

Reg. No.

MANIPAL UNIVERSITY

MELAKA MANIPAL MEDICAL COLLEGE (MANIPAL CAMPUS)

MBBS PHASE – I STAGE – I DEGREE EXAMINATION – SEPTEMBER 2016

SUBJECT : BIOCHEMISTRY – PAPER I (ESSAY)

Saturday, September 03, 2016

Time : 9.00 - 11.00 Hrs.

Max. Marks : 60

1. Name the different chemical forms of vitamin A. Discuss the role of this vitamin in vision. Add a note on the ocular changes in its deficiency conditions.
(6 marks)
2. Answer the following:
 - 2A. Isoenzymes of creatine kinase and their clinical utility
 - 2B. Structural components of TWO phospholipids and their function
(3x2 = 6 marks)
3. Describe the following
 - 3A. Draw and label the parts of tRNA and give its function
 - 3B. Define and classify gout. List the causes for each type
(3+4 = 7 marks)
4. Describe in detail the steps of glycolysis in RBCs.
(8 marks)
5. Medha, a ten year old girl was admitted to the hospital with complaints of severe vomiting and dizziness. Biochemical investigations revealed a low blood glucose. History revealed that she developed symptoms after consuming a few unripe fruits from an akee tree.
 - 5A. Name the toxin in unripe akee fruits and name the enzyme inhibited by it.
 - 5B. Write the steps of the pathway inhibited by this toxin.
(1+4 = 5 marks)
6. Classify bile acids and give examples. Give a diagrammatic representation of the enterohepatic circulation of bile acids. Add a note on the role of bile salts in lipid digestion.
(5 marks)
7. Give a diagrammatic representation of the steps of cellular uptake and utilization of LDL by extrahepatic tissues.
(3 marks)

8. Name THREE plasma proteins and write ONE function of each.

(3 marks)

9. Illustrate the role of insulin in glucose uptake by skeletal muscle cells

(3 marks)

10. Justify the following

10A. Pale clay colour stools are a characteristic finding in obstructive jaundice

10B. Fetal hemoglobin has higher oxygen affinity than HbA

(2x2 = 4 marks)

11. A 59 year old bank manager was on a week-long hunger strike. He was brought to the hospital trauma center in a state of coma. His breath had a strong fruity odour. Laboratory reports were as follows

- Random blood glucose- 31mg/dl
- Blood pH- 7.19
- Rothera's test: Positive

11A. What is your diagnosis?

11B. Discuss in detail the metabolism of the metabolite that answers positive for Rothera's test.

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

12. Answer the following

12A. Illustrate the mechanism of action of steroid hormones

12B. Hydroxylation reactions in collagen biosynthesis

(3+2 = 5 marks)



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MBBS PHASE – I STAGE – I DEGREE EXAMINATION – SEPTEMBER 2016

SUBJECT : BIOCHEMISTRY – PAPER II (MTF)

Saturday, September 03, 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.

Vitamin K

101. Present in animals is phylloquinone
102. Is required for the γ -carboxylation of glutamic acid residues
103. Absorption requires bile salts
104. Is transported in the blood by albumin

Regarding non oxidative phase of HMP shunt pathway

105. It produces ribose-5-phosphate
106. Transaldolase needs TPP
107. Provides intermediates for glycolysis
108. It generates NADPH

The fatty acid represented as 18: 3(9, 12, 15)

109. Is linolenic acid
110. Contains a double bond between carbon 3 and 4
111. Is a monounsaturated fatty acid
112. Is an ω - 6 fatty acid

Ganglioside/s

113. Contain N-acetylneuraminic acid
114. Are negatively charged at physiologic pH
115. G_{M1} serves as a receptor for cholera toxin
116. Contain sphingosine

Isoenzyme/s

117. Catalyze different reactions
118. Differ in their electrophoretic mobility
119. Creatine kinase -2 is abundant in cardiac muscle
120. LDH-4 level in blood increases after a myocardial infarction

Among carbohydrates

121. Glucose is an aldohexose
122. Glycogen is a heteropolysaccharide
123. Fructose is a reducing sugar
124. Heparin is a disaccharide

Pyruvate dehydrogenase complex

125. Is present in the cytosol
126. Activity is decreased in thiamine deficiency
127. Is active in its phosphorylated form
128. Requires lipoic acid

The component/s of electron transport chain

129. Are arranged in the decreasing order of their redox potential
130. Are located in the outer mitochondrial membrane
131. Includes cytochrome c as a mobile electron carrier

