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MANIPAL UNIVERSITY**MBBS PHASE I STAGE I DEGREE EXAMINATION – SEPTEMBER 2015****SUBJECT: BIOCHEMISTRY – I (ESSAY)**

Saturday, September 05, 2015

Time: 09:00 – 11:00 Hrs.

Max. Marks: 60

1. With the help of Michaelis- Menten plot, explain the effect of substrate concentration on enzyme activity and emphasize on K_m and V_{max} .
(5 marks)
2. Define genetic code and explain FOUR of its characteristic features.
(5 marks)
3. Give a diagrammatic representation of the chemiosmotic hypothesis of oxidative phosphorylation.
(3 marks)
4. Classify lipids and mention suitable examples for all its subclasses.
(5 marks)
5. With the help of diagrammatic representations, explain the role of NADPH in erythrocytes and leucocytes.
(6 marks)
6. Describe the role of LDL in the formation of atherosclerotic plaque.
(3 marks)
7. Write the reactions of β -oxidation in the mitochondria.
(4 marks)
8. Write in detail the steps of gluconeogenesis from glycerol.
(5 marks)
9. A 53 year old chronic alcoholic was brought to the emergency department in an unconscious state. Doctor noticed the alcohol smell in his breath and physical examination revealed hepatomegaly and fatty liver was confirmed. His blood glucose level was 35 mg/dL. Explain the biochemical basis for the various findings in this patient.
(6 marks)

10. A one year old fair chubby child presented to the clinician with the clinical features of mental retardation and failure to grow. Lab tests showed elevated level of phenylalanine in blood and urine had a mousey odour.

10A. What is your diagnosis?

10B. Write in detail the biochemical reaction affected in this disorder.

10C. Give the biochemical basis of the various findings in the above patient.

($\frac{1}{2} + 1\frac{1}{2} + 3 = 5$ marks)

11. Diagrammatically represent the general mechanism of action of steroid hormones.

(4 marks)

12. **Write short notes on:**

12A. Bicarbonate reclamation in the kidney

12B. Southern blotting

(3+3 = 6 marks)

13. Explain with suitable reactions, the role of ascorbic acid in collagen biosynthesis.

(3 marks)



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MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – SEPTEMBER 2015

SUBJECT: BIOCHEMISTRY – II (MCQs)

Saturday, September 05, 2015

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 **03 pages**. Please make sure that the question paper provided to you has all the pages.

Regarding competitive inhibition of enzyme catalyzed reaction

101. The inhibitor is structurally similar to the enzyme
102. The inhibitor binds to the free enzyme
103. K_m remains unchanged
104. Inhibition is reversed by increasing the substrate concentration
105. V_{max} is decreased

Immunoglobulin G

106. Contains one kappa and one lambda chain
107. Crosses the placental barrier
108. Is present in the tears and saliva
109. Mediates allergic reactions

Regarding amino acid/s

110. Proline is a nonstandard amino acid
111. Tyrosine is aromatic
112. Glycine is optically active
113. Histidine has buffering action at physiological pH
114. Net charge is negative at isoelectric pH

Regarding the Watson and Crick model of DNA double helix

115. The polynucleotide chains are aligned antiparallel to each other
116. Adenine of one chain forms two hydrogen bonds with uracil of the other chain
117. Phosphodiester bond connects two nucleotides
118. Each turn contains 11 base pairs
119. The diameter is 3.4 nm
120. Distance between two base pairs is 2.0 nm

Pyruvate dehydrogenase complex

121. Is active in the dephosphorylated form
122. Is inhibited by NADH
123. Requires carbon dioxide
124. Is located in the cytosol
125. Has dihydrolipoyl transacetylase as one of the subunits

Hexokinase

126. Is an oxido-reductase
127. Is inhibited by its product
128. Has higher K_m than glucokinase
129. Is active in the mitochondria
130. Is induced by glucagon

Vitamin K

131. Deficiency leads to prolonged clotting time
132. Is synthesized by intestinal bacteria
133. Is required for the posttranslational modification of prothrombin

Vitamin B₁₂

134. Is richly found in green leafy vegetables
135. Has copper ion as the prosthetic group
136. Is required for transmethylation

Regarding water soluble vitamins

137. Niacin forms NAD^+
138. The deficiency of riboflavin causes glossitis
139. Coenzyme form of pantothenic acid is required for the synthesis of bile salts
140. The deficiency of vitamin C affects catecholamine synthesis
141. Biotin deficiency affects gluconeogenesis from pyruvate

