SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I (RS 1 Batch) University Examinations September/October– 2025

SUBJECT: BIOCHEMISTRY PAPER 1 (QP CODE: 1030)

Your answer should be specific to the question asked

Draw neat labelled diagrams wherever necessary

Maximum Marks: 100 **Date: 24/09/2025** **Time: 3 hrs**

I. Long Essay question **1X12=12 Marks**

1. A 30 year old female during her second pregnancy underwent glucose tolerance test and the results were Fasting Blood Glucose- 125mg/dL , 1 Hour Glucose level 210 mg/dL, 2 Hour Glucose level 170 mg/dL. Urine Glucose present. (4+8)
   a. Plot a Glucose Tolerance Test graph with these results and interpret the results.
   b. Explain the regulation of Blood Glucose levels.

II. Short Notes **3X6=18 Marks**

2. What is the normal blood pH? Describe the renal mechanisms by which acid- base balance is regulated in the body (1+5)
3. Name ketone bodies. Explain the formation and utilization of ketone bodies in the body. (1+5)
4. What is BMR? Mention the normal range and explain the factors affecting BMR. (1+1+4)

III. Short notes (Applied aspects) **4X5=20 Marks**

5. A 35 old man presents with chest pain on exertion. Examination shows xanthomas over the tendon and corneal arcus. His father died of Myocardial infarction at the age of 40. His LDL cholesterol is markedly elevated.(1+3+1)
   a. What is the likely diagnosis?
   b. Explain the metabolism of LDL.
   c. Why LDL cholesterol called as bad cholesterol.
6. Compare and contrast Kwashiorkor and Marasmus.
7. A 7-year-old boy presents with night blindness and recurrent respiratory infections. Examination shows conjunctival xerosis and Bitot's spots.(1+3+1)
   a. Which is the deficient Vitamin?
   b. Explain the role of this vitamin in Vision.
   c. Mention the other clinical features associated with this vitamin deficiency.
8. A 60-year-old smoker presents with chest pain, elevated CK-MB and Troponin I (1+3+1)
   a. What is your probable diagnosis?
   b. Describe the role of Isoenzymes in diagnosis and management of this case.
   c. Mention the risk factors for this condition?

P.T.O

IV. Short notes **4X5=20 Marks**

9. Describe the fluid mosaic model of cell membrane with neat labeled diagram.
10. Describe the composition, tissue of origin and functions of different Glycosaminoglycans (GAG's).
11. What is normal serum calcium level? How does serum calcium levels are regulated in the body? (1+4)
12. Enumerate the role of a physician towards society and community.

V. Reasoning Questions **5X3=15 Marks**

13. Explain why
    a. Vitamin D toxicity will not occur in over exposure to sunlight
    b. Vitamin D deficiency is seen in chronic renal failure
14. Why is the presence of brown adipose tissue critical for thermoregulation in neonates?
15. Give reasons
    a. Patients taking Iron supplements should be advised to take citrus fruits.
    b. Iron is known as a one- way element.
16. Why Phospholipase A2 is implicated in snake venom toxicity?
17. Why do competitive inhibitors increase Km but not Vmax?

VI. MCQs **15X1=15 Marks**

18.

1) A 10 month old child presents with hepatomegaly, severe fasting hypoglycemia hyperuricemia and lactic acidosis blood glucose remains low after administration. The enzyme defect is

a. Glucose 6 phosphatase.
b. Glucose 6 phosphate uridyltransferase
c. Glucose 1 phosphate aldolase.
d. Glucose Oxidase

2) A 17-year-old boy with tall stature, long limbs, and lens subluxation is diagnosed with Marfan syndrome.

a. Collagen type III
b. Fibrillin-1.
c. Elastin
d. Fibronectin

P.T.O

3) A 45-year-old chronic alcoholic presents with hypoglycemia after heavy drinking. His serum lactate is high. Which enzyme activity indirectly contributes to lactic acidosis in this patient?

a. Aldehyde dehydrogenase
b. Lactate dehydrogenase
c. Pyruvate carboxylase
✓d. Alcohol dehydrogenase

4) A preterm baby born at 28 weeks develops tachypnea, nasal flaring, and cyanosis soon after birth. Chest X-ray shows ground-glass appearance. The deficiency in this condition is due to lack of:

a. Phosphatidyl inositol
✓b. Phosphatidylcholine (dipalmitoyl lecithin)
c. Phosphatidylserine
d. Sphingomyelin

5) A 20-year-old medical student skips dinner and breakfast before his exam. Which metabolic pathway supplies glucose in this period?

