1904/105
BIOLOGY TECHNIQUES I
June/ July 2020
Time: 2 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** the 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. State **three** differences and **one** similarity between Hydrozoa from Scyphozoa. (4 marks)

2. (a) Define the term 'resolution of a microscope'. (1 mark)

   (b) An image measures 50 mm while the object measures 5 μm on a compound microscope. Calculate the magnification of the object. (3 marks)

3. State the functions of each of the following organelles:

   (a) lysosomes; (1 mark)

   (b) endoplasmic reticulum. (3 marks)

4. Outline the preparation of a temporary slide of a stained onion tissue. (4 marks)

5. Describe the emulsion test for lipids and the expected positive results. (4 marks)

6. Figure 1 represents a cell undergoing cell division.

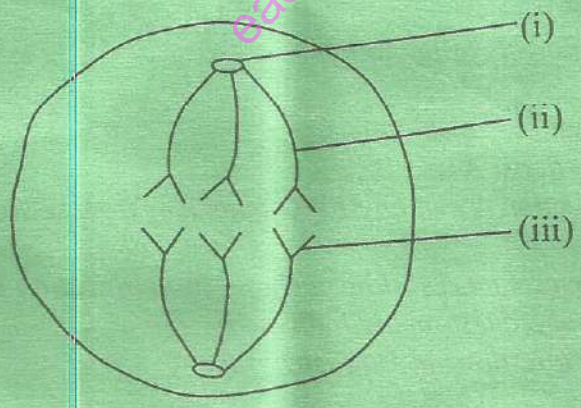

Fig. 1

   (a) Identify the stage of cell division. (1 mark)

   (b) Name the structures labelled (i), (ii) and (iii). (3 marks)

7. Figure 2 represents the reaction rate of an enzyme controlled reaction.

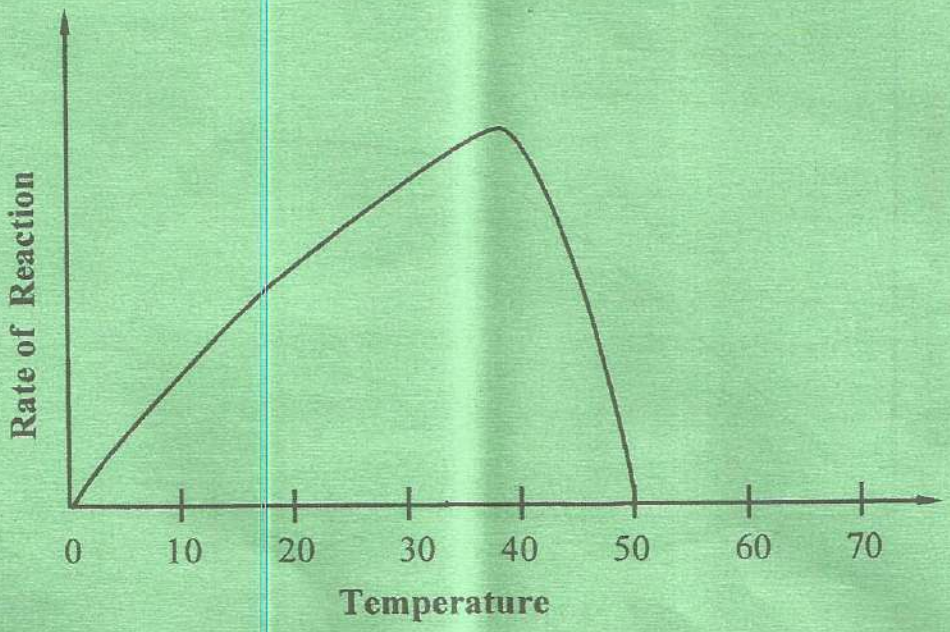

Fig. 2

Explain the effect of temperature on the rate of reaction. (4 marks)

8. Identify each of the following bacterial shapes:

(a)  (1 mark)

(b)  (1 mark)

(c)  (1 mark)

(d)  (1 mark)

9. Figure 3 represents the effects of light intensity on the rate of photosynthesis.

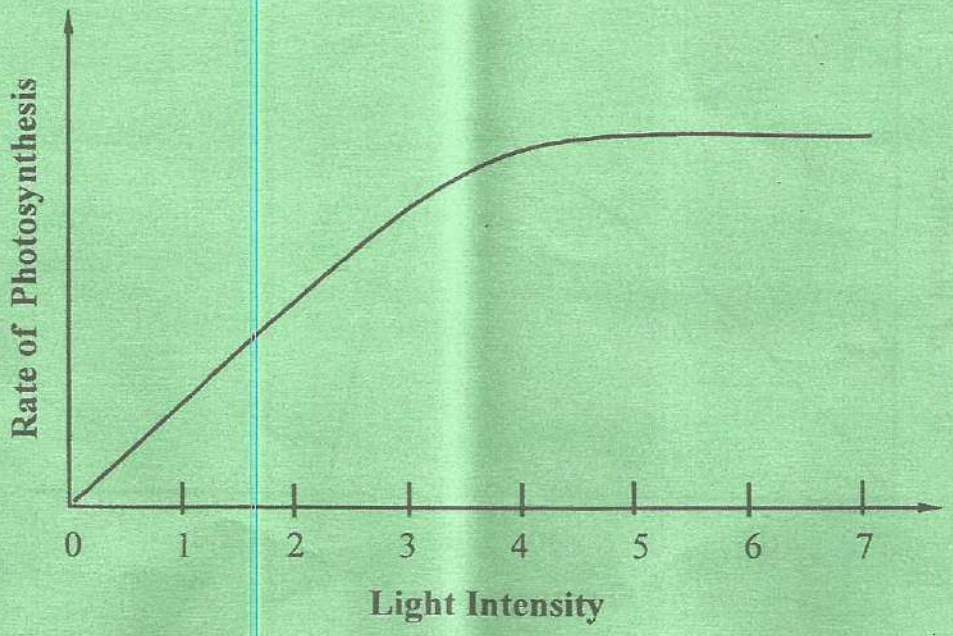

Fig. 3

Explain the effect of light intensity on the rate of photosynthesis. (4 marks)

10. The dental formula of a certain animal is given by $\frac{0}{3};\frac{0}{1};\frac{3}{3};\frac{3}{3}$

(a) Identify the animal. (1 mark)

(b) Relate the dental formula to the feeding habit of the animal. (3 marks)

11. Distinguish between each of the following lung volumes:

(a) tidal volume and vital capacity; (2 marks)

(b) residual volume and dead space. (2 marks)

12. Relate the structure of nephron to its function. (4 marks)

13. (a) Name any **two** blood plasma components. (2 marks)

(b) State the functions of each component in (a). (2 marks)

14. Describe the whorl of a complete flower. (4 marks)

15. State the functions of each of the following in a male reproductive system:

(a) prostate gland; (2 marks)

(b) seminal vesicles; (1 mark)

(c) Cowper's gland. (1 mark)

SECTION B (40 marks)

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

16. (a) Outline the working of an autoclave. (15 marks)

(b) State **five** characteristics of an ideal microbial culture media. (5 marks)

17. (a) Differentiate between mitosis in plant and animal cells. (8 marks)

(b) Explain the significance of mitosis. (8 marks)

(c) Using a labelled diagram, illustrate a cell undergoing division at metaphase 1 stage. (4 marks)

18. (a) Outline the series of events in human cardiac cycle. (15 marks)

(b) Name the structures through which red blood cells flow from superior vena cava to the dorsal aorta. (5 marks)

19. (a) Describe the formation of lymph. (10 marks)

(b) Relate the structure of human stomach to its function. (10 marks)

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