

Roll No.

E-809

**M. A./M. Sc. (Third Semester)
EXAMINATION, Dec.-Jan., 2020-21**

ANTHROPOLOGY

(Group—A : Physical Anthropology)

Paper Fourth (a)

(Human Molecular Genetics)

Time : Three Hours]

[Maximum Marks : 80

[Minimum Pass Marks : 16

Note : Attempt all Sections as directed.

Section—A

1 each

(Objective/Multiple Choice Questions)

Note : Attempt all questions.

Choose the correct answer :

1. Repeating units of nucleic acids are :

- (a) Bases
- (b) Nucleotides
- (c) Phosphate molecules
- (d) Sugar molecules

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2. Which of the following is found in RNA but not in DNA ?
 - (a) Deoxyribose
 - (b) Adenine
 - (c) Phosphate
 - (d) Uracil

3. RFLP is :
 - (a) The technique used for sequencing DNA
 - (b) The technique used to fingerprint patterns of inheritance
 - (c) The difference in the restriction maps between two individuals of two species
 - (d) The difference in the restriction maps between two individuals of one species

4. Random mutation occurs due to :
 - (a) Chemicals
 - (b) Radiation
 - (c) External factors
 - (d) All of the above

5. Gene mapping provides useful information about chance of :
 - (a) Inheritance of disorders
 - (b) Inheritance of dominant genes
 - (c) Inheritance of genes
 - (d) Inheritance of recessive genes

6. Approximately what percentage of human genome contains protein coding genes ?
- (a) ~ 2%
 - (b) ~ 20%
 - (c) ~ 80%
 - (d) ~ 50%
7. Which method is used to identify locus of gene and distance between genes ?
- (a) Gene pool
 - (b) Gene localization
 - (c) Gene linkage
 - (d) Gene mapping
8. Chargaff's rules stated that :
- (a) $(G + C)$ in both RNA and DNA
 - (b) $(A + T)/(G + C) = \text{Always } 1$
 - (c) $(A + G)/(T + C) = 1$
 - (d) In RNA, $A = U$ and in DNA $A = T$
9. Proteins are polymers of :
- (a) Sugar
 - (b) Nucleotides
 - (c) Amino acids
 - (d) Fatty acids

10. In eukaryotes the initiation codon of protein is :
- (a) AUG
 - (b) CCA
 - (c) CGA
 - (d) GUA
11. The most commonly used method of sequencing DNA was :
- (a) Fred Sanger
 - (b) Francis Crick
 - (c) Barbara McClintock
 - (d) Oswald Avery
12. Who discovered the method of DNA fingerprinting ?
- (a) Sanger
 - (b) Alec Jefferey
 - (c) Mendel
 - (d) Muller
13. Most protein coding genes are :
- (a) Circular DNA
 - (b) Repetitive DNA
 - (c) Single copy DNA
 - (d) None of the above

14. The PCR is used to :
- (a) Amplify a small amount of DNA
 - (b) Cleave bacteria plasmids
 - (c) Seal sticky ends
 - (d) Identify target plasmids
15. The first steps in the PCR is :
- (a) Primer extension
 - (b) Annealing
 - (c) Cooling
 - (d) Denaturation
16. The polymerase enzyme used in PCR is :
- (a) DNA-polymerase-I
 - (b) Taq-polymerase
 - (c) Reverse transcriptase
 - (d) DNA polymerase-III
17. Which is not a step in the Southern blotting procedure ?
- (a) Separation of the DNA
 - (b) Transfer of the DNA fragments to a nitrocellulose membrane
 - (c) Ligation of the DNA into a vector
 - (d) Hybridization of the membrane with a labelled probe

18. Which of the following would not be possible to address using a Northern Blot ?
- (a) Location of restriction site in a particular gene
 - (b) Spatial expression of a particular gene
 - (c) Temporal expression of a particular gene
 - (d) *m*-RNA size
19. Transposons :
- (a) Insert into DNA by homologous recombination.
 - (b) Cannot be transferred by phage mediated transduction.
 - (c) Contain the equivalent of insertion elements.
 - (d) Can insert into plasmids but not the bacterial chromosome.
20. Amplification of genes involves :
- (a) Removal of histones from the DNA to allow transcription of the gene.
 - (b) Invertebrate genomes only.
 - (c) Multiplication of extrachromosomal elements only.
 - (d) Multiple duplications of the gene via replication.

Section—B

2 each

(Very Short Answer Type Questions)

Note : Attempt all questions. Answer each question in 2 to 3 lines.

1. Write *three* physical properties of DNA.
2. Write *three* chemical properties of DNA.
3. What is the full form of PCR and who discovered it ?
4. What is conserved sequences ?

5. What is the use of spectroscopic properties of DNA ?
6. Define DNA polymorphism.
7. Explain VNRT.
8. Define amino acid.

Section—C

3 each

(Short Answer Type Questions)

Note : Attempt all questions. Answer each question in 75 words.

1. State Chargaff's rule.
2. Explain in-situ hybridization in brief.
3. Write about microsatellite repair polymorphism.
4. Write a brief note on prenatal diagnosis.
5. Explain RNA structure.
6. What is genomic imprinting ?
7. Briefly discuss about 'Transgenic organisms'.
8. Write a short note on DNA structure.

Section—D

5 each

(Long Answer Type Questions)

Note : Attempt all questions. Answer each question in 150 words.

1. Write a brief essay on gene transcription in eukaryotes.
2. Write a brief essay on recombinant DNA technology used in molecular genetics.
3. Give a detailed account of DNA sequencing.
4. Explain Human Genome Project. What is its relevance to welfare of society ?