Reg. No.										

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – MARCH 2016

SUBJECT: BIOCHEMISTRY – I (ESSAY)

Saturday, March 05, 2016

Time: 09:00 – 11:00 Hrs. Max. Marks: 60

1. Explain the effect of temperature on enzyme activity with the help of a suitable graph. Name **TWO** other factors that affect enzyme activity.

(4 marks)

2. Describe with suitable reactions, the role of NADPH in maintaining the integrity of erythrocyte membranes.

(3 marks)

3. Explain the following:

3A. THREE characteristic features of genetic code

3B. Chemiosmotic hypothesis

3C. Components and actions of prokaryotic RNA polymerase

3D. Lipolysis

(3 marks × 4 = 12 marks)

4. A six month old infant began to vomit suddenly and was brought to the outpatient clinic with fever, in a state of drowsiness. The doctor noticed that the child had ceased to gain weight and observed hepatomegaly. Routine investigations revealed hyperammonemia and high glutamine levels in urine. The child was immediately put on phenylbutyrate therapy.

4A. Describe in detail the steps of the metabolic pathway whose defect led to hyperammonemia

4B. Discuss the clinical utility of phenylbutyrate therapy

(5+1 = 6 marks)

5. Mention the role of bile salts in the digestion and absorption of dietary lipids. Give a diagrammatic representation of the steps of lipid absorption in the intestine.

(6 marks)

6. Define the terms and explain them with suitable examples:

6A. Nitrogen balance and its types

6B. Proenzymes

(3 marks × 2 = 6 marks)

7. Justify the following with biochemical reasons

7A. Calcitriol is a hypercalcemic hormone

7B. Prolonged starvation is a cause for metabolic acidosis

7C. Polydypsia, polyphagia and polyuria are characteristic symptoms in diabetes mellitus

(4+3+4 = 11 marks)

8. Diagrammatically represent the general mechanism of action of thyroxine.

(3 marks)

9. Discuss the effect of 2, 3-bisphosphoglycerate on the oxygen affinity of hemoglobin.

(3 marks)

10. A 45 year old male presented to the emergency with chest pain. An ECG recording showed an abnormal pattern following which an angiography was done. The report showed a 94% block in the left coronary artery. Serum investigations revealed that total cholesterol was 450 mg/dL and the lactate, CK-MB, cardiac troponin I levels were highly elevated.

10A. What is your diagnosis?

10B. Describe the biochemical changes leading to the formation of plaque in the coronary artery.

10C. Comment with biochemical reasons the cause for rise in lactate levels in this condition.

(½+3½+2 = 6 marks)

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MBBS PHASE I STAGE I DEGREE EXAMINATION – MARCH 2016

SUBJECT: BIOCHEMISTRY – II (MCQs)

Saturday, March 05, 2016

Time: 11:30 – 12:30 Hrs. Max. Marks: 120

INSTRUCTIONS

1. For each statement, select **T** (True) or **F** (False) as your choice.

2. Indicate your choice by darkening the appropriate circle in the answer sheet provided.

3. Use only HB or 2B pencils to darken the circle.

4. Leave blank for Don't Know response.

5. 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

6. Indicate your roll number (Registration Number) clearly and correctly.

7. Do not write anything in the question paper.

8. The true/false statements are numbered 101 to 160 and 201 to 260 (Total 120 statements).

9. This question paper contains **04 pages**. Please make sure that the question paper provided to you has all the pages.

Glycine

101. Has an asymmetric carbon atom
102. Is converted to glucose in the liver
103. Undergoes post translational modification in collagen
104. Is synthesized from serine

According to IUBMB system of enzyme classification

105. Lactate dehydrogenase is an oxidoreductase
106. Aldolase is an isomerase
107. Pyruvate carboxylase is a ligase
108. Trypsin is a transferase

Galactose

109. Is a C-2 epimer of glucose
110. Answers positive for Benedict's test
111. Is a component of keratan sulphate
112. In high levels in serum contributes to cataract formation

Among complex lipids

113. Dipalmitoyllecithin is a component of lung surfactant
114. Phosphatidylglycerol is a precursor for second messenger
115. Cardiolipin is a component of mitochondrial membrane
116. Plasmalogen inhibits platelet activation

Heme synthesis

117. Takes place in the spleen
118. Requires succinyl CoA
119. Is accelerated in porphyria cutanea tarda
120. Is regulated at the ALA dehydratase reaction

Iron deficiency anemia is characterized by

121. Increased serum ferritin levels
122. Hypochromic erythrocytes
123. Increased TIBC
124. Lenticular degeneration

Folic acid

125. Is abundant in green leafy vegetables
126. Derived coenzyme is needed for methionine synthesis
127. In N^5 methyl form is required for purine synthesis
128. Supplementation is given in homocystinuria

