

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2011

SUBJECT: BIOCHEMISTRY – I (ESSAY)

Wednesday, February 16, 2011

Time: 09:00 – 11:00 Hrs.

Max. Marks: 60

✍ Answer ALL questions. Write brief, relevant and legible answers.

✍ Draw diagram, flow charts wherever appropriate.

1. Discuss in detail the biochemical reactions involved in the complete detoxification of ammonia in the body.

(5 marks)

2. Describe the biochemical process involved in adaptation to dim light vision.

(3 marks)

3. Explain the following with a suitable example:

3A. Frame shift mutation

3B. Wobble hypothesis

(2+2 = 4 marks)

4. Kantha, a 35 year old lady presented to her physician with complaints of tiredness, profuse sweating and increased weight loss inspite of increased appetite for the past few months. On examination the doctor noticed an increase in her pulse and blood pressure. Physical examination revealed an enlargement of a gland in the anterior region of the neck, which moved on deglutition. Her blood was sent for hormone assays.

4A. Identify the hormone affected in this disorder and add a note on its transport in plasma.

4B. Describe the biochemical mechanism of action of this hormone in its target cells.

(2+3 = 5 marks)

5. Describe the synthesis, activation and biochemical actions of the vitamin involved in calcium homeostasis. Name the disorders of its deficiency.

(3+3+1 = 7 marks)

6. Lipoprotein 'X' transports dietary lipids in the blood.

6A. Identify 'X' and describe the action of one important extrahepatic enzyme needed for its metabolism.

6B. Name three apolipoproteins needed for its metabolism.

6C. Explain two disorders affecting its metabolism.

(1½+1½+2 = 5 marks)

7. Sundar, a labourer was rushed to the hospital emergency unit one night in an unconscious state. His friends revealed that he was a chronic alcoholic and ate poorly. Doctor on duty noticed the alcohol smell in breath. Blood investigations revealed low blood glucose and high lactate levels. Describe the biochemical reasons for the findings in blood.
(5 marks)
8. Describe the process of digestion of the major dietary lipid.
(5 marks)
9. Draw and label the structure of an immunoglobulin molecule.
(3 marks)
10. Discuss the significance of pentose phosphate pathway in erythrocytes.
(5 marks)
11. With suitable graphs, describe the effect of 2,3-BPG and pH on oxygen affinity of hemoglobin.
(5 marks)
12. Discuss the effect of substrate concentration on an enzyme catalyzed reaction with suitable graphs.
(5 marks)
13. Describe the formation of atherosclerotic plaque.
(3 marks)



MANIPAL UNIVERSITY**MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2011****SUBJECT: BIOCHEMISTRY – II (MCQs)**

Wednesday, February 16, 2011

Time: 11:30 – 12:30 Hrs.

Max. Marks: 120

INSTRUCTIONS

- For each statement, select **T** (True) or **F** (False) as your choice.
- Indicate your choice by darkening the appropriate circle in the answer sheet provided.
- Use only HB or 2B pencils to darken the circle.
- Leave blank for Don't Know response.
- Scoring systems is as follows:

For every Correct response	1 mark is awarded
For every Wrong response	0.5 mark is deducted
For every Don't Know response	No mark is deducted
- Indicate your roll number (Registration Number) clearly and correctly.
- Do not write anything in the question paper.
- The true/false statements are numbered 101 to 160 and 201 to 260 (Total 120 statements).
- This question paper contains **03** pages. Please make sure that the question paper provided to you has all the pages.

Acidic amino acids include

- 101. Aspartate
- 102. Glycine
- 103. Methionine
- 104. Glutamate

Following pairs correctly match the proteins with their functions

- 105. Collagen : Transport
- 106. Albumin : Structural support
- 107. Ferritin : Storage
- 108. Haptoglobin : Immunity

Coenzymes needed for TCA cycle include

- 109. TPP
- 110. NAD⁺
- 111. NADP⁺
- 112. PLP

Denaturation of proteins

- 113. Abolishes its biological activity
- 114. Causes loss of primary structure
- 115. Is favored by strong alkalis

Hyaluronic acid is

- 116. A glycolipid
- 117. A component of cartilage
- 118. Intracellular

Competitive inhibitors of enzymes

- 119. Lower the Km of enzyme
- 120. Alter the Vmax of the enzyme catalysed reaction
- 121. Bind to the active site of the enzyme
- 122. Become ineffective in the presence of increased substrate concentration

Vitamin B₁₂

- 123. Absorption in the intestine requires intrinsic factor
- 124. Deficiency leads to megaloblastic anemia
- 125. Deficiency is characterized by branched chain amino aciduria
- 126. Is richly found in green leafy vegetables

Deoxyribonucleic acid

- 127. Contains adenosine
- 128. Contains three hydrogen bonds between cytosine and guanine
- 129. Contains ribose sugar moiety
- 130. Is a component of ribosomes

