Reg. No.										

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – SEPTEMBER 2015

SUBJECT: PHYSIOLOGY – I (ESSAY)

Monday, September 07, 2015

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

1. John, a 58 year old patient was rushed to the hospital by his relatives as he was found lying unconscious in his bedroom. The senior neurologist of the hospital, who attended John suspected this as a case of stroke. MRI investigations revealed widespread thrombosis at certain brain areas. John was then treated at the intensive care unit and he regained consciousness. As signs of hemiparesis persisted in his lower limbs John underwent rehabilitation therapy. Two weeks later, his relatives noticed that John was speaking excessively with very less language comprehension and failed to recognize familiar faces.

1A. Name the language disorder in John and mention the language area affected.

1B. Write the sequence of events by which written information is converted into speech.

1C. Name the disorder associated with inability to recognize familiar faces.

(2+2+1= 5 marks)

2. Tabulate three differences between upper and lower motor neuron lesions. Add a note on supraspinal control of stretch reflex.

(3+2 = 5 marks)

3A. Draw a neat labeled diagram of nerve action potential and indicate the refractory period in it.

3B. Describe all-or-none law.

(3+2 = 5 marks)

4A. Draw a neat labeled diagram of a skeletal muscle sarcomere.

4B. Explain why skeletal muscle can be tetanized but not cardiac muscle.

(2+3 = 5 marks)

5. Define anemia and give the morphological classification of anemia with one example for each type. Comment on the MCV values in these types.

(5 marks)

6A. Draw a labeled spirogram.

6B. Mention the significance of timed vital capacity.

(4+1= 5 marks)

7. Daniel, a cardiologist was examining 44 year old Vimal who was brought to the hospital with complaints of occasional chest pain and tiredness for the past few days. On examination Vimal's blood pressure was found to be 160/98 mm Hg and his electrocardiogram (ECG) revealed bigger QRS complexes and slightly depressed ST segments. Vimal was put on appropriate medication and was advised to come back for a review after a month.

7A. Mention the causes for the above ECG changes in Vimal.

7B. Draw a labeled diagram of a normal ECG from limb lead II and mention the cause for each wave.

(2+3 = 5 marks)

8. In the form of a flow chart describe the regulation of gastric juice secretion when food enters the stomach. List any two factors that inhibit gastric secretion.

(4+1= 5 marks)

9. Explain the phases of ovarian cycle.

(5 marks)

10. Describe the regulation of aldosterone secretion by renin-angiotensin mechanism in the form of a flow chart.

(5 marks)

11. Give physiological basis for the following:

11A. Overflow incontinence during spinal shock

11B. Albuminuria in nephritis

11C. Autoregulation of renal blood flow

11D. High hydrostatic pressure in glomerular capillaries

11E. Osmolarity of the tubular fluid in the descending limb is always greater than that in the ascending limb of loop of Henle

(1 mark × 5 = 5 marks)

12A. Draw a labeled diagram of the visual pathway. Indicate the location of the following lesions in the pathway:

i. Lesion of left optic nerve

ii. Lesion of right optic tract

12B. Describe the visual field defects produced by the above lesions

(3+2 = 5 marks)

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MBBS PHASE I STAGE I DEGREE EXAMINATION – SEPTEMBER 2015

SUBJECT: PHYSIOLOGY – II (MCQs)

Monday, September 07, 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 **04 pages**. Please make sure that the question paper provided to you has all the pages.

Intracellular fluid (ICF)

101. Includes plasma and interstitial fluid
102. Is around 28L in a 70kg adult male
103. Has greater sodium concentration than that of extracellular fluid (ECF)

Sodium dependent glucose transport mechanism

104. Requires carrier protein
105. Uses energy directly from ATP
106. Is an antiport mechanism
107. Transports glucose against its concentration gradient

Heads of the myosin molecules

108. Have ATP splitting activity
109. Have affinity for calcium ions
110. Bind with active sites on tropomyosin
111. Must be phosphorylated for smooth muscle contraction

Skeletal muscle fiber of type I

112. Is also called fast muscle fiber
113. Has very high calcium pumping capacity of sarcoplasmic reticulum
114. Has larger diameter than that of type II fibers

Indicate whether the set of clotting factors and their names are true/false

115. Factor I : Fibrinogen
116. Factor V : Calcium
117. Factor IX : Christmas factor
118. Factor XII: Hageman factor

Blood is kept in fluid state inside the blood vessels because of

119. Smooth vascular endothelium
120. Thrombin
121. Anti-thrombin III
122. Heparin

Hemoglobin

123. Present in adults has two α-chains and two β-chains
124. Binds to oxygen to form oxyhemoglobin
125. Content in a normal male is 16 g/dL
126. Affinity for carbon monoxide is much lower than that for oxygen