✓a. Glycogenolysis
b. Gluconeogenesis
c. Lipolysis
d. Ketogenesis

6) A 50-year-old man with ischemic heart disease is prescribed statins. Statins inhibit which enzyme of cholesterol synthesis?

a. HMG-CoA Synthase
✓b. HMG-CoA Reductase
c. Squalene synthase
d. Mevalonate kinase

7) A man takes high doses of dinitrophenol (DNP) as a weight-loss drug. He develops hyperthermia. DNP uncouples oxidative phosphorylation by:

a. Inhibiting ATP synthase directly
b. Preventing O_2 consumption
✓c. Dissipating proton gradient across inner mitochondrial membrane
d. Blocking NADH oxidation

8) A 7-year-old child presents with gum bleeding, bone pain, and poor wound healing. On examination, subperiosteal hemorrhages are noted. Which vitamin deficiency is responsible?

a. Vitamin A
✓b. Vitamin C
c. Vitamin D
d. Vitamin K

9) A healthy adult consumes a high-fat meal. Insulin secretion increases. Which pathway predominates in adipose tissue?

a. Ketolysis
b. Beta Oxidation
✓c. Lipogenesis
d. Proteolysis

P.T.O

Samantha N.S. 24/9/25

10) A patient accidentally ingests rat poison containing rotenone. Rotenone blocks electron transfer between:

✓a. Complex I → CoQ
b. Complex II → CoQ
c. Complex III → Cytochrome c
d. Complex IV → O_2

11) A 40-year-old man on prolonged isoniazid therapy presents with peripheral neuropathy. Which vitamin supplementation should be given?

a. Vitamin B1
✓b. Vitamin B6
c. Vitamin B12
d. Vitamin B2

12) A 51 year old man came to casuality with excruciating pain in the left upper quadrant of abdomen with past history of chronic alcoholism. Investigations suggested the diagnosis of acute pancreatitis. Which of the following enzymes in serum will be elevated in this case?

a. Aspartate transaminase
✓b. Amylase
c. Alkaline phosphatase
d. Creatine kinase

13) A child presents with poor wound healing, dermatitis around the mouth, and loss of taste sensation. Which mineral deficiency is most likely?

a. Magnesium
b. Copper
✓c. Zinc
d. Selenium

14) A 25-year-old woman with recurrent vomiting presents with weakness. ABG: pH 7.55, HCO_3^- 36 mmol/L, pCO_2 48 mmHg. Which is the most likely condition?

✓a. Metabolic alkalosis with respiratory compensation
b. Respiratory alkalosis
c. Metabolic acidosis
d. Respiratory acidosis

15) A 3-year-old child presents with sunken eyes, dry mucous membranes, and decreased skin turgor after severe diarrhoea. Serum Na^+ = 140 mEq/L. What type of dehydration is this?

a. Hypertonic dehydration
b. Hypotonic dehydration
✓c. Isotonic dehydration
d. Overhydration

24/9/25 Sumantara N.S. 24/9/25

SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I (RS1 Batch) University RESIT Examinations Nov/Dec– 2025

SUBJECT: BIOCHEMISTRY PAPER 1 (QP CODE: 1030)

Your answer should be specific to the question asked

Draw neat labelled diagrams wherever necessary

Maximum Marks: 100 **Date: 24/11/2025** **Time: 3 hrs**

I . Long Essay Question **1x12=12 Marks**

1) A 42-year-old woman with history of menorrhagia presented with a chief complaint of increasing fatigue and dizziness for 2 weeks. Her vitals were normal. Physical examination was notable for typical findings of anemia, including marked pallor with pale mucous membranes and conjunctiva and koilonychia of her fingernails. Her laboratory results showed low hemoglobin of 6.0 g/dL and microcytic hypochromic anaemia. (1+5+3+3)
   a) Which mineral deficiency is the probable cause for this type of anemia?
   b) Write the Sources, RDA, absorption and transport mechanism for this mineral.
   c) Discuss the theory associated with regulation of absorption of this mineral.
   d) Write any three functions of this mineral.