The following pairs correctly match the lipoproteins with their apolipoprotein content

132. VLDL: Apo B-100
133. LDL: Apo C-II
134. HDL: Apo B-48
135. Chylomicron: Apo D

Chylomicron

136. In its mature form has more triglycerides than cholesterol esters
137. Is synthesized in the liver
138. Transports dietary vitamin A
139. Is least dense among lipoproteins

Specific dynamic action

140. Is also known as thermic effect of food
141. Represents the energy required to maintain normal body functions
142. For fats is 30%
143. Is more in females than in males

Causes for post-hepatic jaundice include

- 144. Sick cell anemia
- 145. Cancer of head of pancreas
- 146. Cholelithiasis
- 147. Malaria

Regarding the digestive enzymes of the GI tract

- 148. Salivary amylase requires chloride ions for its action
- 149. Pepsinogen is activated by gastric HCl
- 150. Pepsin activates trypsinogen to trypsin
- 151. Enterokinase is secreted by the pancreas
- 152. Maltase is a brush border enzyme

Denovo synthesis of a fatty acid requires

- 153. Biotin
- 154. NADPH
- 155. Acetyl CoA
- 156. CO₂

Production of glucose from lactate

- 157. Is activated by fructose 2,6-bisphosphate
- 158. Takes place in the liver
- 159. Happens during well fed state
- 160. Requires niacin
- 201. Is inhibited by high levels of AMP

Ehlers Danlos syndrome is

- 202. Characterized by skin hyperextensibility
- 203. Characterized by hypermobile joints
- 204. Characterized by low serum calcium levels
- 205. Caused by the deficiency of lysyl hydroxylase

Enzymes inhibited by insulin include

- 206. Pyruvate carboxylase
- 207. Glucokinase
- 208. Lipoprotein lipase
- 209. Carboxypeptidase
- 210. Glycogen synthase

Parathyroid hormone

- 211. Is a steroid hormone
- 212. Secretion is favored by decreased serum calcium level
- 213. Activates 21 α -hydroxylase
- 214. Causes mineralization of bone

The following pairs correctly match the glycogen storage disorders with their enzyme defects

- 215. McArdle's disease: Glucose 6-phosphatase
- 216. Pompe's disease: Debranching enzyme
- 217. Anderson's disease: Branching enzyme
- 218. Cori's disease: Muscle phosphofructokinase

Abnormal constituents of urine include

- 219. Urea
- 220. Creatinine
- 221. Bilirubin
- 222. Glucose

Regarding water soluble vitamins

- 223. Vitamin C is involved in carboxylation reactions
- 224. Thiamine is rich in unpolished rice
- 225. Biotin is involved in oxidation reduction reactions
- 226. Pyridoxine is required for maturation of RBC
- 227. Riboflavin is a component of electron transport chain

The following hormones are correctly matched with their second messenger system

- 228. Insulin : Kinase cascade
- 229. ANF : Adenylate cyclase
- 230. Epinephrine: Guanylate cyclase
- 231. Glucagon : Calcium phosphatidylinositol system

The synthesis of following compounds requires the active form of methionine

- 232. Melatonin
- 233. Creatine
- 234. Acetylcholine
- 235. Norepinephrine

Excitatory neurotransmitters include

- 236. Glycine
- 237. Acetylcholine
- 238. Dopamine
- 239. γ -aminobutyric acid

Following pathways are activated in liver during well fed state

- 240. Glycogenolysis
- 241. Ketogenesis
- 242. Fatty acid synthesis
- 243. HMP shunt

During de novo synthesis of purine nucleotides

- 244. Ribose 5- phosphate is used as a starting material
- 245. Uric acid is produced
- 246. Glycine is required
- 247. Rate limiting step is catalyzed by CPS-I

In the process of prokaryotic DNA replication

- 248. Primase forms short stretches of DNA
- 249. Ligase helps in the removal of primer
- 250. SSB proteins recognize the origin of replication
- 251. Topoisomerase I removes positive supercoils
- 252. Helicase plays a role in unwinding of parent DNA duplex

Regarding genetic code

- 253. All codons code for amino acids
- 254. Wobble hypothesis accounts for redundancy
- 255. UUU is an initiation codon
- 256. A single codon codes for a specific amino acid

In the Watson and Crick model of DNA

- 257. Adenine is paired with guanine
- 258. The two strands run in the antiparallel direction
- 259. Each turn has 10 base pairs
- 260. Hydrogen bonds are parallel to the phosphodiester backbone

