

1904/105  
BIOLOGY TECHNIQUES I  
Oct./Nov. 2021  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
CRAFT CERTIFICATE IN SCIENCE LABORATORY TECHNOLOGY

MODULE I

BIOLOGY TECHNIQUES I

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Non-programmable scientific calculator.*

*This paper consists of TWO sections; A and B.*

*Answer ALL questions in section A and any TWO questions from section B in the answer booklet provided.*

*Each question in section A carries 4 marks while each question in section B carries 20 marks.*

*Maximum marks for each part of a question are indicated.*

*Candidates should answer the questions in English.*

**This paper consists of 5 printed pages.**

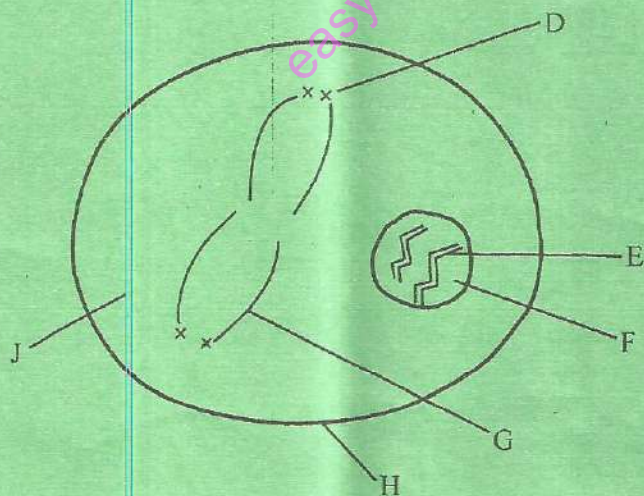
**Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**



**SECTION A (60 marks)**

*Answer ALL questions in this section.*

1. Differentiate between prokaryotes and eukaryotes in terms of:
  - (a) flagella; (2 marks)
  - (b) respiration. (2 marks)
2. Differentiate between low power objective lens and high power objective lens in terms of:
  - (a) magnification; (1 mark)
  - (b) focal length; (1 mark)
  - (c) working distance; (1 mark)
  - (d) resolving power. (1 mark)
3. State **four** functions of cell plasma membranes. (4 marks)
4. Figure 1 illustrates cell division in a somatic cell.



**Fig. 1**

- (a) Identify the stage of cell division. (1 mark)
  - (b) Name the parts labelled D, E, F, G, H and J. (3 marks)
5. Outline the emulsion procedure for food test and the expected results. (4 marks)



6. Draw any **four** named shapes of bacteria. (4 marks)
7. Using a labelled diagram, explain the effect of carbon dioxide on the rate of photosynthesis. (4 marks)
8. State **four** functions of the non-ruminant stomach in digestion. (4 marks)
9. Outline conditions for efficient gaseous exchange in mammals. (4 marks)
10. List **four** components of the lymphatic system. (4 marks)
11. Describe fertilization in flowering plants. (4 marks)
12. (a) Name the **three** accessory glands associated with male reproductive system. (3 marks)  
(b) State **one** function of Vas deferens tube. (1 mark)
13. Differentiate between mitosis in plants and animals. (4 marks)
14. State **two** advantages and **two** disadvantages of blood collection from marginal ear vein of a rabbit. (4 marks)
15. Draw a labelled diagram of the Bowman's capsule. (4 marks)

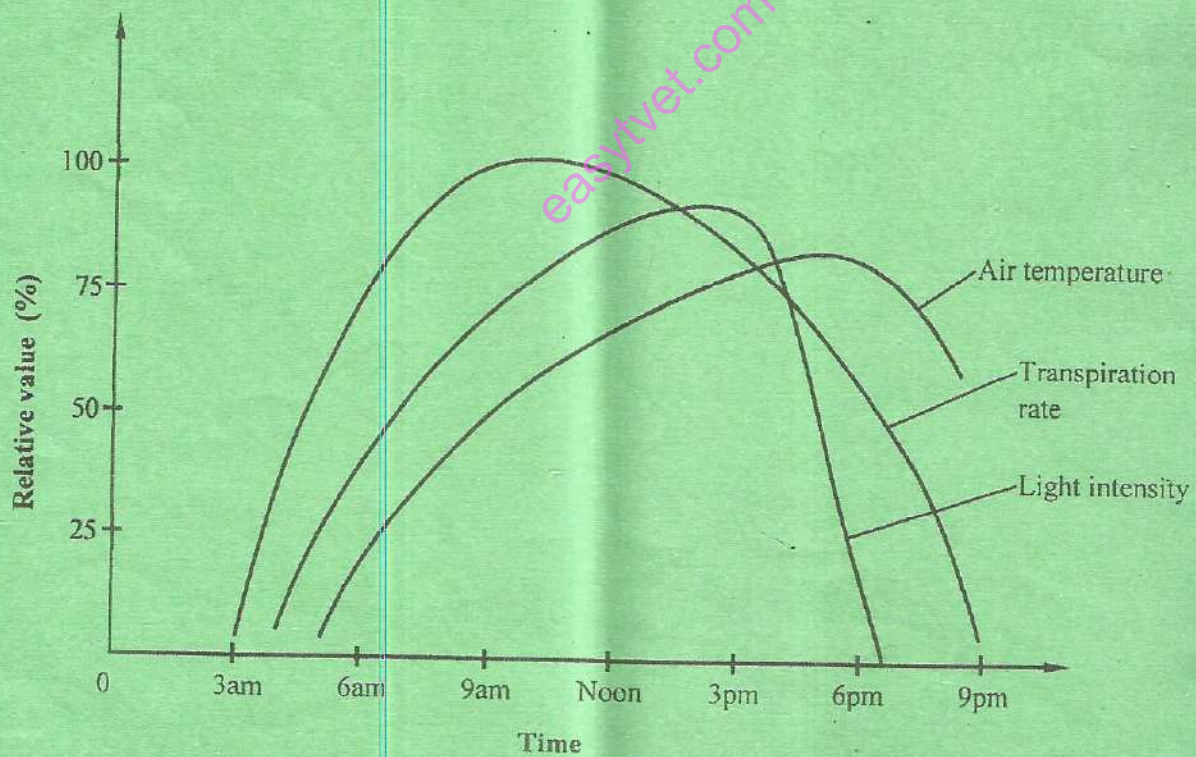


**SECTION B (40 marks)**

Answer any **TWO** questions from this section.

16. (a) Giving **one** specific example in each case, classify culture media based on:
- (i) nutrient factors;
  - (ii) phases of growth.
- (10 marks)
- (b) (i) Outline the preparation of a bacterial lawn culture. (6 marks)
- (ii) Name **four** bacteria culturing methods other than lawn culturing. (4 marks)

17. Figure 2 represents the relationship between light intensity, air temperature and transpiration in a tropical plant.



**Fig. 2**

Explain the relationships between the three variables.

(20 marks)



18. (a) List the blood vessels and organs, in sequence, through which urea passes to reach the kidneys from the liver. (12 marks)
- (b) (i) Relate the structure of proximal convoluted tubules to its function. (3 marks)
- (ii) Name the substances reabsorbed in proximal convoluted tubules. (5 marks)
19. (a) Differentiate between arteries and veins in mammals. (10 marks)
- (b) Describe the functions of mammalian blood. (10 marks)

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