II. Short Notes **3x6=18 Marks**

2) Enumerate the functions of Vitamin C. Add a note on deficiency manifestations.
3) Define metabolic acidosis. Describe the various causes and add a note on compensatory mechanisms in metabolic acidosis.
4) Classify and discuss the various transport mechanisms across the cell membrane with suitable examples.

III. Short Notes with Applied aspects **4x5=20 Marks**

5) Name ketone bodies. Describe the synthesis of ketone bodies. Add a note on ketosis.
6) Define BMR. Explain any four factors affecting BMR.
7) Mention the enzyme deficient in Von Gierke disease and explain the cause for high levels of uric acid (hyperuricemia) and fasting hypoglycemia in Von Gierke disease.
8) Mention any five diagnostic enzymes with their respective diseases.

IV. Short Notes **4x5=20 Marks**

9) Name any five heteropolysaccharides along with their functions.
10) Describe chemiosmotic theory. Add a note on uncouplers.
11) Enumerate the functions of phospholipids. Add a note on respiratory distress syndrome.
12) Describe and discuss the commitment to lifelong learning as an important part of physician's growth.

V. Reasoning Questions **5x3=15 Marks**

13) Gout is treated with allopurinol. Give reason by explaining the type of enzyme inhibition.
14) HDL Cholesterol reduces the cardiovascular risk. Justify.
15) Role of Antidiuretic hormone in water balance.

(P.T.O)

16) Certain antimalarial drugs are not used in known cases of Glucose 6 phosphate dehydrogenase deficiency. Give reason.

17) Why dietary fibers are advised in the management of obesity?

VI. MCQs 15x1=15 Marks

18)

1. A45-year-old male underwent a baseline health assessment. He was a non-smoker with no alcohol use and reported a balanced diet and regular exercise. The lipid profile is as follows: Total Cholesterol: 195 mg/dL; Triglycerides: 250 mg/dL; LDL-C: 95 mg/dL; HDL-C: 45 mg/dL. Which of the lipid profile component is above the reference range?
   a. Total Cholesterol
   b. Triglycerides
   c. LDL-C
   d. HDL-C

2. A 19-year-old male, a known case of Type 1 Diabetes came to hospital with altered sensorium. His investigations revealed RBS 580mg/dL, Arterial pH 7.2, Bicarbonate = 22mEq/L, Urine Benedict's test was positive, Urine Rothera's test Positive. Most likely diagnosis is
   a. Diabetic neuropathy
   b. Hypoglycemia
   c. Hyperosmolar non ketotic coma
   d. Diabetic ketoacidosis

3. A 52-year-old male presented for an annual health check-up and was diagnosed with metabolic syndrome. Following are the components of metabolic syndrome measured in a blood sample **EXCEPT**:
   a. Fasting Glucose
   b. Triglycerides
   c. HDL Cholesterol
   d. LDL Cholesterol

4. A two-year-old female was brought to the clinic by her mother with a chief complaint of swelling in her legs and abdomen. She had a history of being recently weaned from breast milk to a diet primarily consisting of corn porridge. Physical examination revealed bilateral pitting edema, a distended abdomen, and dry, brittle hair. Lab tests showed severe hypoalbuminemia. The nutritional disorder most likely to be present is:
   a. Marasmus
   b. Kwashiorkor
   c. Osteomalacia
   d. Cretinism

5. A 45-year-old male with a history of chronic alcohol abuse presented with severe epigastric pain radiating to the back. A diagnosis of acute pancreatitis was made. Which biochemical tests would confirm the diagnosis?

