

Reg. No.

**MANIPAL UNIVERSITY**

**FIRST MBBS DEGREE EXAMINATION – MAY/JUNE 2013**

**SUBJECT: BIOCHEMISTRY– PAPER I (ESSAY)  
(OLD REGULATION)**

Monday, June 03, 2013

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 40

1. Describe citric acid cycle. Why is it regarded as an amphibolic pathway?  
(3+1 = 4 marks)
2. Explain the formation, transport and disposal of ammonia in body.  
(4 marks)
3. Write the following aspects of tyrosine metabolism:
  - 3A. Synthesis
  - 3B. Special products formed from tyrosine
  - 3C. Phenylketonuria(1+2+1 = 4 marks)
4. Describe the following aspects of glycogenolysis:
  - 4A. Reactions
  - 4B. Regulation by covalent modification
  - 4C. Type1 glycogen storage disorder(2+1+1 = 4 marks)
5. Discuss ketogenesis and utilization of ketone bodies. Add a note on ketosis.  
(2+1+1 = 4 marks)
6. Outline the reactions catalysed by the enzymes LCAT and pancreatic lipase. Write the significance of these reactions.  
(1+1 = 2 marks)
7. Define primary structure of a protein. Explain with an example, how alteration in primary structure may affect the function of that protein.  
(2 marks)
8. Explain the effect of the following on the velocity of enzyme catalysed reactions:
  - 8A. pH
  - 8B. Temperature
  - 8C. Substrate concentration( $\frac{1}{2}+\frac{1}{2}+1 = 2$  marks)

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

9. **Write notes on:**

- 9A. Components of electron transport chain in sequence
- 9B. Definition and diagnostic utility of Isoenzymes
- 9C. Role of insulin in blood glucose regulation
- 9D. Structure and metabolism of LDL

(2×4 = 8 marks)

10. **Write the formation, fate and significance of:**

- 10A. UDP-glucose
- 10B. Creatine

(1½×2 = 3 marks)

11. **Give specific biochemical reasons for the following:**

- 11A. Trypsin alone cannot complete the digestion of a protein
- 11B. Histidine residues in hemoglobin play a significant role in buffering
- 11C. Children with type I hyperlipoproteinemia can utilize medium chain triglycerides
- 11D. Glucose and galactose are epimers but glucose and fructose are not
- 11E. Congenital cataract is a feature of galactosemia
- 11F. Methotrexate is used in treatment of cancer

(½×6 = 3 marks)



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## MANIPAL UNIVERSITY

FIRST MBBS DEGREE EXAMINATION – MAY/JUNE 2013

SUBJECT: BIOCHEMISTRY– PAPER II (ESSAY)  
(OLD REGULATION)

Tuesday, June 04, 2013

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 40

1. **Long answer questions:**

- 1A. Explain translation. Add a note on post translational modifications.  
1B. Describe chemistry, functions and mechanism of action of vitamin D. Add a note on deficiency symptoms.

$((4+2)+(5+1) = 12 \text{ marks})$

2. **Short answer questions:**

- 2A. Explain absorption and iron homeostasis.  
2B. Catabolism of purine nucleotides and gout.  
2C. Blood urea and creatinine estimation in the evaluation of kidney function .

$((2+2)+(2+2)+4 = 12 \text{ marks})$

3. **Brief answer questions:**

- 3A. Polymerase chain reaction  
3B. Erythropoietic porphyrias  
3C. Protein calorie malnutrition  
3D. Recombinant proteins in medicine

$(3 \times 4 = 12 \text{ marks})$

4. **Give biochemical basis/reasons:**

- 4A. During replication of DNA one strand is synthesized discontinuously as Okazaki fragments.  
4B.  $^{131}\text{I}$  isotope could be used to locate thyroid tumour.  
4C. Rate of respiration is high in uncontrolled diabetes mellitus patients.  
4D. In vitamin B<sub>12</sub> deficiency coenzyme function of folic acid is impaired.

$(1 \times 4 = 4 \text{ marks})$



## MANIPAL UNIVERSITY

FIRST MBBS DEGREE EXAMINATION – MAY/ JUNE 2013

SUBJECT: BIOCHEMISTRY– PAPER I (ESSAY)  
(NEW REGULATION)

Monday, June 03, 2013

Time: 10:20 – 13:00 Hrs.

