THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY

[MD 0524] **MAY 2024** **Sub. Code: 4031**

M.D. DEGREE EXAMINATION

BRANCH XIII – BIOCHEMISTRY

PAPER III – MOLECULAR BIOLOGY, MOLECULAR AND GENETIC ASPECTS OF CANCER, IMMUNOLOGY AND EFFECTS OF ENVIRONMENTAL POLLUTANTS ON THE BODY

Q.P. Code: 204031

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. Explain in detail the process of protein synthesis in eukaryotes. Add a note on inhibitors of protein synthesis.

2. Describe in detail the recombinant DNA technology and its applications.

II. Write notes on: **(10 x 5 = 50)**

1. Chromatin immunoprecipitation technique.
2. Cyclins.
3. cDNA.
4. Interleukins.
5. Subacute combined immunodeficiency syndrome.
6. DNA sequencing.
7. Ames assay.
8. Epigenetic Mechanism involved in cancer.
9. Gene switching.
10. Expression vector.

III. Reasoning out: **(4 X 5 = 20)**

1. Wobble and degeneracy is a protective mechanism in cell.
2. The complement system also protects against infection.
3. Mitochondria are parasites.
4. Telomerases are target for anticancer agents.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY

[MD 1224] **DECEMBER 2024** **Sub. Code: 4031**

(OCTOBER 2024 EXAM SESSION)

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER III – MOLECULAR BIOLOGY, MOLECULAR AND GENETIC ASPECTS OF CANCER, IMMUNOLOGY AND EFFECTS OF ENVIRONMENTAL POLLUTANTS ON THE BODY

Q.P. Code: 204031

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

(4+6+5)

1. a) Explain the various modes of Replication.
   b) Describe how recombination resets the replication machinery when replication stalls.
   c) How topoisomerases identify and relieve the supercoils.

(10+5)

2. a) Brief the different types of mutation and its Phenotypic effects with suitable examples.
   b) How do cyclins and CDKs differ? How do they interact in controlling the cell cycle.

II. Write notes on: **(10 x 5 = 50)**

1. Deciphering of genetic code.
2. Systemic immune complex disease.
3. DNA vaccines.
4. Classify tumour markers and brief with examples.
5. Drug resistance in cancer cells.
6. Discuss the various types of cloning.
7. Vectors used in recombinant DNA technology.
8. Toxic manifestation and assessment of fluoride.
9. Post transcriptional modification of tRNA.
10. Nutritional regulation of gene expression.

III. Reasoning out: **(4 X 5 = 20)**

1. R.N.A. Editing is not synonymous with alternate splicing.
2. Defects in DNA-repair systems have been strongly linked to cancer.
3. Cell cycle arrests at S phase if one carbon generation is defective.
4. Restriction endonucleases spare host D.N.A.

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THE TAMIL NADU DR.M.G.R. MEDICAL UNIVERSITY

[MD 0525] **MAY 2025** **Sub. Code: 4031**

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER III – MOLECULAR BIOLOGY, MOLECULAR AND GENETIC ASPECTS OF CANCER, IMMUNOLOGY AND EFFECTS OF ENVIRONMENTAL POLLUTANTS ON THE BODY

Q.P. Code: 204031

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. Explain in detail the process of Transcription in Eukaryotes with suitable diagram. Add a note on the classes of Transcription factors and processing of mature RNA molecules.
2. Explain the Regulation of Gene expression in Eukaryotes with suitable examples and diagrams.

II. Write notes on: **(10 x 5 = 50)**

1. RNA editing.
2. Microarray techniques.
3. Hereditary persistent fetal haemoglobin.
4. Monoclonal antibodies.
5. Human genome project.
6. Slipped Mis Paired DNA (SMP-DNA).
7. Chromosomal walking.
8. Micro satellite DNA polymorphisms.
9. P53 induction of apoptosis.
10. Transgenic animal.

III. Reasoning out: **(4 X 5 = 20)**

1. Glutamic acid residues is significant for blood coagulation.
2. A perfect balance is maintained in terms of speed fidelity during translation.
3. Deficiency of folic acid affects methylation of histones.
4. All genes are not subjected to regulation.

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THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

[MD 1025] **OCTOBER 2025** **Sub. Code: 4031**

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER III – MOLECULAR BIOLOGY, MOLECULAR AND GENETIC ASPECTS OF CANCER, IMMUNOLOGY AND EFFECTS OF ENVIRONMENTAL POLLUTANTS ON THE BODY

Q.P. Code: 204031

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. a) Describe in detail the process of transcription in prokaryotes and explain how it differs from eukaryotic transcription. (10)
   b) How the transcription of H.M.G. COA reductase is regulated depending upon metabolic need of cholesterol? (5)
2. a) List the Biochemical and genetic changes that occur in transformed cells. (4)
   b) Describe how the cancer cell alters the metabolic programs for their own growth and spread. (5)
   c) Brief the various DNA repair mechanisms with suitable example. (6)

II. Write notes on: **(10 x 5 = 50)**

1. T cell mediated hyper sensitivity.
2. Initiation of prokaryotic replication.
3. D.N.A. isolation and purification technique.
4. Bio informative data base.
5. Explain the various ways of regulation of Gene expression in Eukaryotic cells.
6. Toxic effects and assessment of lead.
7. Gene mapping.
8. Discuss about cDNA library.
9. Gene knockout.
10. Brief about post-translational protein processing.

III. Reasoning out: **(4 X 5 = 20)**

1. Multiple codons decode the same amino acid.
2. A gene can give rise to multiple products.
3. In sanger's DNA sequencing, DNA synthesis is terminated after a dideoxy-nucleotide is inserted.
4. Telomeres are protective caps for chromosomes.

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THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

[MD 0526] **MAY 2026** **Sub. Code: 4031**

M.D. DEGREE EXAMINATION

BIOCHEMISTRY

PAPER III – MOLECULAR BIOLOGY, MOLECULAR AND GENETIC ASPECTS OF CANCER, IMMUNOLOGY AND EFFECTS OF ENVIRONMENTAL POLLUTANTS ON THE BODY

Q.P. Code: 204031

Time : Three Hours **Maximum : 100 Marks**

I. Elaborate on: **(2 x 15 = 30)**

1. Explain the process of Gene therapy and its applications. Add a note on Stem cells.

2. Explain the steps of transcription in eukaryotes with suitable diagram and describe the post transcriptional modifications.

II. Write notes on: **(10 x 5 = 50)**

1. Replication fork.
2. Inhibitors of prokaryotic translation.
3. In situ hybridization techniques and their clinical uses.
4. Brief about Hybridoma technology and monoclonal antibodies.
5. Brief about Histone proteins and role of post translationally modified Histones.
6. Transgenic animal.
7. Human genome project.
8. Describe the role of Growth factors as signal molecules.
9. Write about Anti oncogenes and the process of Transformation of a normal cell to a malignant cell.
10. Lead poisoning.

III. Reasoning out: **(4 x 5 = 20)**

1. RNA polymerase deficiency affects DNA repair.
2. Metabolic basis of cancer cachexic symptoms.
3. All genes are not subjected to regulation.
4. Telomerase enzyme activity is associated with ageing process.

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