Factors that increase myocardial contractility include

127. Catecholamines
128. Digitalis
129. Barbiturates
130. Hypoxia of myocardium

Regarding the biophysical aspects of circulation

131. Veins are the principal site of the peripheral resistance
132. Velocity of blood flow is lowest in the capillaries
133. In anemia, blood flow is turbulent
134. Arterioles are called capacitance vessels
135. About 50% of the circulating blood volume is in the capillaries

In a jugular venous pulse recording

136. 'c' wave is produced during isometric ventricular relaxation phase of cardiac cycle
137. 'v' wave reflects rise in right atrial pressure before tricuspid valve opens during diastole
138. 'a' wave is produced due to atrial systole

Hypertension

139. Is most commonly due to increased peripheral resistance
140. Causes total oxygen consumption of the heart to increase
141. Is seen in pheochromocytoma

Hypovolemic shock is characterized by

142. Thready pulse
143. Intense thirst
144. Cold skin

Regarding regulation of respiration

145. Basic rhythm of respiration is due to activity of neurons in the pre-Botzinger complex
146. Damage to pneumotaxic center is associated with slow respiration and greater tidal volume
147. Vagotomy alone leads to apneusis
148. Central chemoreceptors are stimulated by an increased H^+ concentration of CSF

Carbon dioxide

149. Solubility in blood is twenty times less than that of oxygen
150. Is normally transported in blood in the form of carboxyhemoglobin
151. Transport from the tissues to lungs at rest, amounts to 250 mL/minute
152. Retention in body results from hyperventilation

Partial pressure of

153. CO_2 in alveoli is 40 mmHg normally
154. O_2 is normal in anemic hypoxia
155. CO_2 when decreased below normal, shifts the oxygen hemoglobin dissociation curve to the right
156. O_2 in arterial blood is reduced in hypoxic hypoxia

Cholecystokinin

157. Stimulates the secretion of pancreatic enzymes
158. Facilitates gastric emptying
159. Contracts gallbladder
160. Secretion is decreased by the presence of amino acids in the duodenum

Achalasia cardia

201. Is the inability of the lower esophageal sphincter to contract
202. Leads to reflux of gastric contents into esophagus
203. Is due to defective release of nitric oxide (NO) and vasoactive intestinal polypeptide (VIP)

Regarding enteric nervous system

204. It receives extrinsic innervation from the autonomic nervous system
205. It functions autonomously
206. Meissner's plexus is concerned with motor control of the gut

Growth hormone

207. Secretion decreases during fasting
208. In excess results in visceromegaly
209. Increases blood glucose level
210. Secretion is stimulated by ghrelin
211. Effect on growth is mediated by somatostatin

Myxedema is characterized by

212. Weight loss
213. Exophthalmos
214. Elevated plasma cholesterol level
215. Constipation
216. Heat intolerance

Epinephrine and norepinephrine

217. Are secreted by the adrenal cortex
218. Increase myocardial excitability
219. Increase alertness
220. Increase insulin secretion via ß-adrenergic mechanisms

Glomerular filtration rate (GFR)

221. Is about 180ml/day
222. Decreases in ureteral obstruction
223. Falls during efferent arteriolar constriction
224. Decreases in dehydration
225. Increases by increased glomerular capillary hydrostatic pressure

Concentrating ability of kidney increases by

226. Increased plasma antidiuretic hormone level
227. A high protein diet
228. Increased rate of blood flow in the renal medulla

Testosterone

229. Inhibits secretion of follicle stimulating hormone (FSH)
230. Maintains spermatogenesis
231. Is a protein anabolic hormone
232. Is responsible for the regression of mullerian ducts in genetic males
233. Is secreted by Sertoli cells

Human Chorionic Gonadotropin (hCG)

234. Has luteinizing action
235. Is detected in blood as early as 6 days after conception
236. Is produced by corpus luteum of pregnancy

Basal Ganglia

237. Has a role in planning and programming of movements
238. Doesn't have any role in regulating muscle tone
239. Lesions leads to hypotonia

Withdrawal reflex

240. Is a polysynaptic reflex
241. Results in flexor muscle contraction and inhibition of extensor muscle of the stimulated limb
242. Occurs in response to painful stimulation of skin

Features of Parkinson's disease include/s

243. Akinesia
244. Bradykinesia
245. Rigidity
246. Intention tremor

Regarding sensory coding

247. It refers to converting a stimulus to a recognizable sensation
248. The magnitude of sensation felt is directly proportional to the log of intensity of stimulus
249. Sensory unit recruitment increases the frequency of impulses reaching sensory cortex

Referred pain

250. Is carried by posterior column tract
251. Follows dermatomal pattern of innervation
252. Of cardiac origin is felt on inner aspect of the left arm

Basilar membrane

253. Is concerned with frequency analysis of sound
254. Is broader at the apex than at the base
255. Separates the scala vestibuli and scala media
256. Is depressed into scala tympani by peaks of sound waves in scala vestibuli

Accommodation reflex

257. Is absent in Argyll Robertson pupil
258. Involves dilation of pupils
259. Involves convergence of eyeballs
260. Involves increase in the anterior curvature of lens