

1904/105  
BIOLOGY TECHNIQUES I  
June/July 2019  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL  
CRAFT CERTIFICATE IN SCIENCE AND LABORATORY TECHNOLOGY  
MODULE I

BIOLOGY TECHNIQUES I

3 hours

**INSTRUCTIONS TO CANDIDATES**

*You should have the following for this examination:*

*Answer booklet;*

*Scientific calculator (battery operated);*

*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 question are indicated.*

*Candidates should answer the questions in English.*

**This paper consists of 3 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 the questions in this section.

1. List any **four** adaptations of seed plants to life on land. (4 marks)
2. Differentiate between class hydrozoa (hydrids) and class scyphozoa (jelly fish). (4 marks)
3. Describe the care and maintenance of microscope lenses and slides. (4 marks)
4. Draw a labelled diagram of a mitochondrion. (4 marks)
5. With the aid of a labelled diagram, illustrate the anaphase of mitotic cell division. (4 marks)
6. A plant cell X was placed in a very hypertonic solution. After an hour, the cell was observed under the microscope. The cell was found to have shrunken protoplast. Explain:
  - (a) What occupies the space between the cell wall and the shrunken protoplast. (2 marks)
  - (b) The  $\psi_p$  of the plant cell X. (2 marks)
7. Name the basic unit molecules that comprise:
  - (a) Nucleic acid; — (1½ marks)
  - (b) Polysaccharide; — (½ mark)
  - (c) Amino acids; — (1½ marks)
  - (d) Sucrose. — (½ mark)
8. List **four** uses of spread plate technique in microbiology. (4 marks)
9. Differentiate between light-dependent and light independent reactions in photosynthesis in terms of:
  - (a) Locations in chloroplasts; (1 mark)
  - (b) End products (detailed reactions not required). (3 marks)
10. Explain any **four** processes involved in holozoic nutrition. (4 marks)
11. (a) Name any **four** types of respiratory surfaces found in animals. (2 marks)  
(b) Give **one** class of animals using the respiratory surfaces mentioned in (a) above. (2 marks)

12. List any **four** functions of a kidney. (4 marks)
13. State any **four** differences between arteries and veins. (4 marks)
14. Describe the structure and functions of the males reproductive organs of a flower. (4 marks)
15. Explain the functions of each of the following glands in human male reproductive systems:
- (a) Prostrate glands; (2 marks)
- (b) Cowper's glands. (2 marks)



**SECTION B (40 marks)**

*Answer any TWO questions from this section.*

16. (a) Describe the prophase I of meiosis. (11 marks)
- (b) Explain **three** effects of exercise on:
- (i) respiratory system; (3 marks)
- (ii) cardiovascular system. (3 marks)
- (c) Give any **three** factors that cause oxygen to be unloaded from blood supplying active muscle tissue. (3 marks)
17. Outline the role of each of the following organs in excretion:
- (a) Liver; (10 marks)
- (b) Skin. (10 marks)
18. (a) Explain the significance of the lock and key model of enzyme action. (5 marks)
- (b) Describe any **five** types of enzyme inhibition. (15 marks)
19. (a) Explain the role of environmental factors on the rate of transpiration. (12 marks)
- (b) Outline the preparation of a temporary slide of a stem tissue. (8 marks)



**THIS IS THE LAST PRINTED PAGE.**