All India Institute of Medical Sciences, Kalyani

First Professional MBBS Supplementary Examination (Batch-2021-22)

Time: 3 Hrs. **Biochemistry (Paper–II)** **Marks: 100**

INSTRUCTIONS:

- Answer all questions.
- Illustrate your answers with well labelled diagram wherever necessary.
- Answer each section in a separate answer book.

SECTION – A (50 MARKS)

1. A 21 year old girl, known diabetic for the last 11 years, was brought to the medical casualty in coma. Her clinical findings and lab reports are as follows:

   On examination:

BP	: 110/80 mm of Hg
Pulse Rate	: 94 per minute
Respiratory Rate	: 46 per minute

   Investigations:

RBS	400 mg/dl
Blood Urea	44 mg/dl
S.Creatinine	1.2 mg/dl
pH	7.29
HCO_3^-	8 mEq/L
PCO_2	33 mm of Hg
Anion gap	18

   a. What is the acid base imbalance? Justify? (2)
   b. What is the cause of the disturbance in this patient? (2)
   c. What is anion gap and it normal levels? (2)
   d. What is the change in respiration due to? (1)
   e. Give two causes of high anion gap. (1)
   f. Define buffer? Give one example of an intracellular buffer. (1)
   g. Name any two organic acids. (1)

2. Write short notes on (2X 2.5)
   a. Antioxidant enzymes of the body
   b. Conjugation reactions in xenobiotics

3. Explain with diagram/flowchart (2X2.5)
   a. Structure of immunoglobulin
   b. Lipid peroxidation

4. Compare and contrast: (2X2.5)
   a. Marasmus and Kwashiorkor
   b. blood buffers and lungs in maintaining pH homeostasis.

5. Give reasons/Justify: (2X2.5)
   a. Lead poisoning causes anemia.
   b. ADA deficiency causes severe immunodeficiency

6. Write true or false and justify: (5X1)
   a. Salicylate poisoning causes respiratory acidosis
   b. B cells present antigens for immunity
   c. Glycerol is present in sphingolipids
   d. pH of gastric juice is 6.5.
   e. Thromboxane is a prostanoid

7. Explain the following: (2X2.5)
   a. Bee sting can cause hypersensitivity reaction
   b. Protein has the highest SDA

8. Write with examples: (5X1)
   a. What are class 1 proteins in our diet? Give example.
   b. Free radical scavenger
   c. Negative nitrogen balance
   d. Dietary fibre
   e. Anaphylactic reaction

9. Fill in the blanks and justify (5X1)
   a. An example of a 'Prion disease' is .....
   b. Cryoprecipitates from human plasma can be used in .....
   c. A cause of metabolic alkalosis is.....
   d. An example of RNA vaccine is.....
   e. Immunoglobulin which crosses the placenta is .....

SECTION – B (50 MARKS)

1. A 2-year-old boy was brought to the Pediatrics OPD with complaints of delayed milestones and inactive nature. On examination- his posterior fontanelle was patent, he had a protuberant tongue, hypotonic muscle and was mentally retarded. (5X2)
   Lab results for TFT were as follows with their normal levels in brackets:
   S.T3: 0.06 ng/ml (1.2-1.9 ng/ml)

   S.T4: 1.5 µg/dl (5-12 µg/dl)

   S.TSH :70 µIU /ml (0.5-5 µIU/ml)
   a. What is the diagnosis? Justify your answer.
   b. Is the mental retardation preventable? Give reason for your answer.
   c. Name another condition causing delayed closure of fontanelles and its basis?
   d. Name two inborn errors of metabolism causing mental retardation?
   e. Name two methods of hormone estimation.

2. What is western Blotting?Describe the principle and steps.Give an account of itsapplications (1+2+2)

3. Name the agent/enzyme/chemical and its use in clinical practice (5X1)
   a. In-vitro DNA synthesis
   b. Probe
   c. Vector
   d. Antioxidant
   e. Inhibitor of Xanthine oxidase

4. What are restriction enzymes used in recombinant DNA technology? Describe the principle and uses of DNA finger printing (2+3)

5. A 5 day old neonate who was discharged on the 3rd day of life was readmitted with yellowish discoloration of the skin noticed by the mother. He was feeding well and his cry and activity was normal with no fever. The urine output was adequate and he was passing normal stools as well. O/E He looked well with normal activity and cry and had jaundice till the lower abdomen. The palms and soles were spared. Stools were golden yellow and urine was clear. Her Lab reports are as follows: (5X1)
   Total bilirubin- 10.5mg/dl
   Direct bilirubin- 0.2 mg/dl
   a. Identify the abnormal lab report(s).
   b. What is the diagnosis?
   c. What is the first line of treatment?
   d. What is biochemical basis of this condition and treatment?
   e. How is bilirubin conjugated?

6. What is the difference between RNA editing and splicing? (5)

7. What are tumour markers? Give two examples and their use. (3+2)

8. Explain the following: (2X2.5)
   a. Creatinine clearance test is the most widely used test for measurement of GFR.
   b. Peptide hormones require second messengers.

9. Write the biochemical basis of the following: (5X1)
   a. Hyperthyroidism causes imbalance in blood sugar levels.
   b. RNA editing is involved in ApoB48 synthesis.
   c. Some mushrooms cause diarrhoea.
   d. Xeroderma pigmentosa patients succumb to multiple cancers.
   e. Prolong use of methotrexate cause drug resistance.