(P.T.O)

a. Serum Aspartate Transaminase & Serum Alalnine Aminotransferase
b. Serum Amylase & Serum Lipase
c. Serum Alkaline Phosphatase & Serum 5' Nucleotidase
d. Serum troponin T & Serum CKMB

6. A 50-year-old male visited the emergency chest pain. ECG changes showed an ST-segment elevation. A sample of blood was drawn to confirm the diagnosis of a myocardial infarction. Which is the enzymelikely to be elevated in the blood?
   a. Creatine Kinase MB
   b. Alanine Transaminase
   c. Lipase
   d. Amylase

7. A nine-year-old male child presented with progressive xanthomas on both auricles, elbows, gluteal regions and legs since birth. His father, paternal and maternal grandfather had xanthomas. The lipid profile is as follows: Total Cholesterol: 681 mg/dL; Triglycerides: 200 mg/dL; LDL-C: 192 mg/dL; HDL-C: 29 mg/dL. Which of the following is the probable diagnosis?
   a. Metabolic Syndrome
   b. Familial Hypercholesterolemia
   c. Nephrotic Syndrome
   d. Diabetes Mellitus

8. A 40-year-old lady with a sedentary lifestyle came for a routine health checkup and her HbA1c was found to be 6.0 %. Which of the following suits the interpretation?
   a. Within the reference limits
   b. Pre diabetes
   c. Diabetes
   d. None of the above

9. A 60-year-old person, a known Type 2 diabetes mellitus on Insulin was brought to hospital in a comatose state. Blood sugar level on glucometer read 30 mg/dL. Most likely diagnosis is:
   a. Hyperosmolar non ketotic coma
   b. Diabetic ketoacidosis
   c. Hypoglycemia
   d. Diabetic neuropathy

10. A 13 -year-old male teenager presented with cough and had a history of frequent respiratory infections. On auscultation, rales and rhonchi were heard throughout both lung fields suggesting the chest congestion with mucous plugging. Sweat Chloride value was increased. The most probable diagnosis is:
    a. Cardiogenic pulmonary oedema
    b. Bronchial Asthma
    c. Kartagener Syndrome
    d. Cystic Fibrosis

(P.T.O)

11. A dyspnoeic 52-year-old patient was brought to casualty. He is a known case of chronic bronchial asthma. Which type of acid base disorder can ensue in this patient?
    a. Metabolic acidosis
    b. Metabolic Alkalosis
    c. Respiratory acidosis
    d. Respiratory Alkalosis

12. A 25-year-old athlete approached a nutritionist for a diet plan. Which of the following factor is **NOT** considered in calculating balanced diet?
    a. SDA
    b. Physical activity
    c. Respiratory quotient
    d. Basal Metabolic Rate

13. A 37-year-old male patient sought medical assistance at the hospital due to persistent asthenia, soreness in both lower limbs, as well as discomfort in the left hand and left shoulder. Subsequently, he was diagnosed for acute lymphoblastic leukemia (ALL) and treated with Methotreaxate. Which of the following is the mechanism of action of methotrexate?
    a. Competitive Inhibition
    b. Non-Competitive Inhibition
    c. UnCompetitive Inhibition
    d. Allosteric Inhibition

14. A two-month-old baby girl was brought by her mother to the accident and emergency department with a one-month history of skin lesions that involved the perioral region, hands, and skin folds including napkin area. This was associated with cracked lips, hair loss, and diarrhea more than seven times per day. Acrodermatitis enteropathica was diagnosed which is due to defective absorption of:
    a. Manganese
    b. Molybdenum
    c. Iodine
    d. Zinc

15. A twenty-six-year-old male was admitted to the emergency clinic with pain and cramps in the legs. After investigations a diagnosis of primary hypoparathyroidism was made. Which of the following finding is seen in this condition?
    a. Plasma calcium and inorganic phosphorous are low.
    b. Plasma calcium and inorganic phosphorous are high.
    c. Plasma calcium is low and inorganic phosphorous high.
    d. Plasma calcium is high and inorganic phosphorous low.

SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I University RESIT Examinations (2023 Repeater Batch) Nov/Dec– 2025

SUBJECT: BIOCHEMISTRY PAPER 1 (QP CODE: 1005)

Your answer should be specific to the question asked

Draw neat, labelled diagrams wherever necessary

Maximum Marks: 100 **Date: 24/11/2025** **Time: 3 hrs.**

I. Long Essay — 2 X 10 = 20 Marks

1. A 10-year-old girl presented with stiffness, tingling of hands and feet, carpopedal spasm. On examination trousseau sign was positive, Chovtek's sign was positive. On laboratory evaluation, serum calcium was significantly reduced. (1+2+3+4)
   a) What is the probable diagnosis
   b) Mention the reference range and dietary sources
   c) List three biochemical functions of this mineral
   d) Explain the role of hormones in regulating the blood level of this mineral.
2. Write the steps in beta oxidation of palmitic acid. Explain the energetics of the pathway

II. Short Essay — 8 X 5 = 40 Marks

3. What are dietary fibers. Give examples of dietary fibers. Mention three advantages of consuming dietary fibers.
4. A 15-year-old boy come to the OPD with a history of being unable to see in dim light, he is fine during day time. On examination, he was formed to have gray white patches on the sclera, on blood investigation his plasma retinol level was low
   a) Which vitamin deficiency may cause these symptoms?
   b) Explain the role of that vitamin on vision.
5. A 19-year-old girl is brought to the emergency. She had a panic attack and was breathing rapidly. On examination she is found to have tachycardia and carpopedal spasm. ABG analysis shows: pH =7.54, pCO_2 = 25 mm/Hg, HCO_3 =25mEq/L
   a) Comment on the laboratory parameters and write the acid base disorder
   b) Describe respiratory regulation of pH
6. Discuss competitive inhibition. Give two examples.
7. Draw a neat labelled diagram of the complexes of election transport chain. Name any two inhibitors of E.T.C.
8. Define gluconeogenesis. Write the reactions catalyzed by the key enzymes of gluconeogenesis
9. Explain the metabolic adaptations occurring in well fed state.
10. Write the coenzyme form of Niacin. Mention any one biochemical reactions dependent on Niacin. Add a note on its deficiency manifestations.

III . Short Answers — 10 X 3 = 30 Marks

11. Name the enzyme defect in Von Gierke's disease. Write the biochemical alterations in Von Gierke's disease.
12. Mention diagnostic importance of following enzymes
    a) Amylase b) Creatine Kinase c) Alkaline phosphatase
13. Name any three disaccharides along with their composition.
14. Name three disorders related to collagen metabolism.
15. What is hyponatremia. List two causes of hyponatremia.
16. Define anion gap. Mention its normal value.
17. What is active transport. Give one example.
18. Define BMR. Mention two factors affecting BMR.
19. What are phospholipids. Mention the biochemical importance of dipalmitoyl lecithin

(P.T.O)

20. Name any three lipoproteins with their function.

IV. MCQ's **10 x 1 = 10 Marks**

21.

i. Serum acid phosphatase enzyme level is increased in
a. Myocardial Infarction
b. Prostate cancer
c. Muscle disease
d. Hepatic disease

ii. Glucose transporter -4 (GLUT-4) is the major glucose transporter in
a. RBC
b. Adipose tissue
c. Intestine
d. Neurons

iii. The ratio of bicarbonate to carbonic acid in bicarbonate buffer system is
a. 1:1
b. 20:1
c. 10:1
d. 4:1

iv. The vitamin that acts as a coenzyme for transketolase activity is
a. Thiamine
b. Pyridoxine
c. Folate
d. Biotin

v. Pyruvate dehydrogenase complex requires all of the following coenzymes except
a. FAD
b. NAD+
c. THF
d. TPP

22.

i. Warfarin is antagonistic to
a. Vitamin A
b. Vitamin C
c. Vitamin K
d. Vitamin B1

ii. Hormone insulin activates which of the following pathway
a. Glycolysis
b. Glycogenolysis
c. Lipolysis
d. Gluconeogenesis

iii. A patient in the hospital has seizures. Physical findings were deposition of copper in eyes as a green ring around the cornea and hepatomegaly. What is the diagnosis ?
a. Rickets
b. Wilson's disease
c. Keshan disease
d. Osteomalacia

iv. Normal biological reference interval for serum potassium is

a. 3.5 – 5 meq/L
b. 6 – 8 meq/L
c. 136-145 meq/L
d. 96 – 106 meq/L

v. A balanced diet should have calories for carbohydrates, proteins and fats in the following ratio

a. 40:50:10
b. 60:20:20
c. 40:10:50
d. 50:15:15

MBBS PHASE I University Examinations (2023 Repeater Batch) Sep/ Oct– 2025

SUBJECT: BIOCHEMISTRY PAPER 1 (QP CODE: 1005)

