

SS/MBBS-I/BIO-CHM-II/11-23**First Professional MBBS Examination****2023****(November)****BIOCHEMISTRY****Paper-II****Full Marks: 100****Time: 3 hours****The figures in the margin indicate****full marks for the questions****Write the answers to the two Halves in separate books****Answer all questions**

1. Describe transcription in prokaryotes. Write a note on the differences between prokaryotic and eukaryotic transcriptions. Write briefly on post-transcriptional modification in (eukaryotes.) What is alternative splicing? [5+4+4+2=15]

2. A 46-year-old patient with type 2 diabetes mellitus since 1 year is referred for dietary advice. His height is 165 cm and weight is 86 kg. He is a software engineer (sedentary worker). Calculate his BMI. What is the calorie requirement of the patient? Assess the amount of proximate principles required in his daily diet. [3+3+9=15]

3. A young 26-year-old pregnant lady came to OPD with complaints of tiredness, lethargy and difficulty in breathing. She also complained of palpitation since the last few days. On examination, she was pale and had fissures in the corner of the mouth. Laboratory investigation showed haemoglobin = 7 m/dl and serum ferritin = 12 microgm/L (normal value for

female = 30 microgm/L). Peripheral smear showed the presence of microcytic hypochromic type of RBCs. $2+3+3+2=10$

- (a) What is the probable diagnosis?
- (b) Explain the biochemical basis of the disorder.
- (c) What are the characteristic clinical features of the disorder?
- (d) What other investigations are required to diagnose the condition?

4. Choose the correct answer of the following : $1 \times 10 = 10$

(i) The coding unit of DNA is called as

- (a) intron,
- (b) exon,
- (c) cistron
- (d) prion

(ii) In which phase of cell cycle, synthesis of deoxyribonucleotide triphosphate is the highest?

- (a) G_0 phase
- (b) S-phase
- (c) G_1 phase
- (d) M-phase

(iii) Synthesis of recombinant DNA (rDNA) requires all of the following **except**:

- (a) restriction endonuclease
- (b) RNA primer
- (c) plasmid vector
- (d) DNA ligase

(iv) The most efficient blood buffer is

- (a) haemoglobin buffer
- (b) protein buffer
- (c) ammonia buffer
- (d) bicarbonate-carbonic acid buffer

(v) Which of the enzymes listed below is heat stable?

- (a) Restriction endonuclease
- (b) Reverse transcriptase
- (c) *Thermus thermophilus*
- (d) Klenow enzyme

(vi) TCA cycle is the final common oxidative pathway, because

- (a) it provides large fraction of energy
- (b) acetyl CoA derived from all sources can be oxidized
- (c) it operates in the mitochondria close to ETC
- (d) it is a cyclical process

(vii) Which is the secretory Ig?

- (a) IgG
- (b) IgD
- (c) IgM
- (d) IgA

(viii) Lavender colour capped vial is

- (a) EDTA vial

- (b) clot activator vial
- (c) heparin vial
- (d) sodium citrate vial

(ix) Colorimeter follows

- (a) Pascal's law
- (b) Beer-Lambert law
- (c) Newton's law
- (d) None of the above

(x) Micropipettes are used to accurately and precisely transfer volumes of liquid in _____.

- (a) microliter
- (b) milliliter
- (c) picoliter
- (d) deciliter

5. Write short notes on the following : 5x7=35

- (a) Hypersensitivity reaction
- (b) Electrophoresis
- (c) Polycistronic RNA
- (d) Tumour markers
- (e) Apoptosis
- (f) Reverse transcriptase
- (g) Structure and function of tRNA

6. Justify the following statements : 2x5=10

- (a) Metabolism of xenobiotics is not detoxification
- (b) Increased drinking of tea restricts iron absorption from the gut.
- (c) Hyperuricaemia is found in Lesch Nyhan syndrome.
- (d) Heat resistant DNA polymerase is used in PCR technique.
- (e) p53 is known as the guardian of genome.

7. How will you explain to your family members and relatives about the beneficial effect of eating fruits and vegetables?

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