Reg. No.										

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – AUGUST 2014

SUBJECT: PHYSIOLOGY – I (ESSAY)

Monday, August 18, 2014

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

1. A 45-year-old male patient was referred to the neurology department. On examination the neurologist noticed that the patient was swaying towards his right side when he was asked to walk in a straight line. He had difficulty in speech. When the neurologist asked him to write his name on a paper, marked tremors appeared in his right hand.

1A. Name the brain structure that is involved in this case.
1B. Mention any two functions of the above brain structure.
1C. Comment on the findings obtained if a knee jerk is performed on the right side of this patient.

(1+2+2 = 5 marks)

2. Give physiological basis for the following:

2A. Repeated exposure to the same stimulus leads to a reduced behavioral response.
2B. Lesions in ventro-medial nucleus of hypothalamus causes obesity.
2C. Dissociated anesthesia in syringomyelia.
2D. It is risky to perform lumbar puncture when CSF pressure is raised.
2E. Applying counter irritant balm to an injured area reduces pain.

(1 mark × 5 = 5 marks)

3A. Mention three differences between cardiac and skeletal muscles.
3B. Add a note on plasticity of smooth muscle.

(3+2 = 5 marks)

4A. Explain the role of thrombin in blood coagulation.
4B. With the help of a flow chart explain the fibrinolytic system.

(3+2 = 5 marks)

5A. Mention any two factors that determine the stroke volume. Explain the role of any one in the regulation of stroke volume.
5B. Describe the basis of myogenic theory of autoregulation.

(3+2 = 5 marks)

6. Shyam, a 70 year old man was taken to a nearby hospital following complaints of shortness of breath and difficulty in expiration. After examination, the physician who attended him ordered few pulmonary function tests which revealed an increased airway resistance, FEV_1 of 2L and vital capacity of 4L:

6A. Name the type of respiratory disorder in the above case.
6B. Calculate the percentage FEV1 and comment on the result.
6C. Name a pulmonary function test that is done in our laboratory to test airway resistance.

(1+3+1=5 marks)

7A. In the form of a flow chart describe the regulation of growth hormone secretion.

7B. Describe the basis of hypertension in Conn's syndrome.

(3+2 = 5 marks)

8. With the help of appropriate diagrams explain the role of countercurrent multiplier in kidneys.

(5 marks)

9. Give physiological basis for the following:

9A. Greater the nerve fiber diameter, faster will be the conduction of impulses.

9B. RBCs will be crenated when placed in a hypertonic solution.

9C. Secondary active transport requires energy indirectly.

9D. Difference in ionic concentrations exists across the cell membrane.

9E. Regeneration of neuron does not occur in the central nervous system.

(5 marks)

10A. Describe the pharyngeal stage of deglutition.

10B. How does pancreas protect itself from autodigestion?

(3+2 = 5 marks)

11. Name the placental hormones and explain actions of any one hormone.

(5 marks)

12A. Name the receptors present in the vestibular apparatus and mention their mode of stimulation.

12B. Mention any two refractory errors of the eye. Explain any one.

(2+3 = 5 marks)

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MBBS PHASE I STAGE I DEGREE EXAMINATION – AUGUST 2014

SUBJECT: PHYSIOLOGY – II (MCQs)

Monday, August 18, 2014

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. Constitutes two thirds of the total body water (TBW)
102. Includes the interstitial fluid and plasma
103. Accounts for about 40% of the body weight
104. Is also known as Milieu interieur

Resting membrane potential

105. Is recorded by inserting both the electrodes inside the cell
106. Is measured in millivolts
107. Becomes less negative when potassium level in ECF is increased from normal
108. Of a neuron is more closer to the equilibrium potential of sodium ions

Myasthenia gravis is characterized by

109. Weakness in skeletal muscles
110. Drooping of eyelids
111. Autoantibody formation against calcium channels in the nerve endings at NMJ

Regarding neuromuscular transmission of skeletal muscle

112. Spontaneous miniature potentials are recorded from the motor end plate
113. The motor nerve ending consists of vesicles containing neurotransmitters
114. Sodium conductance of motor end plate membrane increases as acetylcholine binds to its receptors
115. Ach is removed from synaptic cleft by acetylcholinesterase

Dangers of blood transfusion includes

116. Circulatory overload
117. Transmission of diseases
118. Death due to hyperkalemia
119. Renal failure

Monocytes are

120. Transformed into tissue macrophages
121. Part of the reticuloendothelial system
122. Phagocytic cells
123. The largest leukocytes

Albumin

124. Provides immunity to the body
125. Concentration in plasma is about 3.5-5.0 g/dl
126. Level when decreased in plasma causes edema
127. Helps in blood coagulation

Hypovolemic shock is usually associated with

128. Rapid, thready pulse
129. Warm skin
130. Rapid respiration
131. Intense thirst

Regarding the conduction system of heart

132. AV node is the normal cardiac pacemaker
133. Purkinje fibers are the fastest conducting fibers
134. AV nodal delay is shortened by stimulation of sympathetic nerves to heart
135. Rate at which SA node discharges determines the heart rate