Your answer should be specific to the question asked

Draw neat labelled diagrams wherever necessary

Maximum Marks: 100 **Date: 24/09/2025** **Time: 3 hrs.**

I. Long Essay — 2 X 10 = 20 Marks

1. A 35-year-old man was admitted in casualty with history of road traffic accident. He had sustained injury to the chest wall and was complaining of breathing difficulty. On investigation ABG analysis showed pH 7.2, PCo2- 54 mmHg, HCO3- 23 mg/L ((1+6+3)
   a) What is the probable diagnosis
   b) Explain the regulation of blood pH
   c) Name the other acid base disorders.
2. Describe the sources, RDA, absorption and factors affecting absorption of Iron. Write a note on its transport and storage. (1+1+2+2+2+2).

II. Short Essay — 8 X 5 = 40 Marks

3. A 5 year old child was brought to the hospital with complaints of generalized weakness. On examination there was pigeon chest, beaded ribs and bow shaped leys (1+2+2)
   a) What is the probable diagnosis?
   b) Explain the formation of the substance.
   c) Enumerate its biochemical functions.
4. Enzymes of diagnostic significance.
5. Explain the fluid mosaic model of cell membrane with a neat labelled diagram.
6. A chronically cranky irritable and lethargic baby girl has an extended abdomen resulting from an enlarged liver and was diagnosed of having Von Gierke's disease.
   a. Which enzyme is deficient in Von Gierke's disease?
   b. Explain the pathway where this enzyme is required.
   c. What are the features of this disorder? (1+2+2)
7. Classify Lipoproteins along with its functions?
8. Draw a neat labelled diagram of ETC. Write the flow of electrons and mention any TWO inhibitors
9. Explain the amphibolic role of TCA cycle with examples
10. Define BMR. Explain the factors affecting it and its biological importance with normal reference values

III. Short Answers — 10 X 3 = 30 Marks

11. A newborn baby was brought to the hospital with history of excessive cry, abdominal distension and diarrhea after breast feeding. Baby was asymptomatic otherwise.
    a) What is the probable diagnosis?
    b) What is the enzyme deficiency?
    c) What is the biochemical basis of the symptoms ?
12. Folate trap.
13. Explain the role of adipose tissues during starvation.
14. Define cofactors and give suitable examples.
15. Reverse cholesterol transport
16. Ehler Danlos syndrome.
17. Enumerate the functions of Zinc. Give 2 examples of Zinc containing enzymes.
18. Enumerate the causes of metabolic acidosis.
19. Define Glycosaminoglycans. Give 3 examples with their biological importance.
20. Name the serum electrolytes. Give the reference range of any TWO .

P.T.O

24/9/25 Sumeetha N.S. 24/9/25 (Dr. Sumeetha N.S.)

21.

i. Besides proteins which has been shown to act as enzymes
   a. DNA
   b. Carbohydrates
   c. RNA
   d. Lipids

ii. The following fat soluble vitamins do not perform coenzyme functions except
   a. A
   b. D
   c. E
   d. K

iii. Calcitriol regulates plasma level of calcium by acting on
   a. Intestine, skeletal muscle & bone
   b. Intestine, kidney, muscle & bone
   c. Intestine, bone & heart
   d. Kidney, bone & skeletal muscle

iv. Most of the lipid consumed by humans are in the form of
   a. Triacylglycerol's
   b. Free fatty acids
   c. Cholesterol
   d. Phospholipids

v. Which of the following is true with respect to dietary fibres
   a. Having no nutritive value
   b. Helpful in diabetes mellitus
   c. Easily digestible
   d. All of the above

22.

i. Name the primary ketone body.
   a. Acetone
   b. Acetoacetate
   c. Beta hydroxy butyrate
   d. Acetic acid

ii. High consumption of PUFA should be accompanied by the following vitamin to protect the body from harmful effects
   a. Vitamin B 1
   b. Vitamin K
   c. Vitamin D
   d. Vitamin E

iii. Rate limiting enzyme in cholesterol synthesis pathway is
   a. Thiolase
   b. Squalene synthase
   c. HMG-CoA reductase
   d. Aceto acetyl CoA synthase

