Question Paper

MANIPAL ACADEMY OF HIGHER EDUCATION
FIRST MBBS DEGREE EXAMINATION - DECEMBER 2021
SUBJECT: BIOCHEMISTRY - PAPER I1

Marks: 80   Duration: 160 mins.

Answer all the questions.

1. Following are the findings of a patient brought to the hospital in the unconscious state

    Blood glucose - 53mg%

    Blood pH-7.2

    Serum bicarbonate - 15mg/L

    Urine ketone bodies - +ve

1A) Comment on each of the above parameters and give your probable diagnosis (4)

1B) Describe the hormonal regulation of blood sugar level. (4)

1C) Mention the different pathways of glucose oxidation (2)

2. Discuss the metabolism of tyrosine under the following headings:

2A) Synthesis (1)

2B) Catabolism (2)

2C) Biologically important products formed (4)

2D) Inborn errors associated (3)

3A) What is competitive inhibition? What is its clinical application? (4)

3B) Give an account of metabolism of chylomicrons (4)

3C) Describe the Rapoport Leubering cycle. What is its significance? (4)

3D) Define radio isotopes. What are the applications of radio isotopes? (4)

3E) Outline the pathway of β-oxidation. (4)

3F) Give the diagnostic importance of elevation of the following enzyme levels in blood (4)

    i)   Creatine phosphokinase

    ii) Acid phosphatase

    iii) Alanine transaminase

    iv) Amylase

3G) Describe the amphibolic role of citric acid cycle. (4)

3H) What is the effect of substrate concentration on enzyme catalyzed reaction? Add a note on the significance of Km value (4)

3I) What is the normal serum cholesterol level? Name the biologically important compounds derived from cholesterol. (4)

3J) Trace the synthesis of glucose from Lactate (4)

3K) A patient having severe chest pain is brought to the hospital. Laboratory findings of this patient is given below:

Serum total cholesterol	400mg%
HDL cholesterol	30mg%
Triglycerides	310mg%
CK – MB	90U/L
Troponin T	45picogram/ml
AST	220 U/L

    i)   What is your probable diagnosis?

    ii)   Comment on the lab report.

    iii)   Calculate the LDL cholesterol of the patient

                                                                           (1+2+1 = 4 marks)

3L) Write the electron transport chain. Show the ATP synthesizing sites and one inhibitor for each(4).

3M i)   Name the amino acid from which each of the following compound is formed:

    a)   Heme   b)   Melatonin c)   Taurine   d)   Nitric oxide

    ii)   Write briefly on functions of Phospholipids.

                                                                           (2+2 = 4 marks)

3N) Give reasons: (4)

    i)   Vitamin C not synthesized in humans.

    ii)   Excessive alcohol consumption can lead to fatty liver

    iii)   Oxidation of FADH in electron transport chain yields 2 ATP

    iv)   Liver cannot utilize the ketone bodies

3O) Give the biochemical defect in   (4)

    i)   Galactosemia

    ii)   Von Gierke's disease

    iii)   Refsum's disease

    iv)   Niemann pick disease

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Question Paper

Exam Date & Time: 28-Dec-2021 (10:20 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION
FIRST MBBS DEGREE EXAMINATION - DECEMBER 2021
SUBJECT: BIOCHEMISTRY - PAPER II

Marks: 80   Duration: 160 mins.

Long answer questions:

1. Discuss the process of transcription of genes under following sections:

1A) The different phases of transcription process (6)

1B) Action of two antibiotics on the process (2)

1C) Two post transcriptional modifications (2)

2. A 20-year old male presented with nausea, vomiting, loss of appetite and abdominal discomfort. His liver function tests (LFT) showed the following results: Total Bilirubin: 11.8 mg/dl, Direct Bilirubin: 7.6 mg/dl, AST: 2050 U/L, ALT: 2700 U/L

2A) What may be the provisional diagnosis? Write one cause for this disorder (½ +½ = 1 mark)

2B) Discuss how LFT can be used in the differential diagnosis of jaundice (4)

2C) Describe the transport and excretion of bilirubin (3)

2D) Add a note on Van den Bergh reaction (2)

3. Short Answer Questions:

3A) A 25-year-old girl presented with fatigue, weakness and pallor. Her blood hemoglobin levels were low suggesting anemia. Name the nutritional deficiencies that can cause anaemia in this patient and describe the biochemical mechanism responsible for development of anaemia in any two nutritional deficiency states (4)

3B) i) A 45-year-old, 75 Kg weighing female business executive had dietary intake of 535 gm carbohydrate, 150gm protein and 95 gm fat each day. In addition, she drank 45 gm alcohol.

         a) How many calories did she consume per day?

         b) What would be your dietary advise to this lady regarding her diet composition and intake?

                                                             (1+2 = 3 marks)

     ii) In a suspected case of homocystinuria, the consulting doctor ordered for serum estimations of vitB_{12} and folate. What is the biochemical rationale for ordering these tests? (1)

3C) Explain the absorption and storage of iron in the body (2+2 = 4 marks)

3D) Discuss the regulation of gene expression with the example of the lac operon model (4)

3E) Write the principle and two applications each for

     i) RFLP

     ii) Hybridoma technology

3F)   Explain the detoxification of following compounds (1 mark × 4 = 4 marks)

    i)   Aspirin   ii)   Ethanol   iii)   Picric acid iv)   Cyanide

3G)   Describe the procedure and applications of recombinant DNA technology (4)

3H)   How is calcitriol synthesized in the body? Discuss its role in calcium and phosphorus metabolism.

(2+2 = 4 marks)

3I)   How are the following compounds formed? (2+2 = 4 marks)

    i)   UMP from orotic acid

    ii)   Uroporphyrinogen III from aminolevulinic acid

3J)   Write brief notes on: (2+2 = 4 marks)

    i)   Metabolic acidosis

    ii)   Protein calorie malnutrition

3K)   Write two coenzyme reactions each for niacin and pyridoxine to show their participation in metabolic pathways (2+2 = 4 marks)

3L)   Write the biochemical defect and one clinical/biochemical manifestation for each of the following:

    i)   Lesch Nyhan Syndrome

    ii)   Orotic aciduria

    iii)   Dubin Johnson's Syndrome

    iv)   Xeroderma Pigmentosum

(1 mark × 4 = 4 marks)

3M)   Write notes on: (2+2 = 4 marks)

    i)   Creatinine clearance test

    ii)   Dietary fibers

3N)   Give biochemical explanations for the following: (1 mark × 4 = 4 marks)

    i)   Dicoumarol prevents the formation of biologically active prothrombin

    ii)   In the genetic code a mutation in codon AAG may lead to premature termination of polypeptide chain in ribosomes

    iii)   Egg albumin is considered as a standard protein

    iv)   Recurrent renal stones are formed in patients with primary hyperparathyroidism

3O)   Discuss the significance of following: (2+2 = 4 marks)

    i)   Clinical utility of estimation of tumour markers in diagnosis and management of cancer

    ii)   Clinical utility of estimation of plasma electrolytes and anion gap in acid-base disorders

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