MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR
SECOND YEAR FIRST SEMESTER

SCHOOL OF SCIENCE AND INFORMATION SCIENCES
BACHELOR OF SCIENCE

COURSE CODE: BOT 2106/FEM 2212
COURSE TITLE: PRINCIPLES OF GENETICS/GENETICS & EVOLUTION

DATE: 3RD DECEMBER, 2018 **TIME: 0830 - 1030 HRS**

Instructions

a. Select **ONLY TEN** Questions (7 marks each).

b. Illustrate your answers with well labeled diagrams where appropriate.

This paper consists of 2 printed pages. Please turn over.

1. Describe the behaviour of chromosomes in mitosis. **(7 marks)**

2. Discuss evidences that support the theory of evolution. **(7 marks)**

3. Describe briefly the semi-conservative process of DNA replication. **(7 marks)**

4. Sketch and label four different types of chromosomes based on the position of the centromere. **(7 marks)**

5. Briefly explain why Mendel's approach to the study of heredity was so successful. **(7 marks)**

6. Outline general characteristics that a genetic material must possess. **(7 marks)**

7. Explain how is sex determined in insects with haplodiploid sex determination. **(7 marks)**

8. A student mixes some heat-killed type IIS *Streptococcus Pneumonia* bacteria with live type IIR bacteria and injects the mixture into a mouse. The mouse develops pneumonia and dies. The student recovers some type IIS bacteria from the dead mouse. It is the only experiment conducted by the student. **(7 marks)**

a) Has the student demonstrated that transformation has taken place? (3 marks)

b) What other explanations might explain the presence of the type IIS bacteria in the dead mouse? (4 marks)

9. Describe the role of the microtubules in chromosome movement during mitosis and meiosis. **(7 marks)**

10. Explain how a purine differ from a pyrimidine and what purines and pyrimidines are found in DNA and RNA. **(7 marks)**

11. Describe two processes unique to meiosis that are responsible for genetic variation. **(7 marks)**

12. Briefly define the following terms as used in genetics: **(7 marks)**

(a)gene; (1 mark)
(b)allele; (1 mark)
(c)chromosome; (1 mark)
(d)DNA; (1 mark)
(e)genotype; (1 mark)
(f)phenotype; (1 mark)
(g)evolution. (1 mark)

13. Briefly explain why genetics is crucial to modern biology. **(7 marks)**

14. Describe briefly Darwin's theory of natural selection **(7 marks)**

15. Describe the lac operon model involved in gene regulation in bacteria. **(7 marks)**

//END