BATCH 30

Reg. No.										

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2013

SUBJECT: BIOCHEMISTRY – I (ESSAY)

Wednesday, February 13, 2013

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

1. With the help of Michaelis-Menten graph, explain the effect of substrate concentration on enzyme activity.

(4 marks)

2. Justify the statement "TCA cycle is an amphibolic pathway" with examples.

(6 marks)

3. Explain the role of various biochemical investigations used in the detection of iron deficiency anemia.

(4 marks)

4. Johnson, a fifty five year old male came to the hospital with complaints of loss of appetite, right upper quadrant abdominal pain and dark urine. On clinical examination, the doctor noticed yellowish discoloration of sclera. Various biochemical tests were performed in blood which confirmed the diagnosis of viral hepatitis.

4A. Describe the metabolism of the compound that is responsible for yellowish discoloration of the Johnson's sclera.

4B. Explain the usefulness of various biochemical tests in blood that helped the doctor to confirm the diagnosis.

(5+3 = 8 marks)

5. Diagrammatically represent the role of LDL in the formation of atherosclerotic plaque.

(4 marks)

6. Explain the mechanism of action of thyroid hormones with the help of a diagram.

(3 marks)

7. Explain the role of proximal tubular cells in the maintenance of steady state of bicarbonate buffer system.

(3 marks)

8. Three day old Alsha presented with lethargy, vomiting, anorexia that progressed towards coma. Biochemical investigations revealed elevated serum ammonia, high level of glutamine and low level of urea. An inborn error in metabolism was diagnosed and the appropriate treatment was administered.

8A. Write the reactions of the metabolic cycle which is defective in this patient.

8B. Describe the basis for the different treatment options available for the above patient.

(5+3 = 8 marks)

9. With the help of diagrams, explain the process of elongation in protein synthesis. Add a note on the inhibitors of this process.

(5 marks)

10. **Give reasons for the following:**

10A Acute pancreatitis causes steatorrhea

10B. High carbohydrate diet increases triacylglycerol synthesis

10C. Type I glycogen storage disorder causes hyperuricemia and hypoglycemia

10D. Lactate is the end product of anaerobic glycolysis in RBC

10E. Hypoxia is a feature of sickle cell anemia

(2+3+4+3+3 = 15 marks)

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MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2013

SUBJECT: BIOCHEMISTRY – II (MCQs)

Wednesday, February 13, 2013

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.

Regarding the peptide shown below

Ala-Glu-Ser-Arg-Val-Leu-His-Met

101. It is an octapeptide
102. Amino acid present in the third position contains a hydroxyl group
103. Sulfur-containing amino acid is present at its amino terminal end
104. Fifth amino acid is essential
105. Second amino acid is glucogenic

Glucose

106. Is a C-2 epimer of galactose
107. Uptake by adipose tissue is through GLUT-4
108. Oxidation at C-6 produces glucuronic acid
109. Is in its β form in cellulose

Double helix of DNA

110. Contains phosphate at its 3' end
111. Has equal number of adenine and thymine residues
112. Is stabilized by hydrogen bonds between two strands
113. Contains uridylate

Following pairs correctly match the disorders with their diagnostic enzyme markers

114. Acute pancreatitis: serum amylase
115. Prostatic carcinoma: alkaline phosphatase
116. Myocardial infarction: streptokinase
117. Bone disease: acid phosphatase

Complex I of electron transport chain

118. Has lower redox potential compared to complex III
119. Receives electrons from ascorbic acid
120. Contains cytochrome b
121. Is inhibited by rotenone

2,3-bisphosphoglycerate

122. Is formed from triglyceride
123. Is converted to 2-phoshphoglycerate
124. Shifts oxygen dissociation curve to the right
125. Binds to the β chain of hemoglobin

NADPH is converted to $NADP^+$ by

126. Glutathione peroxidase
127. NADPH oxidase
128. Cytochrome P450 monooxygenase
129. Nitric oxide synthase

Pyruvate kinase

130. Is an enzyme of gluconeogenesis
131. Is active in dephosphorylated state
132. Produces ATP
133. Deficiency causes hemolytic anemia

