**CYTOPOGY, HISTOLOGY AND GENETICS**

**Oct./Nov.2013**

**Time: 3 hours**

**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**DIPLOMA IN APPLIED BIOLOGY**

**CYTOLOGY, HISTOLOGY AND GENETICS**

3 HOURS

SECTION A

Answer all the questions in this section in the spaces provided.

1. (a) Explain how darkfield microscopy reduces the amount of light entering the lens. (2 marks)

(b) Name the parts in an electron microscope involved in:

(i) electron production. (1 mark)

(ii) directing electrons towards the stage. (1mark)

2. Differentiate between mitosis in plant and animal cells. (4 marks)

3. Two plants cells A and B which are adjacent have water potential – 800kpa and -650 kpa respectively.

(a) Name the cell with the higher water potential. (1 mark)

(b) Explain the water diffusion across the two plant cells. (2 marks)

(c) Calculate the potential at equilibrium. (1 mark)

4. Explain how:

(a) a cell may reduce its production of metabolite. (2 marks)

(b) the effect of increasing substrate concentration on an enzyme differs in irreversible inhibitor from that of allosteric inhibitor. (2 marks)

5. State:

(a) the fault that may be observed in section which have undergone inadequate impregnation. (1 mark)

(b) the remedy in 5(a) above. (3 marks)

6. State the advantages and disadvantages of Lenchart embedding iron. (4 marks)

7. State the constituents of:

(a) Boun’s fluid fixative. (2 marks)

(b) Carnoy’s fluid fixative. (2 marks)

8. Figure 1, below, shows the gene loci of 12 alleles situated on a pair of chromosomes.



(a) State the terminology used to describe the chromosome shown in figure 1. (1 mark)

(b) Suggest, with reasons, the two gene Loci where crossing-over is likely to occur. (3 marks)

9. In fowl, the colour of feathers is controlled by 2 sets of genes, including the following:

W(white) dominant over(w) (other colours)

B(black) dominant over (b)(brown)

The heterozygote F1 genotype WwBb is white. Account for this type of gene interaction. (4 marks)

10.(a) Write the genotype of Klinefactor’s syndrome condition. (1 mark)

(b) Describe the phenotypic abnormalities resulting from Klinefetter’s syndrome. (3 marks)

SECTION B: (60 m arks)

Answer any THREE questions in this section in the spaces provided at the end of question 15.

11. Compare and contrast the process of mitosis and meiosis. (20 marks)

12. Discuss the significance of cell wall in plants. (20 marks)

13. (a) Describe the cris-du-chat syndrome. (5 marks)

(b) Illustrate the genetic inheritance of haemophilia from two carrier parents. (15 marks)

14. (a) State the importance of the boiling phase in beer making. (5 marks)

(b) Describe the process of cheese production. (15 marks)

15. (a) (i) Name any three permanent mountants. (3 marks)

(ii) State the characteristics of an ideal mounting media. (4 marks)

(b) Outline the procedure of staining paraffin waxed section using haematoxylin-eosin. (13 marks)