Vitamin B_{12}

129. Has a porphyrin ring
130. Absorption in intestine requires extrinsic factor
131. Deficiency causes microcytic anemia
132. Is needed for oxidation of stearic acid

The electron transport chain

133. Is located in rough endoplasmic reticulum
134. Contains heme proteins
135. Activity is inhibited by azides
136. Contains components arranged in the decreasing order of redox potential

Chylomicron/s

137. Levels in serum rise in type I hyperlipoproteinemia
138. Are synthesized in the liver
139. Metabolism requires insulin
140. Contains Apo B-100

Low density lipoprotein/s

141. Are also known as β-lipoproteins
142. Levels in serum increase in type IIA hyperlipoproteinemia
143. Uptake requires Apo C- II
144. Carries out reverse cholesterol transport

The following disorders of fatty acid oxidation correctly match with their defects

145. Refsum's disease: Acyl CoA dehydrogenase
146. Zellweger's syndrome: Peroxisomal oxidation of long chain fatty acids
147. Jamaican vomiting sickness: α- oxidation
148. Sudden infant death syndrome: Medium chain acyl CoA dehydrogenase

Denovo synthesis of fatty acids

149. Is inhibited by insulin
150. Requires an active HMP shunt pathway
151. Requires biotin
152. Produces palmitic acid

The endopeptidases of pancreatic juice include

153. Trypsin
154. Pepsin
155. Aminopeptidase
156. Elastase

Gluconeogenesis from lactate

157. Requires mitochondrial enzymes
158. Is activated by acetyl CoA
159. Utilizes GTP
160. Is regulated by fructose 1,6- bisphosphatase

The conjugation of bilirubin

201. Releases carbon monoxide
202. Requires glucuronic acid
203. Is affected in Rotor syndrome
204. Requires NADPH

Ascorbic acid is involved in

205. Increasing absorption of dietary copper
206. The cross linking of collagen fibrils
207. Neutralizing reactive oxygen species
208. Synthesis of cholic acid

The essential fatty acids found in sunflower oil

209. Are unsaturated
210. Are predominantly of n-3 type
211. Include linoleic acid
212. Decrease serum LDL levels

Cyclic AMP

213. Levels rise in the intestinal mucosal cells in the presence of cholera toxin
214. Is degraded by adenylate cyclase
215. Acts as a second messenger for glucagon
216. Binds to protein kinase C

Adrenal cortical hormone/s

217. Require transporters in blood
218. Cortisol levels are high in Cushing's syndrome
219. Are synthesized from cholesterol
220. Mediate their action through cGMP

Parathyroid hormone

221. Activates calcitonin synthesis
222. Acts on bone to decrease serum calcium levels
223. Decreases phosphate excretion
224. Synthesis is decreased in Hashimoto's disease

Glycogen degradation

225. Is decreased in Her's disease
226. Releases glucose as major end product in muscle
227. Requires coenzyme of vitamin B_6
228. During muscular exercise, is stimulated by glucagon

Collagen synthesis

229. Is affected in rickets
230. Requires copper
231. Takes place in chondroblasts
232. Requires glycosylation of lysyl residues

Polymerase chain reaction

233. Is an in vitro process of RNA amplification
234. Requires restriction endonucleases
235. Has a role in prenatal diagnosis of inherited diseases
236. Requires a temperature of 95°C for polymerization

Phosphoribosyl pyrophosphate

237. Is an intermediate in the synthesis of adenosine monophosphate
238. Production increases in Von Gierke's disease
239. Is required for the synthesis of IMP from hypoxanthine
240. Is used in the synthesis of pyrimidine nucleotides

The process of Southern blotting

241. Uses nitrocellulose paper for blotting the DNA fragments
242. Uses DNA probes to identify fragments of interest
243. Is used for detection of DNA mutations
244. Utilizes electrophoresis for separation of DNA fragments

The activity of telomerase

245. Is low in cancer cells
246. Is of a reverse transcriptase
247. Requires a DNA primer
248. Is seen in prokaryotes

Retinal

249. In its 11-cis form in rhodopsin helps in dim light vision
250. Is derived from β-carotene by action of dioxygenase
251. Plays a role in maintenance of epithelial cells
252. Deficiency causes myopia

The following pairs of amino acids are correctly matched with the products derived from them

253. Methionine : Heme
254. Tryptophan : FAD
255. Phenylalanine : Epinephrine
256. Lysine : Glutathione

Regarding neurotransmitters

257. Acetylcholine is excitatory
258. Dopamine levels are high in Parkinson's disease
259. Synthesis of serotonin requires thiamine pyrophosphate
260. Nitric oxide is a vasoconstrictor