

**MANIPAL ACADEMY OF HIGHER EDUCATION****FIRST MBBS DEGREE EXAMINATION – JUNE 2021****SUBJECT: BIOCHEMISTRY – PAPER II (ESSAY)**

Thursday, June 24, 2021

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

**✍ Answer ALL the questions.**

1. A 35 year old man complains of poor vision after sunset. Eyes showed triangular grey patches on clinical examination.

1A. Diagnose the vitamin deficient in this patient.

(1 mark)

1B. Explain the metabolism of the vitamin under following headings:

i) Sources    ii) Functions    iii) RDA    iv) Deficiency manifestations

(1+4+1+3 = 9 marks)

2. Describe the process of translation with suitable diagrams. Add a note on post translational modifications of proteins.

(7+3 = 10 marks)

3A. A 40 year old man was investigated for prostatic cancer. Following surgery, the oncologist suggested palliative therapy with 5- fluorouracil along with other drugs.

i) What is the rationale behind the use of 5-fluorouracil in this patient?

ii) Give the biochemical reaction inhibited by the drug.

iii) Name the tumor marker used to detect prostatic cancer.

(1+2+1 = 4 marks)

3B. Write the sources of Carbon and Nitrogen atoms of purine ring with the structure.

(4 marks)

3C. What are dietary fibres? Discuss their importance in diet.

(4 marks)

3D. Describe the Watson and Crick model of DNA

(4 marks)

3E. Give the biochemical defect in the following disorders.

i) Lesch Nyhan Syndrome

ii) Wilson's disease

iii) Orotic aciduria

iv) Pellagra

(4 marks)

3F. Outline the steps of heme biosynthesis.

(4 marks)

3G. **Write notes on:**

- i) Kwashiorkor
- ii) Basal Metabolic Rate (BMR)

(2+2 = 4 marks)

3H. **Give reasons:**

- i) Hemolyzed blood specimen is not suitable for phosphate estimation
- ii) Anion gap increases in prolonged starvation
- iii) Bicarbonate buffer is the best blood buffer
- iv) Kussmaul's respiration is seen in diabetic ketoacidosis

(4 marks)

3I. Define trace elements. Name any three trace elements giving one function each.

(1+3 = 4 marks)

3J. Explain how provitamins are converted to active vitamins taking vitamin D as an example.

(4 marks)

3K. Write briefly on sickle cell anemia

(4 marks)

3L. Explain conjugation reactions of detoxification giving 4 examples.

(4 marks)

3M. Explain the role of enzymes in the evaluation of liver function

(4 marks)

3N. Discuss the causes and compensatory mechanisms of metabolic alkalosis.

(4 marks)

3O. The following are the biochemical findings in a patient. What is your diagnosis and list the causes for the same? Predict the urinary findings in this patient.

Serum total bilirubin 9 mgs%

Conjugated bilirubin 0.2 mgs%

ALT 20 IU/L (5-40 IU/L)

ALP 70 IU/L (40-129 IU/L)

(4 marks)



**MANIPAL ACADEMY OF HIGHER EDUCATION****FIRST MBBS DEGREE EXAMINATION – JUNE 2021****SUBJECT: BIOCHEMISTRY– PAPER I (ESSAY)**

Wednesday, June 23, 2021

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long Answer Questions.**

1. Describe the tricarboxylic acid cycle under the following headings:

- 1A. Complete sequence of reactions with enzymes and coenzymes
- 1B. Amphibolic role with suitable examples
- 1C. Regulation
- 1D. Energetics

(4+2+2+2 = 10 marks)

2. A 20-year old female patient was brought to the casualty in an irritable semicomatose state. She was dehydrated with the pulse rate of 110 beats/min and respiratory rate of 30/min. Biochemical investigations of blood and urine showed the following:

pH:7.02; Bicarbonate:11mEq/L; Creatinine:3.2 mg/dl and Glucose:650 mg/dl;

Benedict's test in urine :positive; Rothera's test in urine: positive

- 2A. What is the probable diagnosis and why has it occurred?
- 2B. Explain the biochemical mechanisms responsible for four clinical/biochemical alterations observed in this patient
- 2C. Discuss ketone body metabolism

(1+4+5 = 10 marks)

3A. Discuss how plasma enzyme estimations will be useful in the differential diagnosis and management of following patients

- i) A patient presenting with acute chest pain
- ii) A patient presenting with jaundice

(4 marks)

3B. Discuss the primary and secondary levels of structural organization of proteins

(4 marks)

3C. How is tyrosine synthesized in the body? Give the catabolic pathways of tyrosine to show that is both glucogenic and ketogenic.

(4 marks)



3D. Discuss the metabolism of high density lipoproteins in the body. Add a note on the clinical significance of HDL.

(4 marks)

3E. Provide brief and precise answers for the following two case studies:

i) A 40-year-old, chronic alcoholic was brought to the emergency room by his neighbor who stated that the patient had been drinking alcohol heavily for the past week and not eaten food for the past three days. Patient was confused, tremulous and sweating profusely.

What is the probable diagnosis? How would you confirm it?

How would you biochemically explain the clinical symptoms?

ii) The plasma and urine glucose levels in a patient after oral glucose tolerance (OGTT) test is as follows:

	0 hr.	2 hr.
Plasma glucose (mg/dl)	118	190
Urine glucose	-	+

\*Interpret the results of OGTT

(2+2 = 4 marks)

3F. Give biochemical basis for the following:

- i) Cataract is seen in children suffering from galactosemia
- ii) Milk fat to be used as the major source of dietary lipids in patients with cystic fibrosis
- iii) In ammonia toxicity brain cells get depleted of glutamate
- iv) In sickle cell anemia polymerization of hemoglobin takes place under deoxygenated state

(4 marks)

3G. Briefly explain the relationship between

- i) HMP shunt and RBC membrane integrity
- ii) Carnitine and oxidation of fatty acids
- iii)  $K_m$  and  $V_{max}$
- iv) Hemoglobin and haptoglobin

(4 marks)

3H. Outline the structural organization of electron transport chain indicating the various complexes.

(4 marks)

3I. Draw a diagram of normal serum electrophoretic pattern, labeling the various fractions. Mention the predominant changes in various electrophoretic bands in the following disorders:

- i) Cirrhosis of liver
- ii) Nephrotic syndrome

(4 marks)

3J. Briefly explain the following phenomenon:

- i) Denaturation
- ii) Effect of substrate concentration on the velocity of an enzyme catalyzed reaction

(4 marks)

3K. Mention the biochemical basis and diagnostic significance of following tests:

- i) L/S ratio
- ii) Serum Lp(a)
- iii) Fecal fat
- iv) FIGLU excretion test

(4 marks)

3L. Write notes on:

- i) Malate – aspartate shuttle                      ii) Creatine

(4 marks)

3M. Describe the reactions of  $\beta$ -oxidation of palmitoyl CoA in mitochondria. Calculate the energetics.

(4 marks)

3N. Mention the clinical use and explain the biochemical mechanism of the therapeutic action of following drugs:

- i) Lovastatin    ii) Methotrexate

(4 marks)

3O. Discuss the hormonal regulation of blood glucose level

(4 marks)

