

MANIPAL UNIVERSITY

FIRST MBBS DEGREE EXAMINATION – SEPT/OCT 2017

SUBJECT: BIOCHEMISTRY – PAPER I (ESSAY)

Tuesday, October 03, 2017

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

✍ Long answer questions:

1. A 45 year old woman came to an ophthalmologist with complaints of headache, blurred vision with history of excessive weight loss and frequent urination. She was diagnosed with retinopathy and a random blood sample gave a glucose value of 310mg/dl.

1A. What is the probable cause of retinopathy?

1B. Comment on the plasma glucose and its contribution to the diagnosis.

1C. Name an indicator of long term glycemc status.

1D. Describe in detail the blood glucose homeostasis.

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

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

2A. Biosynthesis

2B. Catabolism

2C. Synthesis of biologically important compounds

2D. Any two inborn errors with associated enzyme defect.

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

3A. Write briefly on synthesis and utilization of ketone bodies.

(4 marks)

3B. Explain competitive inhibition with two clinical applications.

(4 marks)

3C. With the help of a neat diagram explain glucose absorption in the intestine.

(4 marks)

3D. Describe the secondary structure of proteins.

(4 marks)

3E. A 30 year old obese patient is admitted to the casualty with history of acute chest pain. ECG shows signs of acute myocardial infarction.

i) Name three markers that can justify this diagnosis in order of their elevation in the plasma.

ii) Write a short note on isoenzymes.

(2+2 = 4 marks)

3F. Explain the ELISA technique with a note on its diagnostic applications.

(4 marks)

3G. Discuss the absorption of dietary fat. Add a note on steatorrhoea.

(3+1 = 4 marks)

- 3H. Exemplify the following reactions and give their significance.
i) Transmethylation
ii) Decarboxylation
(2+2 = 4 marks)
- 3I. Outline the key steps of gluconeogenesis. Comment on contribution of fats to gluconeogenesis.
(3+1 = 4 marks)
- 3J. Compare and contrast.
i) Inhibitors and uncouplers of ETC.
ii) NADH and NADPH.
(2+2 = 4 marks)
- 3K. Discuss briefly the oxidation of palmitic acid under the following headings.
i) Activation
ii) Transport
iii) Oxidation
(4 marks)
- 3L. Give biochemical reasons for the following:
i) Urine sample in alkaptonuria turns black from top downwards on standing.
ii) Selenocysteine is considered 21st amino acid.
iii) Choline prevents fatty liver.
iv) Alcohol consumption may lead to hypoglycaemia.
(4 marks)
- 3M. Write short notes on:
i) Diagnostic applications of radioisotopes.
ii) Biochemical investigations of multiple myeloma.
(2+2 = 4 marks)
- 3N. Write the differences between the following
i) Passive diffusion and facilitated diffusion.
ii) Glycogenolysis in muscle and liver.
(2+2 = 4 marks)
- 3O. Justify the following statements with appropriate reasoning.
i) von Gierke's disease may cause hyperuricemia.
ii) Polyunsaturated fatty acids help in reducing the risk of atherosclerosis.
iii) Urea cycle is linked to tricarboxylic acid cycle.
iv) Phospholipids in membranes participate in signal transmission.
(4 marks)



MANIPAL UNIVERSITY

FIRST MBBS DEGREE EXAMINATION – SEPT/OCT 2017

SUBJECT: BIOCHEMISTRY– PAPER II (ESSAY)

Wednesday, October 04, 2017

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

✍ Answer ALL the questions.

✍ Long answer questions.

1. Discuss the process of synthesis of DNA. Name two inhibitors.

(8+2 = 10 marks)

2. A 13 year old high school boy had complaint of difficulty in performing his work in dim light. His diet was found to be deficient in carrots, papaya and fish liver oil.

2A. What is your probable diagnosis? Name the biochemical compound which is responsible for the above condition.

2B. Discuss its metabolism under following headings:

i) Requirement

ii) Functions

iii) Deficiency manifestations

(1½+½+4+4 = 10 marks)

3A. Describe the structure of tRNA with the help of a neat diagram. Add a note on the importance of each arm.

(3+1 = 4 marks)

3B. Explain PCR technique and write two applications.

(3+1 = 4 marks)

3C. Write briefly on **TWO** DNA repair mechanisms.

(4 marks)

3D. A 42 year old man presents with pain in joints and attacks of painful arthritis of great toe. Following are some of the biochemical findings.

Urine pH : 4.5

Urinary uric acid: 1.65g/day

Serum uric acid: 10.5 mg/dl

What is the probable diagnosis? Write the:

i) Causes

ii) Treatment for the disorder

(1+2+1 = 4 marks)

- 3E. Name the different mechanisms involved in detoxification process giving one example each. (4 marks)
- 3F. Write note on specific dynamic action. (4 marks)
- 3G. Name the coenzyme forms of niacin with one reaction each in which they participate. Add a note on deficiency manifestations. (2+2 = 4 marks)
- 3H. Write briefly on:
i) Fluorosis ii) Four functions of phosphorus (2+2 = 4 marks)
- 3I. Name the hepatic porphyrias with the associated biochemical defect. (4 marks)
- 3J. Discuss:
i) Normal level, formula for the calculation and clinical significance of creatinine clearance test
ii) Principle and use of van den Bergh test (2+2 = 4 marks)
- 3K. What is the normal blood pH? Name the lines of defense mechanisms which are responsible for blood pH regulation. Add a note on the acid base disorder seen in uncontrolled diabetes mellitus. ($\frac{1}{2}+1\frac{1}{2}+2 = 4$ marks)
- 3L. Give the normal levels of serum:
i) HCO_3^- ii) Total bilirubin
iii) Sodium iv) Calcium (4 marks)
- 3M. Discuss BMR under the following headings:
i) Definition
ii) Normal value
iii) Factors affecting (4 marks)
- 3N. Write the reactions of heme biosynthesis indicating enzymes & coenzymes. (4 marks)
- 3O. Give reasons:
i) Actinomycin D is an anticancer drug.
ii) Prolonged vomiting results in metabolic alkalosis
iii) Delayed wound healing is seen in scurvy
iv) Iron over load leads to bronze diabetes (4 marks)

