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[MBBS 0124] **JANUARY 2024** **Sub. Code : 6055**

M.B.B.S. DEGREE EXAMINATION
(For the candidates admitted from the Academic Year 2019-2020)

FIRST YEAR – SUPPLEMENTARY (CBME)

PAPER I – BIOCHEMISTRY

Q.P. Code: 526055

Time: Three hours **Maximum : 100 Marks (80 Theory + 20MCQs)**

Answer All Questions

I. Essay: **(2 x 15 = 30)**

1. A 3-year-old male child, presented with blisters on exposed areas since the age of around 6 months. The blisters used to heal with atrophic scars. Since early infancy the mother had noticed reddish colored urine. The child's mental and physical development had been normal. There was no family history of a similar problem. On examination, the child's face was badly scarred. There was hypertrichosis on the shoulders, arms and face. The teeth were of coppery-red color. A diagnosis of Congenital Erythropoietic Porphyria was made.
   a) Name the enzyme defective in Congenital Erythopoietic Porphyria.
   b) What is the biochemical basis of Congenital Erythropoietic Porphyria presenting with erythrodontia (red teeth) and port wine urine (red urine).
   c) Will ALA and PBG be elevated in this condition? Why?
   d) What are the differences between Acute Inrermittent Porphyria and Congenital Erythropietic Porphyria?
   e) What is / are the effect of lead poisoning on Heme synthesis?

2. A child presents with hypoglycemia, hypophosphatemia, jaundice and hepatomegaly after transitioning from mother's milk to infant foods. He is diagnosed with hereditary fructose intolerance.
   a) Name the enzyme that is defective in this condition.
   b) Describe in detail normal fructose metabolism.
   c) Why is fructose more lipogenic than glucose?
   d) Why does fructose intolerance present with hypoglycemia and hypophosphatemia?
   e) How did the clinician exclude Galactosemia in this child?
   f) What is expected if Benedict's test is performed in the child's urine? Why?

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

1. A 70 hrs old new born baby, delivered normally was brought to the paediatric OPD with H/o passing yellow coloured urine and yellowish discoloration of conjunctive and the body skin.
   a) What are the investigations you do to confirm Jaundice?
   b) Brief the clinical significance of enzymes with their normal value involved in Liver diseases?

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2. A 6 month old infant presented with failure to thrive, based on deviation across two major percentiles on standardized growth curves, despite normal feeds. His serum calcium was normal, phosphorus and Vitamin D were very low, Alkaline Phosphatase level (ALP) and parathormone level (PTH) were very high. He was diagnosed as a case of nutritional Vitamin D deficiency.
   a) Why does Vitamin D deficiency cause an elevated PTH and ALP?
   b) How is Vitamin D activated?
   c) How does Vitamin D regulate calcium and phosphorus levels?

3. 55 year old alcoholic was brought to the emergency department by his friends, during their usual hangout at the local bar, he had passed out and they were unable to revive him. On admission, his blood glucose was low.
   a) Why does chronic alcoholism present with hypoglycemia?
   b) Alcohol is considered as a source of empty calorie. Why?

4. Following an early morning run, a 29 year old man consumes a carbohydrate rich South Indian breakfast.
   a) Which hormone will be released into the circulation of this person?
   b) What is the common allosteric regulator? Which regulated glycolysis and gluconeogenesis?
   c) Describe in detail how glycolysis and gluconeogenesis will be regulated with the help of a tandem enzyme in this person in this scenario.

5. A 56 year old male is treated with statins for reducing blood cholesterol. Two weeks after initiation of treatment he presented with muscle pain.
   a) What is the mechanism of action of satins?
   b) What are the by-products of cholesterol synthesis?
   c) Mention two derivatives of cholesterol.
   d) How is cholesterol synthesis regulated?

6. What are the ways by which you can get a consent from a patient for blood sample collection for diagnosis? What are the ethical issues associated with using a blood sample in a clinical laboratory?

7. A 35-year-old male with central obesity undergoes a master health checkup. His abdominal Ultrasound reveals grade II fatty liver. He blames it on the high fatty diet prepared by his wife. The physician denies that as the cause.
   a) Why doesn't dietary lipid cause fatty liver changes?
   b) What are lipotrophic factors? Give examples.
   c) What are the causes of fatty liver?
   d) Mention the biochemical basis of fatty liver in one of the causes.

8. A Village Health Nurse instructs a mother to provide her child, a drink made with 6 level teaspoons of sugar and ½ level teaspoon of salt dissolved in 1 liter of clean water to rehydrate the child.
   a) Why is sugar included in oral rehydration solution?
   b) What are the differences between passive diffusion and active transport?
   c) What is facilitated passive diffusion? Give examples.

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9. Inspired by Sylvester Stallone's "Rocky" body, a 23-year-old male wants to build his muscle and as instructed by his trainer, he takes 6 raw eggs every day. After 2 months, when he was working out, he suddenly passed out and his plasma glucose was 60mg/dL. After treating him, the physician advised him to refrain from having raw eggs and warned him that raw egg consumption causes low glucose.
   a) Why does raw egg consumption cause low glucose?
   b) What are the products of odd chain fatty acid oxidation?
   c) How are the products of odd chain fatty acid oxidation metabolized further?

10. A 51 year old person with a recent episode of Myocardial infarction was prescribed Aspirin as an antiplatelet drug by inhibiting cyclooxygenase enzyme.
   a) What are Eicosanoids?
   b) Name two of them.
   c) Mention their functions.
   d) How does Aspirin act as an antiplatelet drug by inhibiting cyclooxygenase?

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