Reg. No.										

MANIPAL UNIVERSITY

MELAKA MANIPAL MEDICAL COLLEGE (MANIPAL CAMPUS)

MBBS PHASE – I STAGE – I DEGREE EXAMINATION – MARCH 2017

SUBJECT : BIOCHEMISTRY – PAPER I (ESSAY)

Thursday, March 09, 2017

Time : 9.00 – 11.00 Hours

Max. Marks : 60

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1. Explain the steps of formation, transport, conjugation and secretion of bilirubin.

(5 marks)

2. Define the term isoenzyme and add a note on the isoenzymes of creatine kinase.

(3 marks)

3. Write the structural features of α- helix of proteins.

(2 marks)

4. A three year old girl was brought to the pediatric OPD with a history of episodes of weakness and profuse sweating early in the morning before breakfast. She also had complaints of swelling and pain in the distal phalangeal joints. On examination, she had moderate hepatomegaly and investigations revealed that liver had high glycogen storage content. Blood investigations showed low glucose and increased levels of uric acid, lactic acid and ketone bodies.

4A. Name the disorder and the defective enzyme in this child.

4B. Explain the biochemical basis for hepatomegaly and the blood findings.

(1+4 = 5 marks)

5. Explain FOUR beneficial effects of dietary fibres.

(4 marks)

6. Give the biochemical basis for the following:

6A. Diarrhea and flatulence are seen in lactose intolerance

6B. Spongy gums and loose teeth are features of scurvy

6C. Methionine deficiency causes fatty liver.

6D. Production of 2,3-BPG increases in high altitude

6E. HDL cholesterol is considered as a good cholesterol

(2×5 = 10 marks)

7. Write the reactions involved in ketogenesis. (4 marks)

8. Illustrate the mechanism of calcium–phosphatidylinositol second messenger system. (4 marks)

9. List FOUR abnormal constituents in urine and name ONE condition each in which they are excreted. (4 marks)

10. A four month old child began to vomit occasionally, ceased to gain weight and became drowsy. Within few days, the child started getting convulsions. Analysis of urine showed increased levels of glutamine and blood ammonia levels were highly elevated. Symptoms improved upon treatment with sodium benzoate.

10A. Describe the reactions of the metabolic cycle affected in this child

10B. Give the biochemical basis for the treatment given (5+1=6 marks)

11. Write the reactions of citric acid cycle in detail (8 marks)

12. Define genetic code and describe its salient features (5 marks)

BATCH 38 – MARCH 2017

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MANIPAL UNIVERSITY

MELAKA MANIPAL MEDICAL COLLEGE (MANIPAL CAMPUS)

MBBS PHASE – I STAGE – I DEGREE EXAMINATION – MARCH 2017

SUBJECT : BIOCHEMISTRY – PAPER II (MTF)

Thursday, March 09, 2017

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.

Glycogen

101. Is a plant storage polysaccharide
102. Has α (1 → 6) glycosidic linkages at the branching points
103. In liver is used in maintenance of blood glucose
104. Breakdown is affected in McArdle's disease

Following pairs correctly match the vitamin with its coenzyme form

105. Niacin : CoA
106. Riboflavin: FMN
107. Pantothenic acid: THF
108. Pyridoxine : PLP

Among complex lipids

109. Sphingomyelin accumulates in Niemann-Pick disease
110. Phosphatidylinositol is a glycerophospholipid
111. Phosphatidylcholine is a component of lung surfactant

Calcitriol

112. Helps in the absorption of calcium in the small intestine
113. Synthesis takes place in the kidneys
114. Is the active form of vitamin K
115. Synthesis is activated by parathyroid hormone

Collagen

116. Biosynthesis requires copper
117. Is rich in glycine
118. Is a fibrous protein
119. Is a glycoprotein

Regarding the functions of minerals

120. Iodine is required in the synthesis of parathyroid hormone
121. Zinc is a component of DNA polymerase
122. Copper is a component of cytochrome oxidase
123. Fluoride prevents dental caries

Thiamine

124. Coenzyme is a component of pyruvate dehydrogenase complex
125. Deficiency leads to cheilosis
126. Is abundant in unpolished rice

Uronic acid pathway in humans

127. Produces ascorbic acid
128. Provides intermediates for HMP shunt pathway
129. Provides an intermediate for synthesis of proteoglycans
130. Is affected in essential pentosuria

Cytochrome P450 dependent hydroxylase

131. Is a heme containing enzyme
132. Plays a major role in liver
133. Is induced by phenobarbital
134. Detoxifies drugs by hydrolysis

