MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2013/2014
DEPARTMENT OF COMPUTING AND APPLIED SCIENCES
End of Semester Examination for Science Laboratory Technology Craft I
Biology Techniques

Date: Wednesday 26th March, 2014 **Time:** 2 Hours

INSTRUCTIONS:

1. *Write your Admission number on the answer booklet*
2. *Answer **all questions** in **section A** and select **2 questions** from **section B***

SECTION A

1. Sketch diagrams to show the morphology of the following types of bacteria (4 marks)

   i). Bacillus, ii). Streptococcus, iii) Staphylococcus and iv). Diplococcus

2. State the function of each of the following classes of culture media (8 marks)

   i). Transport medium, ii). Enriched medium, iii). Enrichment medium iv). Selective media

3. When red blood cell are placed in a hypertonic solution, they shrink and lose their spherical form

a) Which physiological process is responsible for this observation? (2marks)

b) Describe the physiology responsible for this observation (4marks)

4. Explain the relationship between an Antigen and an Antibody (4marks)

6. The following table shows arbitrary units of an enzyme activity in relation to substrate concentration.

Substrate Concentration	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5
Rate of Enzyme Activity	2.0	3.0	9.0	10.0	11.0	15.0	15.0	15.0

a). Explain the general trend illustrated by this table (2 marks)

b). Suggest the reason for the enzyme activity at concentration 4.0, 6.5, and 7.5 (6 marks)

c). What reagents and materials would you use to demonstrate this observation? (2 marks)

5. State the function of the following parts of a light microscope (5 marks)

i). Cover slip, ii). Stage, iii). Ocular lens, iv). Coarse Adjustment and v). Mirror

6. Explain the functioning of an anemometer and a sunshine recorder (6 marks)

7. Draw a well labeled flow chart to represent the process of blood clotting (5 marks)

8. Work out the final magnification for a microscope whose working tube length is 180mm, objective lens x 80, eye piece x10 (2marks)

9. (a) What is a buffer and what is its role of in living organisms (2 marks)

10. State the difference between sterilization and disinfection (4 marks)

11. State the difference between anaerobic respiration in plants and in animals (4marks)

SECTION B

12. a). Complete the table below and show the compatibility of blood groups during transfusion using a tick (√) for compatibility and a cross (×) for incompatibility, (8 marks)

b). Explain the meaning of a universal donor and universal recipient (4 marks)

c). Using examples differentiate between simple and compound fixatives (8marks)

RECIPIENT

DONOR	A	B	AB	O
A				
B				
AB				
O				

13. Describe how you would go about to set up an activity to observe your own Red Blood Cells under the light microscope in the Laboratory (15marks)

(b) Discuss the role of any five nutrients in plant and animal nutrition (5marks)

14. (a) Describe the following methods of chemical sterilization: (i) Flaming (ii) Incineration (iii) Hot air oven (iv) Dry heat (16 marks)

(b) Explain how competitive and non-competitive enzyme inhibitors function (5marks)