Maximum Marks: 80

## ✍ Long answer questions:

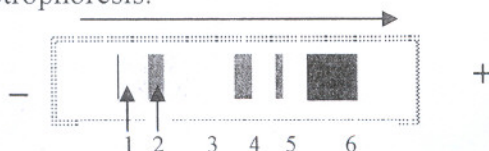
1. A 60 yr old woman was referred to a hospital with history of chest pain. She was noted to have hypertension and her plasma cholesterol level was 410 mg/dl with an increase in the concentration of LDL. Angiogram demonstrated a narrowing of the right coronary artery.
- What is your probable diagnosis?
  - What is the normal serum cholesterol level?
  - Write a note on regulation of cholesterol synthesis and name two hypocholesterolemic drugs.
  - Discuss the metabolism of the lipoprotein which has a protective role against this disorder.
- (1+1+4+4 = 10 marks)

## 2. Discuss the metabolism of glycine under following headings:

- Synthesis and degradation
  - Important products formed
  - Associated defects
- (3+5+2 = 10 marks)

## ✍ Short notes:

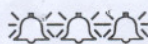
- 3A. Classify enzymes with one example for each class. (4 marks)
- 3B. What are the features of competitive inhibition? Explain its clinical significance by giving two examples. (2+2 = 4 marks)
- 3C. Serum of a 56 year old woman showed the following pattern when subjected to electrophoresis.



- What is your diagnosis?
- Name the bands seen in the electrophoretogram.
- Give the normal levels of serum total protein, albumin and globulins.
- Name the protein that may be excreted in urine in the above condition.

(1×4 = 4 marks)

- 3D. Describe the formation of ketone bodies. (4 marks)
- 3E. Write a note on fatty liver and name any two lipotropic factors. (3+1 = 4 marks)
- 3F. Name four radioisotopes and give their clinical applications. (4 marks)
- 3G. Write the components of ETC in sequence. Indicate the ATP synthesizing sites. (3+1 = 4 marks)
- 3H. Give reason:
- i) Glucokinase cannot act on all hexoses
  - ii) Dicoumarol is used as an anticoagulant
  - iii) Polyuria is a feature of diabetes mellitus
  - iv) Muscle glycogen does not contribute to blood glucose
- (4 marks)
- 3I. Explain the secondary structure of proteins. (4 marks)
- 3J. Give the reactions involved in the synthesis of
- i) SAM
  - ii) Epinephrine
- (2+2 = 4 marks)
- 3K. Write the oxidative steps of HMP shunt pathway and give its significance. (3+1 = 4 marks)
- 3L. Define gluconeogenesis. Give the key gluconeogenic reactions. (1+3 = 4 marks)
- 3M. What is the normal fasting blood glucose level? How is it regulated? (1+3 = 4 marks)
- 3N. Give four examples of heteropolysaccharides with their function. (4 marks)
- 3O. Give one example each for:
- i) Group specificity of enzyme action
  - ii) Derived lipid
  - iii) Polyamine
  - iv) Derivative of monosaccharide
- (4 marks)



- 3E. Describe the steps of PCR with two diagnostic applications. (2+2 = 4 marks)
- 3F. Write briefly on:  
i) Any two tumor markers with a clinical condition causing elevation of each  
ii) Sickle cell anaemia (2+2 = 4 marks)
- 3G. Draw a neat labeled diagram of tRNA and add a note on post transcriptional modifications. (2+2 = 4 marks)
- 3H. Calculate the energy requirements for a 20 year old male student weighing 60kg. What is his daily protein requirement? (3+1 = 4 marks)
- 3I. i) Mention the type of biotransformation observed below.  
a) Ethanol  $\longrightarrow$  Acetic acid  
b) Atropine  $\longrightarrow$  Tropic Acid + Tropin  
ii) What is a limiting amino acid? How can it be compensated? (2+2 = 4 marks)
- 3J. Explain the lac operon concept. (4 marks)
- 3K. Mention one biochemical application of each of the following:  
i) van den Bergh reaction                      ii) Creatinine clearance  
iii) Western Blot technique                      iv) BMI (4 marks)
- 3L. Write short notes on:  
i) The Chargaff's rule                              ii) Acute Intermittent porphyria (2+2 = 4 marks)
- 3M. Give the key reaction of heme synthesis and one inhibitor for the same. Add a note on regulation of heme synthesis. (2+2 = 4 marks)
- 3N. Discuss the metabolism of Iron under the following headings:  
i) RDA in women                      ii) Absorption                      iii) Storage (1+2+1 = 4 marks)
- 3O. Give the biochemical basis for each of the following:  
i) VNTR's are of diagnostic importance  
ii) Vitamin K deficiency is associated with elevated prothrombin time  
iii) Diet rich in green leafy vegetables has cholesterol lowering effect  
iv) There is an increased demand for thiamine in chronic alcoholics (4 marks)



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