In an Electrocardiogram (ECG) from limb lead II

136. 'T' wave represents atrial depolarization
137. Depressed ST segment is an indication of myocardial infarction
138. Tall and slender 'T' waves appear in hyperkalemia
139. PR-interval duration is about 0.12 to 0.2 sec

Baroreceptors

140. Are stretch receptors
141. When stimulated increase blood pressure
142. Are located in the carotid and aortic bodies

Regarding cardiac cycle

143. During isovolumetric ventricular relaxation phase, aortic valve is open
144. Duration of systole phase is normally 0.5 second in a cardiac cycle of 0.8 second duration
145. Left ventricular pressure is decreased during isovolumetric ventricular contraction phase

Regarding carbon dioxide transport

146. Carbon dioxide content of arterial blood is 38 ml /dl
147. Haldane effect doubles the carbon dioxide transport in the venous blood
148. Size of RBCs in arterial blood is greater than that in venous blood
149. Deoxygenation of hemoglobin favors carbon dioxide transport from the tissues to the venous blood

Cyanosis occurs

150. In anemic hypoxia
151. When reduced hemoglobin concentration in blood exceeds 5 g%
152. In histotoxic hypoxia
153. In carbon monoxide poisoning

Carotid bodies are

154. Central chemoreceptors
155. Stimulated by a fall in PO_2 of arterial blood
156. Stimulated by decreased partial pressure of carbon dioxide in arterial blood
157. Supplied by vagus nerve

Basal Electric Rhythm (BER)

158. Refers to spontaneous rhythmic fluctuations in membrane potential of smooth muscle of the GIT
159. Is initated by interstitial cells of Cajal
160. Coordinates peristaltic activity of the GIT
201. Rate is 12/min in the stomach

Movements of colon include/s

202. Mass action contractions
203. Segmentation contractions
204. Peristalsis

Gastrin

205. Stimulates gastric motility
206. Secretion is decreased by increased rate of vagal nerve discharge
207. Inhibits growth of gastric mucosa

Calcium

208. Level in plasma ranges between 9-11 mg/dL
209. Is necessary for blood coagulation
210. Level when decreased in ECF, decreases neuromuscular excitability
211. Absorption from the intestine is decreased by 1,25-dihydroxycholecalciferol

Cushing's syndrome is associated with

212. Hypotension
213. Excess protein breakdown
214. Thin extremities
215. Osteoporosis

Insulin

216. Stimulates protein synthesis
217. Lowers extracellular potassium concentration
218. Secretion is stimulated by somatostatin

Thyroid hormone/s

219. Are essential for normal growth and skeletal maturation in children
220. Decrease heart rate
221. Deficiency is associated with weight loss

Renal clearance of

222. Inulin is used to measure renal plasma flow
223. Glucose is zero in a normal person
224. A substance is the amount of plasma cleared of the substance in unit time
225. Creatinine is used clinically to determine GFR

Sodium

226. Reabsorption is maximum at the proximal convoluted tubule
227. Is co-transported with glucose in the distal convoluted tubule
228. Reabsorption is increased by aldosterone
229. Is not reabsorbed in thick ascending limb of loop of Henle

Estrogen

230. Peak secretion occurs just before ovulation
231. Is secreted primarily by the granulosa cells of ovarian follicles
232. Increases plasma cholesterol level
233. Decreases motility of the uterine tubules

Changes occurring between 7th to 14th day of a 28 day menstrual cycle include/s

234. Increased estrogen level in the blood
235. Maturation of many ovarian follicles
236. Ovulation on the 14^{th} day
237. Progressive decrease in thickness of the uterine endometrium

Cerebrospinal fluid (CSF)

238. Is produced by the choroid plexus
239. Obtained from a person suffering from bacterial meningitis is clear
240. Provides optimum environment to neurons
241. Flow when blocked leads to hydrocephalus

Muscle spindles

242. Are examples for tension receptors
243. Include extrafusal muscle fibres
244. Are innervated by Ia fibres

245. Are stimulated by activation of gamma motor neurons

Sensations conveyed by dorsal column tract include/s

246. Vibration sense
247. Proprioception
248. Pain
249. Crude touch

Rapid Eye Movement (REM) sleep is characterized by

250. Low threshold for arousal by sensory stimuli
251. The occurrence of ponto-geniculo-occipital (PGO) spikes
252. Penile erection in males
253. Reduction of muscle tone

Regarding taste sensation

254. Sensory nerve fibers from the taste buds on posterior one third of the tongue travel via the facial nerve
255. Sensation is absent in persons with dysgeusia
256. Umami sensation is triggered by glutamate
257. The taste fibers do not relay in the thalamus

Aqueous humor

258. Is secreted by the ciliary body
259. Nourishes the cornea and the lens
260. Accumulation in excess leads to increased intraocular pressure