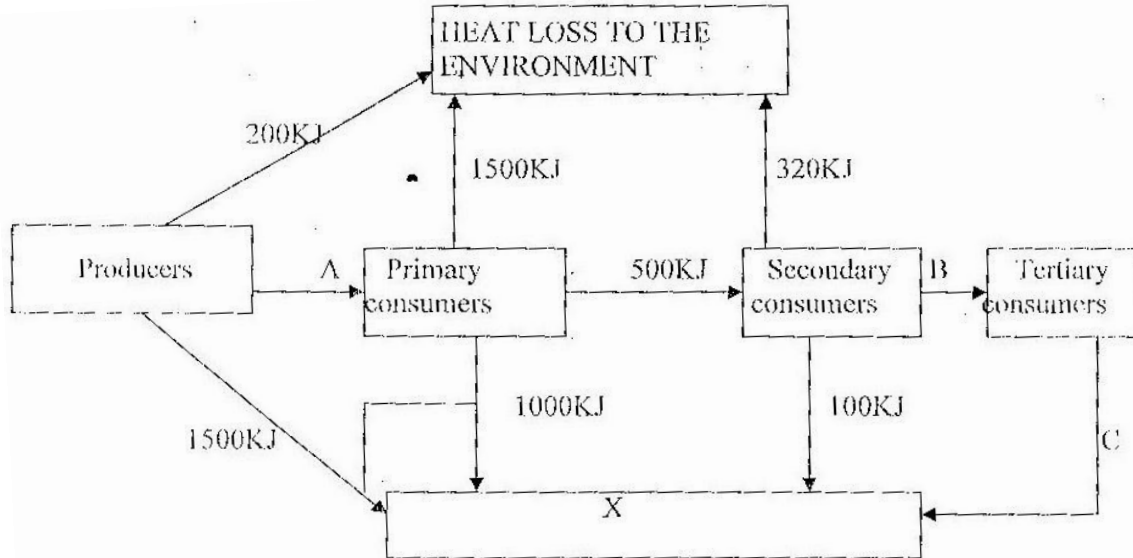
- a) Identify the type of growth curve represented by the graph (1mk)
- b) Suggest the parameters that might have been used to come up with the above graph (1mk)
- c) Account for the following phases
- i) Phase A (2mks)
- ii) Phase B (2mks)
- iii) Phase D (2mk)

5. In certain plant species which is normally green, a recessive gene for colour (n) causes the plant to be white when present in a homozygous state. Such plants die at early age. In heterozygous state, the plants are pale green in colour but grow to maturity
- a) Suggest a reason for the early deaths of plants with homozygous recessive gene (2mks)
 - b) If a normal green plant was crossed with a pale green plant, what would be the genotype of the F1 generation (show your working)
 - c) If seeds from the heterozygous plants were planted and the resulting plants allowed to self pollinate; work out the phenotypic ratio of the plants that would grow to maturity (2mks)
 - d) Give an explanation for occurrence of the pale green colour in heterozygous plants (1mk)

SECTION B -40 MARKS

Question 6 is COMPULSORY then choose any one between 7 and 8

6. In a savanna grassland ecosystem the following organisms were identified; grasses, squirrels, gazelles, lizards, insects larvae, wild dogs, snakes, hawks, vultures and lions
Energy flow in an ecosystem was also determined as follows



- a) Define the term ecology (2mks)
- b) Name the processes through which:
 - (i) Producer's convert sun's energy into chemical energy (1mk)
 - (ii) Living organisms convert chemical energy into heat energy lost to the environment (1mk)
- c) Identify organism X (1mk)
- d) (i) Determine the amount of energy represented by A and B (2mks)
 - A
 - B
- (ii) What is the total amount of energy present within the producers? (1mk)
- (iii) What percentage of energy in the producers is lost as heat before reaching the tertiary consumers? (1mk)
- (iv) If 75% of the energy in the tertiary consumers is lost as heat, calculate the amount of energy presented by C. (1mk)
- e) Explain briefly why it is advisable to feed one bag of maize grains to man instead of using the same bag of fatten steers, then supply beef to the human population (2mks)
- f) (i) Construct a food web that would be noticed in the above ecosystem. (5mks)
- (ii) What would be the effect of the following in the ecosystem?
 - (a) Removing all the dogs (2mks)
 - (b) Bush fire (2mks)

7. (a) Describe the absorption of water by plant roots. (10mks)
(b) Describe the forces involved in the movement of water to the leaves. (10mks)
8. Explain the evidence of organic evolution. (20mks)