

**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST MBBS DEGREE EXAMINATION – OCTOBER 2020**  
**SUBJECT: BIOCHEMISTRY– PAPER I (ESSAY)**

Monday, October 19, 2020

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long Answer Questions.**

1. A 4 year boy was brought to the hospital with history of dizziness very often. On examination hepatomegaly was noticed. The blood report was as follows:

Fasting blood glucose – 60mg/dl

Uric acid - 8mg/dl

Triglyceride – 160mg/dl

Urine ketone bodies +ve

Lactic acid +ve

1A. What is the inborn error of metabolism in the child?

1B. Explain glycogen metabolism in the body

1C. Explain the causes of ketosis in hypoglycemia

(1+6+3 = 10 marks)

2. Explain  $\beta$  oxidation of fatty acids under following headings:

2A. Transport

2B. Reactions

2C. Energetics

(2+5+3 = 10 marks)

3. **Short Answer Questions:**

3A. With the help of diagrams explain the secondary structure of proteins

3B. Give reasons for the following:

i) Prostaglandins may be used in termination of pregnancy

ii) Fatty liver can be seen in prolonged starvation

iii) Adipose tissue can generate glycerol but cannot utilize it

iv) Cyanide is poisonous to human body

3C. Give the clinical significance of elevation of following parameters in blood

i) HbA<sub>1c</sub>

ii) Amylase

iii) ALP

iv) ALT

- 3D. Write short note on proteolytic enzymes.
- 3E. Explain Rapoport Leubering cycle and give its significance.
- 3F. Calculate the serum LDL cholesterol of a 35 year old man whose total cholesterol is 250mg/dl, HDL cholesterol is 30mg/dl and total triglyceride is 100mg/dl. What is the normal serum cholesterol, triglyceride, HDL and LDL levels?
- 3G. Name any four mucopolysaccharides. State their location and function.
- 3H. Explain decarboxylation reactions of amino acids. Write the significance.
- 3I. How is HMG CoA formed? What is its importance?
- 3J. Name 4 biologically active peptides. Give their functions.
- 3K. Name the catecholamines. How are they formed in the body?
- 3L. Define Km value of an enzyme. Add a note on its significance.
- 3M. Give the biochemical defects of the following disorders:
- i) Alkaptonuria
  - ii) Homocystinuria
  - iii) Phenylketonuria
  - iv) Maple syrup urine disease
- 3N. Explain chemiosmotic theory of oxidative phosphorylation.
- 3O. A 8 year old boy complaining of body ache was found to excrete high amounts of creatinine. His serum total CK was elevated. What is your possible diagnosis? Give the steps of creatine synthesis.

(4 marks × 15 = 60 marks)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
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**SUBJECT: BIOCHEMISTRY– PAPER II (ESSAY)**

Tuesday, October 20, 2020

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long Answer Questions:**

1. A 48 year old woman with history of chronic alcoholism was hospitalized due to abdominal pain, fever and jaundice. A liver biopsy of the patient showed fatty infiltration and hepatonecrosis.

1A. Indicate the type of jaundice

1B. Explain the significance of van den Bergh reaction in differential diagnosis of jaundice

1C. What are the other laboratory investigations that would aid in confirming the above case of jaundice?

1D. Trace the pathway for the formation of bilirubin from heme. What is the fate of bilirubin?

( $\frac{1}{2}+2+3+4\frac{1}{2} = 10$  marks)

2. Explain the process of translation under the following headings:

2A. Phases of translation

2B. Three post translational modifications

2C. Any three inhibitors with their mechanisms.

(4+3+3 = 10 marks)

3. **Short Answer Questions:**

3A. Write the normal values for:

i) Serum bicarbonate

ii) Arterial pCO<sub>2</sub>

iii) Plasma pH

iv) Anion gap

(1 mark × 4 = 4 marks)

3B. Explain the principle and procedure of PCR. Mention any two applications for the same.

(3+1= 4 marks)

3C. A 5 year old child presented with severe diarrhea. The child was lethargic and showed oedema of face and lower limbs. His serum albumin level was 1.5g/dl.

i) What is your probable diagnosis?

ii) Give reasons for the clinical findings underlined

(1+3 = 4 marks)

3D. Discuss the deficiency symptoms of the following B complex vitamins.

i) Thiamin

ii) Niacin

(2+2 = 4 marks)

- 3E. Name four iron containing proteins and give their functions. (4 marks)
- 3F. Give reasons:
- Clinical manifestations of sickle cell anemia are aggravated in hypoxic conditions.
  - Kernicterus is observed when the serum unconjugated bilirubin exceeds 20mg%
  - Southern Blotting is used in DNA fingerprinting
  - Loss of pro-apoptotic signals can lead to cancer
- (1 mark  $\times$  4 = 4 marks)
- 3G. Discuss the principles of:
- Gene therapy
  - Antisense therapy
- (2+2 = 4 marks)
- 3H. Name any four anticancer drugs. Describe the mechanism of action of any two. (2+2 = 4 marks)
- 3I. Discuss the formation of the following vitamins from their respective provitamins.
- Vitamin D
  - Vitamin A
- (2+2 = 4 marks)
- 3J. A 45 year old asymptomatic aircrew reporting for a medical examination, revealed a serum uric acid level of 8.8mg/dl
- Mention three causes that can lead to hyperuricemia
  - Give two consequences of hyperuricemia
  - Name one drug that can reduce serum uric acid level. Explain its mechanism of action.
- (1½+1+1½ = 4 marks)
- 3K. What is a limiting amino acid? Explain the supplementary action of proteins with examples. (1+3 = 4 marks)
- 3L. Explain the following:
- Chloride shift
  - Folate trap
- (2+2 = 4 marks)
- 3M. i) Name the coenzyme forms of vit B<sub>12</sub>. Write one reaction for each.  
ii) Explain the biochemical role of vitamin K (2+2 = 4 marks)
- 3N. Give reasons:
- Achlorhydria is associated with pernicious anemia
  - Edible oils containing PUFA are usually fortified with vitamin E
  - Cabbage and lettuce are found to induce goiter
  - Fluoride is an essential component of toothpaste and mouthwash.
- (1 mark  $\times$  4 = 4 marks)
- 3O. What is methemoglobin? Discuss the two types of methemoglobinemias. How can it be treated? (1+2+1 = 4 marks)