24/9/25 P.T.O

Summaiya N.S. 24/9/25 (Dr. SUMAIYA N.S)

SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I University RESIT Examinations Sept/Oct 2024

Biochemistry Paper I (QP CODE: 1005)

Your answer should be specific to the question asked
Draw neat labelled diagrams wherever necessary

Maximum Marks: 100 **Date:30/09/2024** **Time: 3 hrs.**

I. Long Essay **2 X 10 = 20 Marks**

1. A 18 year old girl was brought to casualty with complaints of giddiness and generalized weakness. History revealed that she had skipped her food for one day for a fight with her mother. On examination her vitals were normal. Investigations showed random blood sugar is 45mg/dl. Urine ketone bodies are positive.
    a) What is the diagnosis?
    b) What are the normal values of fasting blood sugar and post prandial blood sugar?
    c) What is the process of formation of pyruvate to glucose?
    d) Explain the above process with key enzymes. (1+2+2+5)
2. Describe the source, RDA, synthesis, biochemical functions and deficiency manifestation of Vitamin D (1+1+2+3+3)

II Short Essay **8x5 = 40 Marks**

3. A 45 year old female complaints of cramps and spasm of hands. She is positive for trousseau's and Chvostek's sign. Lab investigation showed S calcium is 3.9 mg/dl
    a) What is the probable diagnosis?
    b) Give the Normal reference range.
    c) What are the functions of the mineral?
4. What is electron transport chain. Draw ETC and mention enzymes of complexes.
5. What is glycemic index. How is it assessed and write its significance.
6. What is renal regulation of blood pH?
7. Explain ketogenesis and clinical significance of ketone bodies.
8. Name any two Lipoproteins and its importance.
9. Name heteropolysaccharides and write its importance.
10. Describe the factors affecting enzyme activity.

III Short Answers **10x 3 = 30 Marks**

11. What is Lactose intolerance?
12. What is the transport system involved in absorption of glucose?
13. Name three clinically important enzymes and its significance.
14. What is metabolic alkalosis? Write its three causes.
15. What is L/S ratio? Write its significance.
16. Write any three differences between Kwashiorkor and Marasmus.
17. What is folate trap?
18. What are the sources and factors influencing absorption of Iron?
19. What is the significance of bicarbonate buffer?
20. What are the compounds formed from cholesterol?

IV. MCQ's 10x 1 = 10 Marks

21 (i) Normal value of potassium is

a) 2.5 – 3.5 mEq/L
b) 4 – 7 mEq/L
c) 1 – 2 mEq/L
d) 3.5 – 5.5 mEq/L

21 (ii) Key enzyme of glycogenolysis is

a) Glycogen Synthase
b) Glucose 6 Phosphatase
c) Glycogen phosphorylase
d) Pyruvate Kinase

21 (iii) Rate limiting step of heme synthesis is

a) Heme Synthase
b) Uroporphyrinogen synthase
c) ALA dehydrase
d) ALA synthase

21 (iv) Basal metabolic rate is increased by all of the following EXCEPT

a) Fever
b) Thyroxine
c) Starvation
d) Cold climate

21(v) Glucose 6 Phosphate dehydrogenase deficiency leads to

a) Fructosuria
b) Diabetic mellitus
c) Hemolytic anemia
d) Von Gierke's disease

22 (i) Marker of Hepatic disease is all except

a) ALT
b) GGT
c) AST
d) Amylase

22 (ii) Key enzyme of fatty acid synthesis is

a) Acetyl COA carboxylase
b) Beta hydroxy acyl dehydratase
c) Enoyl reductase
d) Acetyl transacylase

22 (iii) Which is the most common amino acid present in collagen?

a) Glycine
b) Lysine
c) Threonine
d) Proline

22 (iv) Extracellular cation majorly present is

a) Potassium
b) Calcium
c) Magnesium
d) Sodium

22 (v) Co enzyme of transketolase is

a) TPP
b) FAD
c) NAD
d) PLP

SAPTHAGIRI NPS UNIVERSITY

MBBS PHASE I university examinations July /August 2024

Biochemistry Paper I (QP CODE: 1005)

