Reg. No.										

MANIPAL UNIVERSITY

FIRST MBBS DEGREE EXAMINATION – MAY/JUNE 2014

SUBJECT: BIOCHEMISTRY– PAPER I (ESSAY)

Monday, June 02, 2014

Time: 10:20 – 13:00 Hrs. Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long answer questions.**

1. A full term baby, born after normal pregnancy developed severe bouts of vomiting, grunting respiration and lethargy. He was unresponsive to stimuli. His blood sample analysis revealed urea=11 mg% (reference range 15-45 mg%), ammonia=468 µg% (reference range = 20-63µg%). The plasma levels of citrulline and glutamine were grossly elevated and that of argininosuccinate level was decreased.

1A. What is the provisional diagnosis?

(½ mark)

1B. What is the biochemical basis for increased citrulline, glutamine and decreased argininosuccinate?

(1½ marks)

1C. Explain the formation, transport and disposal of ammonia in the body.

(3+1+4 = 8 marks)

2A. Explain glycogenolysis. Add a note on its regulation.

(3+2 = 5 marks)

2B. Discuss the biochemical diagnostic tests commonly done in diabetes mellitus.

(5 marks)

3. Short answer questions.

3A. A patient was brought to the hospital in an unconscious state. Some immediate investigations were requested by the attending doctor and the reports were as follows. Blood sugar = 44 mg/dl, blood pH = 7.21, Serum bicarbonate level = 15 mEq/L, Rothera's test with urine = positive.

i) What is the probable diagnosis? Give two biochemical basis for your diagnosis

ii) Discuss ketogenesis

(2+2 = 4 marks)

3B. Explain the digestion and absorption of dietary carbohydrates.

(2+2 = 4 marks)

3C. Write the reaction catalyzed by the rate limiting enzyme of cholesterol biosynthesis. Add a note on the metabolism of HDL indicating its clinical significance.

(1+3 = 4 marks)

3D. Write the reactions of β-oxidation of fatty acids in mitochondria.

(4 marks)

3E. Mention the enzyme defect in the following disorders. Write two biochemical/clinical findings indicating the biochemical basis for the same.

i) von Gierke's disease ii) Galactosemia

(2+2 = 4 marks)

3F. Mention the sources of acetyl CoA and NADPH for De Novo synthesis of fatty acids. Write a note on fatty acid synthase complex.

(1+1+2 = 4 marks)

3G. Classify lipids with examples for each class.

(4 marks)

3H. Explain the effect of temperature and substrate concentration on the rate of enzyme catalyzed reaction.

(1+3 = 4 marks)

3I. Describe the features of competitive enzyme inhibition. Give two examples of competitive inhibitors used in clinical medicine.

(2+2 = 4 marks)

3J. Write the diagnostic significances of:

i) Acid phosphatase ii) Alkaline phosphatase

iii) Lipase iv) CK-MB

(1 mark × 4 = 4 marks)

3K. Schematically represent the components of electron transport chain in a sequence. Explain chemiosmotic hypothesis of oxidative phosphorylation.

(2+2 = 4 marks)

3L. With the help of a diagram describe fluid mosaic model of membrane structure. Give an example for facilitated diffusion.

(3+1 = 4 marks)

3M. Write two reactions for synthesis of glycine in body. Explain the role of glycine in the synthesis of heme and creatine.

(2+2 = 4 marks)

3N. Explain primary and secondary structural organization of proteins with examples.

(1+3 = 4 marks)

3O. Write a reaction to justify that tyrosine is a non- essential amino acid. Enumerate the reactions of synthesis of epinephrine from tyrosine indicating enzymes and coenzymes.

(1+3 = 4 marks)

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FIRST MBBS DEGREE EXAMINATION – MAY/JUNE 2014

SUBJECT: BIOCHEMISTRY– PAPER II (ESSAY)

Tuesday, June 03, 2014

Time: 10:20 – 13:00 Hrs. Maximum Marks: 80

✍ **Answer ALL the questions.**

✍ **Long answer questions.**

1. With the help of labeled diagrams describe:

1A. Watson – Crick model of DNA

1B. The process of DNA replication

(3+7 = 10 marks)

2. A nine day old baby was admitted to the hospital with jaundice. On admission serum total bilirubin was 16 mg/dl. Baby was given phototherapy:

2A. Explain the formation and metabolism of bilirubin.

