

MANIPAL ACADEMY OF HIGHER EDUCATION

FIRST MBBS DEGREE EXAMINATION – AUGUST 2019

SUBJECT: BIOCHEMISTRY– PAPER I (ESSAY)

Thursday, August 22, 2019

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

1. A 57 year old male, who was a heavy smoker, was rushed to the casualty because of sudden crushing chest pain. On examination his ECG was abnormal, CKMB was highly elevated and blood lipids were also high.

1A. What is the probable cause for the chest pain?

1B. Name TWO other markers elevated in this condition

1C. Enumerate the lipids estimated under lipid profile and mention ONE apoprotein associated with each lipoprotein

1D. Explain the metabolism of the lipoprotein inversely related to this condition

(1+1+2+6 = 10 marks)

2. Explain the metabolism of Tyrosine under the following headings:

2A. Formation

2B. Special compounds obtained

2C. Metabolic abnormalities

(2+4+4 = 10 marks)

3A. Outline the Rapaport Leubering cycle. Add a note on its significance.

3B. What is competitive enzyme inhibition? Indicate the clinical usefulness of this type of inhibition with THREE suitable examples.

3C. What is ketosis? Name two causes for ketosis and biochemical mechanism of the same.

3D. How is the active form of Methionine synthesized? Write briefly on polyamines.

3E. Describe the structure of glycogen. Add a note on its function.

3F. Write the components of ETC in an order indicating the sites of ATP formation.

3G. Mention four causes of fatty liver. Name two lipotropic factors and their role in preventing fatty liver.

3H. Define transamination giving one example. Add a note on the metabolic importance of transamination

3I. With suitable examples, justify the amphibolic nature of TCA cycle

3J. Enumerate the mechanisms of regulation of enzyme activity. Explain any one with suitable example.

3K. Outline the reactions of ammonia formation. How is ammonia detoxified in brain?

3L. Write the key reactions of gluconeogenesis

- 3M. i) Name TWO radioisotopes and write ONE application of each
ii) Name the four major tissues involved in integration of fuel metabolism and the source of fuel during starvation.
- 3N. Name the biochemical defect in the following:
i) Maple syrup urine disease
ii) Hyperammonemia type 1
iii) Hartnup's disease
iv) Cystinuria
- 3O. i) A 32 year old female who was under primaquine treatment for malaria was admitted to the hospital due to sudden weakness. Her laboratory finding showed hemolysis. What is the biochemical basis for this hemolysis?
ii) Give reasons:
a. Hyperuricemia is seen in von Gierke's disease.
b. Cellulose cannot be digested in human GI tract.

(4 marks × 15 = 60 marks)



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

Friday, August 23, 2019

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

1. A 3 year old child was brought to the hospital with bow legs, pigeon chest and depressed ribs. He was diagnosed to have a vitamin deficiency disorder.
- 1A. Name the disorder
1B. How is the active form of this vitamin synthesized?
1C. Explain its biochemical functions on target organs.
1D. Describe its mechanism of action as a hormone.

(1+3+4+2 = 10 marks)

- 2A. Explain the process of DNA replication
2B. Enumerate the types of DNA repair and add a note on the associated disorders

(6+4 = 10 marks)

- 3A. i) Write the Henderson-Hasselbach equation. Give its significance
ii) Which is the most efficient buffer system of plasma? Justify

(2+2 = 4 marks)

- 3B. Give the mechanism of detoxification of the following compounds in the body
i) Ethanol ii) Steroids iii) Benzoic acid iv) Picric acid

(1 mark × 4 = 4 marks)

- 3C. A 40 year old man was brought with complaints of persistent vomiting since one week. His blood sample when analysed showed the following results

pH: 7.8

Bicarbonate: 35mEq/L

Pco₂: 40mmHg

- i) What is the acid base disorder seen in this patient
ii) Give any TWO causes for this condition
iii) Comment on the expected compensatory mechanisms

(1+1+ 2 = 4 marks)

- 3D. Define BMR. Explain the factors affecting BMR

(4 marks)

- 3E. What is a limiting amino acid? Explain the supplementary action of proteins with examples

(1+3 = 4 marks)

- 3F. Explain FOUR post translational modifications with FOUR relevant examples
(4 marks)
- 3G. Explain the technique of PCR.
(4 marks)
- 3H. What are proto-oncogenes? Describe 3 mechanisms of activation
(1+3 = 4 marks)
- 3I. Give reasons
i) Aminopterin is used in cancer treatment
ii) Bleeding gums is a common symptom observed in scurvy
iii) Accidental removal of parathyroid glands cause tetany
iv) Gout is seen in von Gierke's disease
(1 mark \times 4 = 4 marks)
- 3J. Enumerate FOUR functions of phosphorous
(4 marks)
- 3K. Outline the process of heme synthesis indicating enzymes and coenzymes, Name the regulatory enzyme
(3+1 = 4 marks)
- 3L. Indicate the vitamin/mineral implicated in the following disorders
i) Pellagra ii) Beri beri iii) Nyctalopia iv) Goiter
(1 mark \times 4 = 4 marks)
- 3M. i) What is microalbuminuria? What is its significance?
(1+1 = 2 marks)
ii) Explain why creatinine clearance is a better marker for renal function, when compared to urea clearance.
(2 marks)
- 3N. What is the principle of van den Bergh reaction? Explain its significance
(1+3 = 4 marks)
- 3O. What is gene therapy? List the steps involved in exvivo gene therapy.
(1+3 = 4 marks)

