TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BMLS

AAB 4209 : HUMAN GENETIC AND MOLECULAR BIOLOGY

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Dec 2016

Instructions to Candidates

You should have the following for this examination

Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

a. Which of the following statement/s are not true; (10 marks)

1. Meiosis differs from mitosis in the following ways:

   i. Daughter cells are haploid, not diploid

   ii. Meiosis is restricted to the gametes and mitosis occurs only somatic cells

   iii. In mitosis there is only one division

   iv. Meiosis generates genetic diversity

   v. The prophase stage of mitosis is one step; in meiosis I there are four stages

2. Base substitutions:

   i. May result in non-sense mutations

   ii. Can affect splicing

   iii. Are always pathogenic in

   iv. Can affect gene expression

   v. Result in frame shift mutations

3. Transcription:

i. Describes the production of polypeptides from the mRNA template

ii. Occurs in the nucleus:

iii. Produces single-stranded mRNA using the antisense DNA strand as a template

iv. Is regulated by transcription factors that bind to the 3' UTR

v. Precedes 5' capping and polyadenylation

4. Chromosome abnormalities reliably detected by light microscopy include

i. Trisomy

ii. Monosomy

iii. Reciprocal translocation

iv. Interstitial deletion

v. Robertsonian translocation

5. Fluorescent in-situ hybridization using whole-chromosome (painting) or specific locus probes enables routine detection of:

i. Gene amplification

ii. Sub-telomeric deletion

iii. Trisomy

iv. Super numerary marker chromosomes

v. Reciprocal translocation

b. Differentiate between mini and microsatellite (5 marks)

c) Describe two causes of Aneuploidy (4 marks)

d) List three differences between meiosis and mitosis (6 marks)

e) Compare the dark and pale bands of human chromosomes (5 marks)

Question TWO

Explain the following methods of labelling DNA for hybridization;

a) Outline the random primed DNA labeling method (10 marks)

b) Describe the occurrence of blood chimeras (10 marks)

Question THREE

a) Explain the functionally identical genes in the human nuclear genome (10 marks)

b) Describe the eukaryotic chromosomes (10 marks)

Question FOUR

a) Explain the paracentric inversions (10 marks)

b) Describe the end-labeling of DNA technique (10 marks)

Question FIVE

Explain tissue in situ hybridization (20 marks)