



# TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

**UNIVERSITY EXAMINATION FOR:**

**BMLS**

**AAB 4209 : HUMANGENETICS AND MOLECULAR BIOLOGY**

**SPECIAL SUPPLEMENTARY EXAMINATION**

**SERIES: AUGUST 2017**

**TIME: 2 HOURS**

**DATE:** Pick Date Sep 2017

## **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.**

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## **Question ONE**

a. Which of the following statement/s are not true;

(10 marks)

1. The following are directly involved in DNA repair:

- i. Glycosylases
- ii. DNA polymerases
- iii. Ligases
- iv. Splicing
- v. Ribosomes

2. During DNA replication:

- i. DNA helicase separates the double-stranded
- ii. DNA is synthesized in one direction,
- iii. Okazaki fragments are synthesized
- iv. DNA is synthesized in a conservative manner
- v. Uracil is inserted to pair with adenine

3 Chemicals used in the preparation of metaphase chromosomes for light microscopy include:

- i. Colchicine
- ii. Phytohemagglutinin

- iii. Giemsa
- iv. Quinacrine
- v. Hypotonic saline

4. The the polymerase chain reaction (PCR) refers to:

- i. A type of cell-free cloning
- ii. A process that uses a heat-labile DNA polymerase
- iii. A very sensitive method of amplifying DNA that can be prone to contamination
- iv. A technique that can routinely amplify up to 100kb of DNA
- v. A method of amplifying genes that requires no prior sequence knowledge

5. The following techniques can be used to screen genes for unknown mutations which one/s can not:

- i. Sequencing
- ii. Single-stranded conformational polymorphism (SSCP)
- iii. Denaturing high-performance liquid chromatography (DHPLC)
- iv. Oligo nucleotide ligation assay (OLA)
- v. Real-time PCR

- b. Differentiate between domain and motif (5marks)
- c) Describe the following types of chromosomes (4 marks)
  - i) telocentric ii) acrocentric iii) metacentric iv) sub metacentric
- d) Describe the following types of genes with highly conserved domains (6 marks)
  - i) PAX genes ii) SOX genes
- e) Highlight the properties of telomeric DNA (5 marks)

**Question TWO**

- a) Describe three factors affecting melting temperature and hybridization stringency (6 marks)
- b) Explain the principle of nucleic acid hybridization (14 marks)

**Question THREE**

- a) Explain gain of function gene mutation using examples (10 marks)
- b) Describe the Prophase I stage of meiosis 1 (10 marks)

**Question FOUR**

Discuss pericentric inversions chromosomal mutation (20 marks)

**Question FIVE**

Explain chromosome in situ hybridization (20 marks)