001/24

# The West Bengal University of Health Sciences
## MBBS 1st Professional Examination (New Regulation), August 2024

**Subject: Biochemistry**
**Paper: II**

**Full Marks: 100**
**Time: 3 hours**

*Attempt **all** questions. The figures in the margin indicate full marks.*

1. a) A 60 year old man reports to the medicine OPD with complaints of extreme weakness and fatigue as well as numbness and heaviness in lower limbs for past 6 months. On taking history it was found that he is a strict vegetarian. On examination of the patient he looks pale and neurological examination showed sensory and motor loss of both the legs.
Findings of the laboratory investigations are:
Peripheral smear showing large sized RBC.
Urine showed high levels of methyl malonic acid and homocysteine.
i) Identify the nutritional deficiency and the probable diagnosis.
ii) Correlate the patient symptoms and the signs on examination with the lab reports.
iii) Enumerate other lab investigations that can be ordered to reach to a definite diagnosis.
iv) Analyze the lab findings and give biochemical explanation of the same.
v) Plan a treatment for this patient. 2+3+2+5+3

b) A seven year old boy showing small blue round cells consistent with Ewing's sarcoma.
i) Mention the best method to confirm translocation on t(11.22).
ii) Mention five different methods of conversion of proto-oncogene to oncogene.
iii) Give two examples of tumor suppressor genes. Describe one of them.
iv) Name one oncofetal marker. 2+5+2+5+1

2. a) Classify hormones based on their mechanism of action. Explain second messenger with example, discuss any one in detail. 5+5
b) What is promoter? Discuss the process of initiation of prokaryotic transcription. Enumerate types of eukaryotic RNA polymerases and mention their individual function. 6+4
c) Define cancer. Enumerate the causes of cancer including chemical, physical, biological, genetic and viral carcinogens/ mutagens. 2+8

3. Write short notes on the following: 2x5
a) Compare and contrast innate immunity.
b) Anti oxidant vitamins and their interdependency.

4. Explain the following statements: 5x4
a) Cytochrome C has important role in apoptosis.
b) Molecular chaperone plays a role in protein folding.
c) Soothern blotting technique is an ideal technique for identifying a DNA segmen.
d) Topo-isomerase enzyme helps in correcting super-coiling.
e) PCR is the gold standard for TB germ detection.

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5. Choose the correct option for each of the following: 10x1

i) Which out of the following are situated away from the coding region:
a) Promoter. b) Enhancer.
c) Structural gene. d) Operator.

ii) Which of the following isotopes of nitrogen were used in the Messelson and Stahl's experiment for proving that DNA replication is semi-conservative?
a) $N_{14}$ and $N_{15}$ b) $C_{12}$ and $C_{14}$ c)$H_1$ and $H_3$ d)$O_{16}$ and $O_{18}$

iii) Identify the incorrect statement:
a) Both replication and transcription have primers.
b) Both replication and transcription use template.
c) Both replication and transcription have initiation, elongation and termination step.
d) Both replication and transcription show polarity.

iv) Which of the following hormones act by extrinsic tyrosine kinase pathway?
a) Growth hormone. b) Insulin. c) Glucagon. d) Thyroxine.

v) Which of the following post translation modification is needed for maturation of collagen fibers?
a) Adenylation of the lysine and arginine. b) Glycation of valine and isoleucine.
c) Hydroxylation of the proline and lysine. d) Acetylation of lysine and arginine.

vi) Elongation of the polypeptide chain requires all the following except:
a) Peptidyl transferase. b) Translocase. c) GTPase. d) rho(p) factor.

vii) Viral load can best be detected by:
a) Reverse PCR. b) Real time PCR.
c) Chromosome walking. d) DNA fingerprinting.

viii) Which of the following enzyme is not used as a tumor marker?
a) Prostate specific antigen. b) Prostatic acid phosphatase.
c) Aspartate transaminase. d) Alkaline phosphatase.

ix) Which is NOT a product of transcription?
a) tRNA. b) cDNA.
c) mRNA. d) rRNA.

x) Connective tissue protein defective in Marfan's Syndrome is:
a) Connexin. b) Tubulin. c) Fibrillin. d) Keratin.