Hepatocellular jaundice is characterized by

142. Normal prothrombin time
143. Marked increase in AST
144. Increase in serum conjugated and unconjugated bilirubin
145. Positive Hay's test with urine
146. Presence of unconjugated bilirubin in urine

Regarding steatorrhea

147. Fecal fat is greater than 5g/day
148. It is caused by lactose intolerance
149. Surgical removal of pancreas is a cause
150. It is seen during obstructive jaundice

Following pairs correctly match the disorders of fatty acid oxidation with their defects

151. SIDS: Deficiency of long chain acyl CoA dehydrogenase
152. Jamaican vomiting sickness: Peroxisomal defect in oxidation of very long chain fatty acids
153. Refsum's disease: Defective oxidation of phytanic acid
154. Zellweger's disease: Carnitine acyl transferase I deficiency

Acetyl CoA carboxylase

155. Is present in mitochondria
156. Is activated by high level of citrate
157. Is active in dephosphorylated form
158. Forms propionyl CoA

Blood levels of significantly following proteins are elevated at four hours after myocardial infarction

159. Troponin T
160. Creatine kinase-1
201. Lactate Dehydrogenase-1
202. Alanine transaminase

HMG CoA reductase

- 203. Forms mevalonate
- 204. Is active in phosphorylated form
- 205. Is induced when cell cholesterol level is low
- 206. Is degraded at a faster rate when bound to *insig* proteins

Among minerals

- 207. Sodium is a micromineral
- 208. Iodine is required for thyroid hormone synthesis
- 209. Cobalt is a cofactor for xanthine oxidase
- 210. Copper is bound to ceruloplasmin in plasma
- 211. Potassium concentration is higher than sodium concentration in plasma

Vitamin D

- 212. Has a steroid ring structure
- 213. Is active in the body as calcitriol
- 214. Absorption requires bile pigments
- 215. Conversion to calcitriol occurs in the liver
- 216. Conversion to active form is increased by parathyroid hormone

Glycogen

- 217. Synthase requires a primer
- 218. Degradation is inhibited by calcium
- 219. Phosphorylase kinase is active in the dephosphorylated form
- 220. Storage disorder type II is characterized by hyperuricemia
- 221. Degradation is stimulated by glucagon

Anion gap is

- 222. The difference between the total concentration of measured cations and anions in the plasma
- 223. Normally 22-26 mEq/L
- 224. Increased during diabetic ketoacidosis
- 225. Increased during diarrhoea
- 226. Normal during prolonged starvation

Nephrotic syndrome is characterised by

- 227. Hypercholesterolemia
- 228. Proteinuria
- 229. Presence of M-band in serum protein electrophoresis

Tissues/cells that require insulin for glucose uptake include

- 230. Cardiac muscle

- 231. Liver
- 232. Adipose tissue
- 233. Satiety center of brain

Regarding transcription

- 234. RNA polymerase has proofreading activity
- 235. Sigma factor signals the termination of transcription
- 236. RNA polymerase requires a primer

During translation

- 237. Shine-Dalgarno sequence is required for initiation
- 238. Activation of amino acids requires ATP
- 239. Peptidyl tRNA occupies the E site
- 240. The 16S rRNA is responsible for peptide bond formation
- 241. The ribosome moves along the mRNA in the 3'→5' direction

Restriction endonuclease/s

- 242. Recognize specific palindromic sequences in DNA
- 243. EcoRI produces sticky ended restriction fragments
- 244. Hae III produces blunt ended restriction fragments

Polymerase chain reaction

- 245. Requires Taq polymerase
- 246. Doubles the amount of DNA in each cycle
- 247. Requires plasmids
- 248. Is used for DNA fingerprinting

Wilson's disease is characterized by

- 249. Increased serum copper level
- 250. Decreased serum ceruloplasmin level
- 251. Hemolytic anemia
- 252. Kayser-Fleischer ring around the cornea

Glycine

- 253. Is an excitatory neurotransmitter
- 254. Contributes atoms 4, 5 and 7 of the purine ring
- 255. Is glucogenic in nature
- 256. Is a component of oxidized glutathione

Regarding vitamin A

- 257. Retinoic acid is used in the treatment of acne
- 258. 11 cis-retinal is bound to opsin in rhodopsin
- 259. RDA in men is 10 µg
- 260. Its deficiency causes keratomalacia

