

**M. Sc. BOTANY
SECOND SEMESTER
MOLECULAR BIOLOGY
MSB – 201**

(Use Separate Answer Scripts for Objective & Descriptive)

[PART-B : Descriptive]

Time : 2 hrs. 40 min.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. What are inborn errors of metabolism? Explain in brief about the causes and general symptoms of IEM. Differentiate between germ-line and somatic gene therapy. 2+4+4
=10
2. "Replication of DNA is semiconservative in nature". Explain with suitable example. 10
3. What is attenuation? Explain the trp operon with proper diagram. 2+8 =10
4. Explain in details the DNA repairing mechanisms in prokaryotes with suitable diagram. 10
5. What are inborn errors of metabolism? Explain in brief about the causes and general symptoms of IEM. Differentiate between germ-line and somatic gene therapy. 2+4+4
=10
6. Discuss the structure of a Chloroplast as observed under electron microscope, giving details of the structure of Thylakoids. 10
7. Describe the different parts of an electron microscope and compare it with a light microscope. Discuss the sample preparation technique in Transmission Electron microscopy. 5+5 =10
8. Write short notes on (any two) 5+5 =10
 - a. negative staining
 - b. ara operon
 - c. lambrush chromosomes
 - d. golgi apparatus

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Duration : 3 hrs.

Full Marks : 70

[PART-A : Objective]

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1 × 20 = 20

1. In eukaryotes RNA polymerase III catalyses the synthesis of
 - a. mRNA
 - b. 5s rRNA
 - c. 18s rRNA
 - d. t RNA
2. Initiation codon of protein synthesis in eukaryotes is
 - a. GUA
 - b. CCA
 - c. AUG
 - d. GCA
3. A molecule of tRNA with the anticodon AAA will transport the amino acid
 - a. Lysine
 - b. Phenylalanine
 - c. Arginine
 - d. Proline
4. Which enzyme is incorrectly matched to its function
 - a. RNA polymerase - transcription
 - b. DNA ligase - joins Okazaki fragments
 - c. Aminoacyl-tRNA synthetase - attaches an amino acid to a tRNA
 - d. Peptidyl transferase - translation
5. In mRNA, the series of nucleotide AGU
 - a. Serine
 - b. Proline
 - c. Cytosine
 - d. Valine
6. DNA damage caused by ultraviolet radiation leads to the formation of
 - a. Pyrimidine dimers
 - b. Purine dimers
 - c. Pyrimidine monomers
 - d. Purine monomers
7. Which DNA polymerase are involved in normal DNA replication process
 - a. Polymerase I & III
 - b. Polymerase I & IV
 - c. Polymerase I & II
 - d. Polymerase II & III
8. DNA gyrase is also known as
 - a. Ligase
 - b.
 - c. Topoisomerase
 - d. Kinase

9. In bacteria, the enzyme that fills in the missing nucleotide during base excision repair is
 a. DNA Polymerase II b. DNA Polymerase III
 c. DNA Polymerase I d. DNA Polymerase IV
10. Origin of chromosome replication '*oriC*' are rich in
 a. Adenine and Thymine b. Guanine and Cytosine
 c. Adenine and Cytosine d. Cytosine and Guanine
11. Polynucleate cells of plants are known as
 a. Syncytial cells b. Coenocytes
 c. coenobium d. Discoidal nuclei
12. In SEM, electrons that originate from much deeper within the sample (a few μm below the surface), and provide compositional information, but give lower resolution images are called
 a. Secondary electrons b. X-rays
 c. Backscattered electrons d. None of the above
13. Long, flattened, sac like, unbranched tubules which remain arranged parallelly in bundles or stacks are called
 a. Vesicles b. Tubules
 c. Nissl bodies d. Cisternae
14. During sample preparation for TEM, the vapour of heavy metal is deposited on one side of the surface of the elevated particles; on the other side a shadow forms. This process of sample preparation is known as
 a. Freeze fracture b. Negative staining
 c. Shadow casting d. Tracers
15. In which phase of the cell cycle is DNA replicated
 a. G1 Phase b. G2 Phase
 c. S Phase d. M Phase
16. Which of the following occurs in meiosis but not in mitosis?
 a. Attachment of spindle fibers to the kinetochore
 b. Pairing of homologous chromosome at the metaphase plate
 c. Replication of DNA prior to the start of cell division
 d. Separation of sister chromatids at anaphase
17. Even though sickle cell anemia is usually fatal to homozygous individuals, the disease persists because:
 a. Gene therapy has alleviated the condition
 b. The disease is carried on a dominant allele
 c. Individuals with one allele for sickle cell anemia are resistant to malaria
 d. A combination of all of the above
18. Using Hardy-Weinberg Principle, which expression represents the frequency of the homozygous recessive genotype?
 a. p^2 b. $2pq$
 c. q^2 d. q
19. Which one of the following would cause the Hardy-Weinberg principle to be **inaccurate**
 a. The size of the population is very large
 b. Individuals mate with one another at random
 c. There is no source of new copies of alleles from outside the population
 d. Natural selection is present.
20. Inbreeding
 a. Increases the rate of mutation
 b. Increases the proportion of homozygous individuals in a population
 c. Never occurs in plants
 d. All of the above