



**KISII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**

**SPECIAL/SUPPLEMENTARY EXAMINATIONS**  
**FIRST YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF**  
**BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES**  
**SECOND SEMESTER, 2024/2025**  
**(AUGUST, 2025)**

**MELS 151: MOLECULAR BIOLOGY AND GENETICS**

**STREAM: Y1S2**

**TIME: 2 HOURS**

**DAY: TUESDAY, 12:00-2:00 PM**

**DATE: 12/08/2025**

**INSTRUCTIONS**

***1. Do not write anything on this question paper.***

**SECTION A: MULTIPLE CHOICE QUESTIONS (20 marks)**

1. The tendency of an offspring to resemble its parent is known as \_\_\_\_\_
  - a. Variation
  - b. Heredity
  - c. Resemblance
  - d. Inheritance
2. The alternate form of a gene is \_\_\_\_\_
  - a. Alternate type
  - b. Recessive trait
  - c. Dominant trait
  - d. Allele
3. An exception to Mendel's law is \_\_\_\_\_
  - a. Independent assortment
  - b. Linkage
  - c. Dominance
  - d. Recessive
4. Cystic fibrosis is \_\_\_\_\_ disorder
  - a. Sex-linked recessive
  - b. Autosomal dominant

- c. Autosomal recessive
  - d. Sex-linked dominant
5. Which of the following is incorrect with respect to mutation?
- a. Sudden
  - b. Continuous
  - c. Change in chromosomes and genes
  - d. Leads to variations in DNA
6. Which of the following is a classic example of point mutation?
- a. Phenylketonuria
  - b. Sickle cell anaemia
  - c. Haemophilia
  - d. Thalassemia
7. Marriages between close relatives is avoided because it causes \_\_\_\_\_
- a. Abnormalities in child birth
  - b. Mutations
  - c. Recessive alleles to come together
  - d. Multiple births
8. Which of the following functions is not performed by transposase?
- a. Restriction of the IS element
  - b. Integration of the transposon
  - c. Formation of the RNA intermediate
  - d. Restriction of the host genome
9. Which of the following is a function of primase
- a. Catalyze synthesis of RNA primer
  - b. Proofreading
  - c. Polymerization
  - d. Exonuclease activity
10. Jacob's syndrome is a \_\_\_\_\_
- a. Trisomy 13
  - b. Trisomy 21
  - c. Trisomy 18
  - d. Sex chromosome aneuploidy
11. The ends of chromosomes are called \_\_\_\_\_
- a. Centromere
  - b. Satellite
  - c. Kinetochore
  - d. Telomere
12. How many sex chromosomes are present in a human being?
- a. 1 pair
  - b. 2 pairs
  - c. 3 pairs
  - d. 4 pairs

13. A fully expressed allele is referred to as \_\_\_\_\_
- Dominant
  - Recessive
  - Homologous
  - Heterozygous
14. How many autosomes are present in a human being?
- 20 pairs
  - 23 pairs
  - 22 pairs
  - 44 pairs
15. In protein synthesis, translocation is initiated with the movement of \_\_\_\_\_
- The tRNA from P-site to the A-site
  - The dipeptidyl tRNA from A-site to P-site
  - The tRNA from A-site to P-site
  - The tRNA from P-site to E-site
16. The process by which protein synthesis from genetic code occurs is known as \_\_\_\_\_
- Transcription
  - Replication
  - Reproduction
  - Translation
17. Which of the following drugs inhibit the initiation step of translation
- Ricin
  - Tetracycline
  - Streptomycin
  - Cyclohexylamine
18. Which complications can occur in severe Thalassemia?
- Enlarged spleen
  - Bone deformities
  - Problems with heart
  - All of the above
19. RNA contains uridine, it is a \_\_\_\_\_
- Nucleotide
  - Pyrimidine
  - Purine
  - Nucleoside
20. Anticodon is present in \_
- DNA
  - tRNA
  - rRNA
  - mRNA

**SECTION B: ANSWER ALL THE QUESTIONS (20 marks)**

1. Outline any five DNA repair mechanisms (5 marks)
2. Highlight any five clinical features of Cystic fibrosis (5 marks)
3. Describe five types of RNA (5 marks)
4. Describe southern blotting (5 marks)

**SECTION C: ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER QUESTION (30 marks)**

1. Describe Mendel's laws of inheritance (15 marks)
2. Discuss any ancient experiment that proved DNA is the genetic material (15 marks)
3. Describe the process of constructing a genomic library (15 marks)