Your answer should be specific to the question asked

Draw neat labelled diagrams wherever necessary

Maximum Marks: 100 **Date: 12/08/2024** **Time: 3 hrs**

I Long Essay **2 X 10 = 20 Marks**

1. A 48-year-old women complaints of weight loss, increased frequency of micturition and generalized weakness. On investigation her blood sugar was found to be 320mg/dl.
    a) What is the probable diagnosis?
    b) What are the relevant investigations to be done?
    c) Describe the regulation of blood glucose in the body
    d) What are the chronic complications of this condition (1+3+4+2)
2. What are ketone bodies. Describe their synthesis and catabolism. What are the causes of ketosis (1+4+3+2).

II Short Essay **8x5 = 40 Marks**

3. Define Isoenzymes and describe its characteristic features with examples (1+4)
4. Explain the inhibitors of Electron Transport Chain and Oxidative phosphorylation. Write a note on uncouplers with its significance (3+2)
5. A 5 year old child was brought to the hospital with complaints of swelling of abdomen. On examination he had enlarged liver. Investigations revealed that the child had hypoglycemia, hyperuricemia and lactic acidosis
    a) What is the probable diagnosis
    b) What is the enzyme deficiency
    c) What is the basis for hypoglycemia, hyperuricemia and lactic acidosis (1+1+3)
6. Explain the sources, RDA, biochemical functions and deficiency manifestations of Vitamin A.
7. Define basal metabolic rate (BMR). Write its reference range. Explain any four factors affecting the BMR.
8. Define buffers. Explain the regulation of blood by buffers (1+4)
9. Define fatty liver. What are the causes of fatty liver. Write a note on lipotropic factors (1+1+3)
10. Explain the metabolic adaptation in starvation.

III Short Answers **10x 3 = 30 Marks**

11. Define Co enzyme. Give 2 examples of co enzymes.
12. List any three disorders associated with collagen.
13. A 60year old female presented with tingling and numbness in fingers. On examination Chvostek's sign and Trousseu's sign were elicited
    a) What is the probable diagnosis?
    b) Give the Normal reference range.
    c) Give two functions.
14. Name essential fatty acids. Mention two functions of essential fatty acids.
15. Draw a neat labelled diagram of Mitochondria.
16. List any three functions of Vitamin C.
17. What is the normal pH. List two causes of metabolic acidosis.
18. List any three heteropolysaccharides and write their functions.
19. What is the cause of Pellagra? Write the clinical manifestations of Pellagra.
20. Give the serum reference ranges of the following electrolytes.
    a) Sodium **b)** Potassium **c)** Chloride

IV. MCQ's

1 X 10 = 10 Marks

21 (i) All of the following are intracellular enzymes except

a) Trypsin
b) Hexokinase
c) Fumarase
d) Alcohol dehydrogenase

21 (ii) Compared to pH of blood, normal urine pH is

a) Acidic
b) Neutral
c) Alkaline
d) The same

21 (iii) The most predominant acid produced in the body

a) Lactic Acid
b) Carbonic Acid
c) Pyruvic acid
d) Hydrochloric Acid

21 (iv) All the following are amphipathic lipids except

a) Triacylglycerol
b) Phospholipids
c) Fatty acid
d) Cholesterol

21 (v) All the following are polymers of glucose except

a) Starch
b) Dextrin
c) Insulin
d) Cellulose

22 (i) Generally water-soluble vitamins are not stored in the body except

a) B 1
b) B 12
c) B 6
d) Biotin

22 (ii) The major principal cation of the extracellular fluid is

a) Sodium
b) Potassium
c) Calcium
d) Magnesium

22 (iii) The specificity of the enzyme is mostly dependent on

a) Apo enzymes
b) Prosthetic Group
c) Co enzymes
d) Cofactors

22(iv) The final common pathway for oxidation of major foodstuff is

a) Glycolysis
b) Kreb's cycle
c) HMP shunt
d) Beta oxidation

22 (v) Calories generated per gram of fat is

a) 4 kcal
b) 5 kcal
c) 8 kcal
d) 9 kcal