(2+3 = 5 marks)

2B. Write the normal serum total and direct bilirubin values.

(1 mark)

2C. Explain the differential diagnosis of jaundice.

(4 marks)

3. Short answer questions.

3A. A 12 year old boy presented to the hospital with anemia, jaundice and recurrent bone pain. Peripheral smear showed numerous sickled erythrocytes

i) What is the probable diagnosis? Explain the biochemical basis for sickling of cells and anemia.

(1+2 = 3 marks)

ii) Explain a test available to prove your diagnosis.

(1 mark)

3B. Explain the principle and applications of hybridoma technology.

(3+1 = 4 marks)

3C. Describe the structure and functions of t RNA with a neat labeled diagram.

(2+2 = 4 marks)

3D. Enumerate the steps of purine degradation indicating enzymes and coenzymes.

(4 marks)

3E. Write notes on two kidney function tests.

(2+2 = 4 marks)

3F. Explain phase 1 and phase 2 detoxification reactions with one example for each.

(2+2 = 4 marks)

3G. Write two coenzymic functions and deficiency manifestations of thiamine.

(2+2 = 4 marks)

3H. Describe Wald's visual cycle.

(4 marks)

3I. Compare and contrast Kwashiorkor and marasmus.

(4 marks)

3J. Discuss the role of vitamin D in serum calcium homeostasis.

(4 marks)

3K. Explain folate trap. Write two reactions involving coenzyme form of folic acid.

(2+2 = 4 marks)

3L. Write notes on the absorption and deficiency of iron.

(2+2 = 4 marks)

3M. Define basal metabolic rate. Explain three factors affecting BMR.

(1+3 = 4 marks)

3N. Define balanced diet. Explain the components of balanced diet.

(1+3 = 4 marks)

3O. With the help of Lac operon model explain regulation of gene expression in prokaryotes.

(4 marks)

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MANIPAL UNIVERSITY

M.Sc. (MEDICAL) (PRELIMINARY) DEGREE EXAMINATION – MAY 2014

SUBJECT: PAPER III: BIOCHEMISTRY

Friday, May 09, 2014

Time: 14:00 – 17:00 Hrs. Maximum Marks: 80

✍ **Answer ALL question.**

1. **Essay questions:**

1A. Classify enzymes, giving examples, as per IUBMB.

1B. Name two isoenzymes. Indicate their clinical importance.

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

2. **Discuss glycine metabolism under the following heads:**

2A. Synthesis

2B. Biologically important compounds formed

2C. Inborn errors

(2+6+2 = 10 marks)

3. **Short questions:**

3A. Name four trace elements. Indicate one function of each.

(2+2 = 4 marks)

3B. Define BMR. Add a note on factors affecting BMR.

(1+3 = 4 marks)

3C. Name the metabolically active form of Vitamin D. Indicate its functions.

(1+3 = 4 marks)

3D. What is a tumor marker? Give two examples, indicating their clinical importance.

(1+1+2 = 4 marks)

3E. Describe the technique of PCR. What is its application?

(3+1 = 4 marks)

3F. i) Name two post-transcriptional modifications.

ii) Name two post-translational modifications.

(2+2 = 4 marks)

3G. Classify jaundice. Add a note on van den Bergh test and its application in jaundice.

(2+2 = 4 marks)

3H. What is anion gap? What is its clinical application?

(2+2 = 4 marks)

3I. Name the parameters tested in a typical fasting lipid profile, indicating their reference values.

(2+2 = 4 marks)

3J. i) Name two essential fatty acids, indicating their source

ii) Name two phospholipids, indicating their function/s.

((1+1)+(1+1) = 4 mark

3K. What is Cori's cycle? Indicate its metabolic significance.

(2+2 = 4 mark

3L. Write the component sequence of Electron transport chain, indicating the sites of AT synthesis.

(2+2 = 4 mark:

3M. What is the reference value for fasting blood glucose. Give an account of regulation of bloo glucose.

(1+3 = 4 marks

3N. What is the reference value for serum albumin? Add a note on functions of albumin an hypoalbuminemia.

(1+2+1 = 4 marks

3O. Give an outline of structural organization of proteins.

(4 marks)

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