Regarding lipids

- 131. Arachidonic acid has four double bonds
- 132. Cardiolipin is a component of mitochondrial membranes
- 133. Gangliosides are derived lipids
- 134. Phosphatidyl inositol is the major component of lung surfactant
- 135. Palmitic acid is a monounsaturated fatty acid
- 136. Oleic acid is a saturated fatty acid with 18 carbon atoms

HMG CoA reductase is

- 137. Activated by cAMP
- 138. Inhibited by cholestyramine
- 139. Needed for ketogenesis
- 140. Inhibited by protein phosphatase-1

β-oxidation

- 141. Takes place in the adipose tissue
- 142. Is active in liver during starvation
- 143. Is totally lacking in patients suffering from Refsum's disease
- 144. Yields NADPH

Following pairs correctly match the minerals with their functions

- 145. Zinc : Cofactor of DNA polymerase
- 146. Copper : Helps in iron transport
- 147. Cobalt : Required for erythropoiesis
- 148. Molybdenum : Prevents dental caries

Characteristic findings in marasmus include

- 149. Fatty liver
- 150. Severe muscle wastage
- 151. Edema
- 152. Anemia

Endopeptidases secreted by the pancreas include

- 153. Trypsin
- 154. Pepsin
- 155. Carboxypeptidase A
- 156. Pancreatic amylase

Unconjugated bilirubin

- 157. Levels in the serum are increased in Gilbert's syndrome
- 158. Is excreted in the urine in high amounts in post hepatic jaundice
- 159. When present in urine, gives positive Hay's test
- 160. Is also known as bilirubin diglucuronide

Key enzymes of gluconeogenesis include

- 201. Phosphoenol pyruvate carboxykinase
- 202. Pyruvate decarboxylase
- 203. Glucose 6-phosphatase
- 204. Fructose 1, 6 bisphosphatase

Regarding deficiency disorders of vitamins

- 205. Niacin deficiency leads to pellagra
- 206. Rifampicin treatment leads to pyridoxine deficiency
- 207. Riboflavin deficiency causes cheilosis
- 208. Folate deficiency leads to microcytic anemia

Basal metabolic rate is

- 209. Increased in thyroid deficiency states
- 210. Higher in children than in adults
- 211. Measured immediately after a meal
- 212. Increased during pregnancy

Hormones that use cAMP second messenger system include

- 213. Glucagon
- 214. TSH
- 215. Cortisol
- 216. Insulin

Insulin

- 217. Activates glycogen phosphorylase
- 218. Induces pyruvate kinase
- 219. Dephosphorylates glucose 6-phosphate dehydrogenase
- 220. Mediates glucose uptake in the satiety centre of brain

Factors favoring calcium absorption in the intestine include

- 221. Oxalates
- 222. Hydrochloric acid
- 223. Iron

Following pairs correctly match the glycogen storage disorders with their enzyme defects

- 224. Von-Gierke's disease : Glucose 6-phosphatase
- 225. Pompe's disease : Branching enzyme
- 226. McArdle's disease : Muscle glycogen phosphorylase
- 227. Her's disease : Hepatic glycogen synthase

Metabolic acidosis occurs in

- 228. Uncontrolled diabetes mellitus type I
- 229. Bronchial asthma
- 230. Prolonged starvation
- 231. Pyloric stenosis

Abnormal constituents of urine include

- 232. Glucose
- 233. Acetoacetate
- 234. Blood
- 235. Urea
- 236. Bile salts

During prolonged starvation

- 237. Ketogenesis is active in skeletal muscle
- 238. Gluconeogenesis is active in adipose tissue
- 239. Glycogenolysis is active in liver
- 240. Proteolysis is active in skeletal muscle

Prokaryotic DNA polymerase I

- 241. Exhibits 5'→3' polymerase activity
- 242. Removes the RNA primer
- 243. Synthesizes the Okazaki fragments
- 244. Exhibits proof reading activity

The following pairs correctly match the enzymes with their inhibitors

- 245. IMP dehydrogenase : Methotrexate
- 246. Peptidyl transferase : Mycophenolic acid
- 247. Dihydrofolate reductase : Chloramphenicol
- 248. DNA gyrase : Quinolones
- 249. Eukaryotic RNA polymerase : α -amanitin

Restriction endonuclease/s

- 250. Are bacterial enzymes
- 251. Recognise specific palindromic sequences in mRNA
- 252. EcoRI produces sticky ended restriction fragments
- 253. Is an important tool for gene cloning
- 254. Have III produces blunt ended restriction fragments

Causes for metabolic gout include

- 255. Lesch-Nyhan syndrome
- 256. G6PD deficiency
- 257. Defect in PRPP synthetase

The change of mRNA codon from UCA to UAA

- 258. Is a type of transversion mutation
- 259. Is a silent mutation
- 260. Brings about a premature termination of translation