Heme synthesis

134. Requires glycine
135. Is induced by phenobarbital
136. Is regulated by feedback inhibition

High density lipoprotein

137. Contains apo B-100
138. Deposits cholesterol in tissues
139. Level in serum increases in type I hyperlipoproteinemia
140. Contains lecithin cholesterol acyl transferase

HMG CoA reductase

141. Is the regulatory enzyme of β-hydroxy butyrate biosynthesis
142. Synthesis is controlled by cellular cholesterol level
143. Is active in phosphorylated state
144. Synthesis increases when SREBP is bound to SRE on DNA

Lipoprotein lipase

145. Is induced by insulin
146. Hydrolyses stored triglycerides in adipose tissue
147. Is activated by apo A-I

Following pairs correctly match regulatory enzymes with their pathways

148. Acetyl CoA carboxylase: lipolysis
149. Acyl CoA dehydrogenase:β oxidation of fatty acids
150. Glucose 6-phosphatase: pentose phosphate pathway
151. Phosphofructokinase-1: gluconeogenesis

Nitrogen balance is

152. Positive in growing children
153. Negative in kwashiorkor
154. Maintained in healthy adults

Specific dynamic action of food is

155. The energy spent on respiration
156. Five percent for a protein diet
157. Calculated after an overnight fast

Pancreatic enzymes include

158. Phospholipase A_2
159. Aminopeptidase
160. α-amylase
201. Sucrase

Trypsin

202. Is an exopeptidase
203. Cleaves peptide bonds contributed by tyrosine
204. Converts chymotrypsinogen to chymotrypsin
205. Is activated within the pancreas in acute pancreatitis

Regarding the drugs used for management of hypercholesterolemia

206. Statins are competitive inhibitors of HMG CoA synthase
207. Probucol prevents formation of oxidized LDL
208. Cholestyramine increases reabsorption of bile salts

Regarding collagen biosynthesis

209. Hydroxylation of lysyl residues require vitamin C
210. Cofactor of lysyl oxidase is copper
211. Crosslinking takes place in extracellular matrix
212. Hydrogen bond formation stabilizes the triple helix
213. Procollagen peptidase converts preprocollagen to procollagen

1, 25-dihydroxycholecalciferol

214. Formation is stimulated by low serum PTH level
215. Stimulates reabsorption of phosphate
216. Promotes calcium absorption
217. Causes bone resorption during hypocalcemia

Blood findings in primary hyperthyroidism include

218. High level of TBG
219. Low TSH
220. Increased free T_4

Insulin

221. Stimulates glucose uptake by skeletal muscles
222. Activates glycogen synthase
223. Decreases synthesis of fructose 2,6-bisphosphate
224. Deficiency leads to glycosylation of LDL receptors

Biochemical findings in Cushing's disease include

225. Hypernatremia
226. High plasma ACTH
227. Suppression of cortisol secretion by high dose of dexamethasone
228. Hyperglycemia

Features of acute glomerulonephritis include

229. Hematuria
230. Glycosuria
231. Proteinuria
232. Ketosis

Following pairs correctly match the neurotransmitters with their precursors

233. GABA: glutamic acid
234. Norepinephrine: tryptophan
235. Serotonin: tyrosine
236. Dopamine: cysteine

Features of Wilson's disease include

237. Low plasma ceruloplasmin
238. High urinary copper
239. Hemolytic anemia
240. Liver cirrhosis

Acetoacetate

241. Is produced in the liver
242. Is utilized by skeletal muscles
243. Generation produces H^+
244. Production is increased in low insulin to glucagon ratio

Thymidylate synthase

245. Requires methyl tetrahydrofolate
246. Is inhibited by 5-fluorouracil
247. Defect leads to oroticaciduria

Regarding replication

248. DnaA protein causes melting of the double helix
249. DNA helicase relaxes supercoils
250. Leading strand extends in the 5'→3' direction
251. Primase synthesizes a short stretch of RNA

252. SSB proteins protect the single stranded template DNA

Polymerase chain reaction requires

253. Vector
254. Oligonucleotide primer
255. Restriction endonuclease
256. Taq polymerase

Post-transcriptional modifications of hnRNA involve

257. Addition of -CCA sequence at 5′end
258. Removal of exons
259. Formation of TΨC loop
260. Addition of poly A tail