Cori cycle

135. Occurs exclusively in liver
136. Is involved in the inter-conversion of lactate and glucose
137. Produces 2,3-bisphosphoglycerate
138. Gets affected due to defect in the debranching enzyme

Hartnup's disease

139. Is caused due to the defect of acidic amino acid transporter
140. Is characterised by symptoms of pellagra
141. Patients excrete dark coloured urine

Pancreatic lipase

142. Requires colipase for its activity
143. Deficiency causes steatorrhea
144. Is activated by bile acids
145. Is inhibited by orlistat

Glucose absorption in small intestine

146. Is by active transport when its concentration in the lumen is low
147. Needs potassium ions for facilitated diffusion
148. Requires GLUT-4

Marasmus is characterised by

149. Moon face appearance
150. Severe muscle wasting
151. Increased serum cortisol levels
152. Fatty liver

Insulin

153. Promotes lipolysis in adipose tissue
154. Decreases glucose uptake by skeletal muscle
155. Stimulates glycogenesis
156. Inhibits gluconeogenesis
157. Molecule consists of 2α and 2β subunits

Following pairs correctly match the blood parameter with its normal value

158. Fasting glucose : 60 - 100 mg/dL
159. Glycated Hb : 8-10 % of total Hb
160. Post prandial glucose : 140 - 200 mg/dL

Following pairs correctly match the chemical nature of the hormone with its example

201. Protein : Growth hormone
202. Amino acid : Thyroid hormone
203. Steroid : TSH
204. Amines : Glucagon

Regarding thyroid hormones

205. T_3 is biologically more active than T_4
206. T_4 is formed from T_3 upon deiodination
207. Protein bound forms are biologically active
208. Their mechanism of action is similar to that of steroid hormones

Following pairs correctly match the inborn error of metabolism with its enzyme defect

209. Alkaptonuria: Tyrosinase
210. Albinism: Homogentisate oxidase
211. Maple syrup urine disease: Branched chain α- keto acid dehydrogenase
212. Homocystinuria: Cystathionine β-synthetase

Transamination reactions

213. Contribute intermediates to the TCA cycle
214. Require biotin as cofactor
215. Release free ammonia
216. Are irreversible

Hereditary fructose intolerance

217. Is due to aldolase B deficiency
218. Patients manifest with hypoglycemia
219. Causes accumulation of fructose 6-phosphate

Anaerobic glycolysis

220. Generates more energy compared to aerobic glycolysis
221. Forms lactate as the end product
222. Occurs predominantly in the brain
223. Is the only source of energy for mature RBCs

NADPH is required by the following enzymes

224. HMG CoA reductase
225. Glutathione peroxidase
226. Myeloperoxidase
227. Nitric oxide synthase

Low density lipoproteins

228. Transport cholesterol to extrahepatic tissues
229. Contain apo B-48
230. Level in blood is increased in type IIb hyperlipoproteinemia

Acetyl CoA carboxylase is

231. The regulatory enzyme of de novo synthesis of fatty acids
232. Active in monomeric form
233. Inhibited by citrate
234. Activated by insulin

Lipolysis

235. Occurs in the liver
236. Releases free fatty acid
237. Increases when the hormone sensitive lipase is phosphorylated

Chylomicron

238. Transports exogenous lipids
239. Remnant contains apo E
240. Has the highest protein content among lipoproteins
241. Is also known as α-lipoprotein

DNA polymerase III

242. Has 5′ →3′ exonuclease activity
243. Possesses 3′→ 5′ polymerase activity
244. Helps in the synthesis of leading strand of daughter DNA
245. Is involved in DNA repair in prokaryotes

Regarding the Watson and Crick model of DNA

246. It contains ten base pairs per turn
247. Base pairs are arranged parallel to the helical axis
248. Number of adenine residues is equal to that of cytosine
249. The two strands run in antiparallel direction

In the purine ring

250. N1 is derived from aspartate
251. C4 is contributed by CO_2
252. N9 is obtained from glutamine
253. C2 is derived from glycine

Characterisitic findings in nephrotic syndrome include

254. Low plasma albumin levels
255. Presence of Bence-Jones protein in urine
256. Positive for heat and acetic acid test

Vitamin B_{12}

257. Deficiency causes microcytic anemia
258. Derived coenzyme is required for oxidation of odd chain fatty acids
259. Is abundant in green leafy vegetables
260. Is required for heme synthesis