

MANIPAL UNIVERSITY
FIRST MBBS DEGREE EXAMINATION – JULY 2017
SUBJECT: BIOCHEMISTRY– PAPER I (ESSAY)

Thursday, July 20, 2017

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long answer questions:**

1. Describe the reactions of the citric acid cycle. Add a note on its energetics. (7+3 = 10 marks)

2. A six month old fair chubby baby was brought to the hospital with complaint of severe vomiting. Urine showed a +ve Benedicts test & a diagnosis of phenylketonuria was made.
 - 2A. Name the metabolic defect.
 - 2B. Outline the pathway by which phenylalanine is catabolized.
 - 2C. Write the reactions leading to the synthesis of catecholamines
 - 2D. Name the other disorders associated with this amino acid. (1+4+3+2 =10 marks)

3. **Short Answers:**
 - 3A. Write a brief note on:
 - i) Essential fatty acids
 - ii) Epimers (2+2 = 4 marks)
 - 3B. Describe the α helical structure of proteins. Name a disease in which this structure is altered. (3+1 = 4 marks)
 - 3C. Define glycogenolysis. Describe the steps involved in this process. (1+3 = 4 marks)
 - 3D. Write briefly on:
 - i) 2-3 BPG
 - ii) Low density lipoproteins (2+2 = 4 marks)
 - 3E. Define β oxidation. Name the three stages of this process. Describe the role of carnitine in the oxidation of fatty acids. (1+1+2 = 4 marks)
 - 3F. Write briefly on:
 - i) Fatty liver
 - ii) α 1 Antitrypsin (2+2 = 4 marks)
 - 3G. Write 4 functions of phospholipids with suitable examples. (4 marks)

- 3H. Classify proteins based on their function. (4 marks)
- 3I. Enumerate the functions of glycine. (4 marks)
- 3J. What are isoenzymes? Explain the characteristic features of LDH isoenzymes and give their diagnostic importance. (1+2+1 = 4 marks)
- 3K. A person suffering from gout was treated with allopurinol. Explain the rationale behind this treatment. Write the salient features of the type of inhibition encountered here. (1+3 = 4 marks)
- 3L. Write briefly on:
i) K_m ii) Prostaglandins (2+2 = 4 marks)
- 3M. Define oxidative phosphorylation. Describe the chemiosmotic hypothesis. (1+3 = 4 marks)
- 3N. A 20 year old man had generalized edema of the body with puffiness of the face in the morning. His laboratory findings were:
- | | |
|---------------------|-----------|
| Serum total protein | 4.5 g/dl |
| Albumin | 1.5 g/dl |
| Globulins | 3.0 g/dl |
| Serum cholesterol | 350 mg/dl |
| Serum creatinine | 1.2 mg/dl |
| Urine protein | +++ |
- i) What is your diagnosis? Give the reason for the edema seen in this patient. (1+1 = 2 marks)
- ii) Mention any 2 applications of radioactive isotopes in biochemistry. (2 marks)
- 3O. Give reasons:
i) Asparaginase is used in the treatment of leukemia
ii) G-6 PD deficiency confers resistance to malaria
iii) Consumption of PUFA reduces the plasma cholesterol level
iv) Cooked food is more easily digested (1 mark \times 4 = 4 marks)



MANIPAL UNIVERSITY

FIRST MBBS DEGREE EXAMINATION – JULY 2017

SUBJECT: BIOCHEMISTRY– PAPER II (ESSAY)

Friday, July 21, 2017

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long answer questions.**

1. A 46-year-old male presents to the emergency department with severe pain in the right toe. The right big toe was swollen, warm, red and tender. Synovial fluid analysis revealed rod- or needle-shaped crystals that were negatively birefringent under polarizing microscopy. Serum uric acid level was found to be 20 mg/dl (normal is 4-7 mg/dl)

1A. What is the likely diagnosis? Explain the primary and secondary causes for this condition.

1B. Describe the pathway leading to the synthesis of uric acid.

1C. What is the pathophysiology of big, swollen toe?

1D. Explain the mechanism of allopurinol, the drug of choice for this condition.

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

2. Describe the sources, RDA, absorption and activation, biochemical functions and the deficiency of vitamin D

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

3. **Short answer questions:**

3A. Write TWO coenzyme functions and the deficiency of thiamine.

(2+2 = 4 marks)

3B. Explain TWO examples each for post transcriptional and post translational modifications.

(2+2 = 4 marks)

3C. Write notes on:

i) RNA polymerase

ii) Functions of chromium

(2+2 = 4 marks)

3D. What is the normal pH of the blood? Write a note on metabolic acidosis

(1+3 = 4 marks)

3E. Describe heme biosynthesis

(4 marks)

3F. Write briefly on:

i) Four functions of calcium

ii) Iron absorption

(2+2 = 4 marks)

- 3G. With the help of a neat labeled diagram explain the structure of DNA.
(4 marks)
- 3H. What is anion gap? Discuss the role of kidney in the maintenance of acid base balance
(1+3 = 4 marks)
- 3I. Define the following terms:
i) Biological value of proteins
ii) Respiratory quotient
iii) Specific dynamic action
iv) Calorific value of food
(1 mark × 4 = 4 marks)
- 3J. Write the biochemical defect in:
i) Crigler najjar syndrome
ii) Gilbert's disease
iii) Dubin Johnson syndrome
iv) Sickle cell anemia
(1 mark × 4 = 4 marks)
- 3K. With the help of diagrams describe recombinant DNA technology. Write two applications
(3+1 = 4 marks)
- 3L. Explain two renal function tests.
(4 marks)
- 3M. Discuss various phases of detoxification with an example for each.
(4 marks)
- 3N. Explain the process of translation.
(4 marks)
- 3O. Define BMR. What is its normal value in adults? Explain the factors affecting BMR.
(1+1+2 = 4 marks)

