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**MANIPAL UNIVERSITY****MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2010****SUBJECT: PHYSIOLOGY – I (ESSAY)**

Monday, February 08, 2010

Time: 09:00 – 11:00 Hrs

Max. Marks: 60

- ✍ Answer ALL questions. Write brief, relevant and legible answers.  
 ✍ Draw diagram, flow charts wherever appropriate.

1. Jim, a first year medical student, during physiology practical examination was asked to elicit knee jerk in three different patients. In one patient Jim observed exaggerated knee jerk, in another patient he observed a pendular knee jerk while in the third patient the knee jerk reflex was absent. The examiner asked him to

- 1A. Give the basis for different type of responses in the three patients.  
 1B. Trace the reflex pathway for knee jerk.  
 1C. Comment on the plantar reflex response in the three patients.

(3+2+2 = 7 marks)

2. In the form of a flow chart, describe the steps of synaptic transmission leading to the production of an excitatory postsynaptic potential.

(3 marks)

3. Describe the changes taking place in the eye during accommodation. Draw and label the pathway for accommodation reflex.

(3+2 = 5 marks)

4. Describe oxygen transport under the following headings:

- 4A. Forms of transport in blood  
 4B. Oxygen hemoglobin dissociation curve and its significance

(1+4 = 5 marks)

5. Define haemostasis. Mention the steps involved in it. Explain how coagulation of blood takes place when blood is taken in a test tube.

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

6. Give the physiological basis for the following:

- 6A. Sodium-potassium pump is an electrogenic pump  
 6B. Latent period precedes action potential  
 6C. Conduction velocity is more in myelinated fiber than non-myelinated fiber  
 6D. Compound action potential is multiphased  
 6E. Facilitated diffusion follows saturation kinetics

(5 marks)

7A. Describe the structure and functions of the sarco-tubular system in skeletal muscle.

7B. Mention two differences between skeletal and smooth muscles.

(3+2 = 5 marks)

8. A 20-year-old woman complained of weakness, constipation, cold intolerance, weight gain in spite of loss of appetite. On examination she was found to have goiter. Her plasma  $T_3$  and  $T_4$  levels were low, but TSH was elevated.

8A. Name the endocrine disorder in the above case. Is it a primary or secondary disorder? Justify your answer.

8B. Describe physiological basis for two of the above symptoms.

8C. What is goiter? Mention one cause for it.

(2+2+1 = 5 marks)

9. A person with chronic renal failure shows the features of anemia, osteomalacia, proteinuria, polyurea and metabolic acidosis. Give physiological basis for the occurrence of above symptoms in this patient.

(5 marks)

10. Give the physiological basis for the following:

10A. Congenital  $5\alpha$ -reductase deficiency leads to male pseudohermaphroditism

10B. Amenorrhea occur during lactation

10C. Withdrawal bleeding occurs about 12 days after ovulation in a normal menstrual cycle

10D. Removal of ovaries within three months of pregnancy results in abortion

10E. Very high concentration of testosterone causes infertility in men

(5 marks)

11. With the help of a diagram, explain the mechanism of hydrochloric acid secretion from parietal cells of stomach. Add a note on peptic ulcer.

(3+2 = 5 marks)

12A. Explain the compensatory mechanism that occurs during hypovolemic shock.

12B. Draw and label the ventricular muscle action potential indicating ionic basis for each phase.

(2½+2½ = 5 marks)



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**MANIPAL UNIVERSITY****MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2010****SUBJECT: PHYSIOLOGY – II (MCQs)**

Monday, February 08, 2010

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 <b>Correct</b> response	<b>1</b> mark is awarded
For every <b>Wrong</b> response	<b>0.5</b> mark is deducted
For every <b>Don't Know</b> response	<b>No</b> 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.

### **Interstitial fluid**

- 101. Forms internal environment of cell
- 102. Volume is about 40% of total body weight
- 103. Contains sodium as major cation
- 104. Compartment is formed by plasma

### **A $\alpha$ nerve fiber**

- 105. Is a non myelinated fiber
- 106. Carries proprioceptive sensation
- 107. Conduction is blocked mainly by local anesthetics
- 108. Has largest diameter

### **Skeletal muscle fiber/s**

- 109. Is a single, multinucleated cell
- 110. Contain contractile protein troponin
- 111. Are completely depleted of ATP in rigor mortis
- 112. Have well developed sarcotubular system

### **Body heat is lost by**

- 113. Food intake
- 114. Radiation
- 115. Respiration
- 116. Urination and defecation

### **Platelet/s**

- 117. Count increases after splenectomy
- 118. Participate in clot retraction
- 119. Deficiency results in thrombocytopenic purpura
- 120. Secrete serotonin upon activation

### **Plasma protein albumin**

- 121. Helps in blood clotting
- 122. Deficiency leads to edema
- 123. Participates in cell mediated immunity

### **Erythrocyte sedimentation rate**

- 124. Is of prognostic importance
- 125. Increases in patients with tuberculosis
- 126. Decreases when plasma albumin level is high

### **Partial pressure oxygen**

- 127. Is exerted by its dissolved form
- 128. Increases in a person ascending to a high altitude
- 129. In alveoli is about 95mmHg
- 130. When decreases, stimulates central chemoreceptors

### **Airway resistance**

- 131. Increases in sympathetic stimulation
- 132. Is maximum during inspiration
- 133. Can be tested by spirometer
- 134. Decreases in surfactant deficiency

### **Causes for hypoxic hypoxia include**

- 135. Pulmonary fibrosis
- 136. Ventilation-perfusion imbalance
- 137. Depression of respiratory neurons in the medulla oblongata
- 138. Venous- to-arterial shunt

### **Causes for hypovolemic shock include**

- 139. Hemorrhage
- 140. Myocardial infarction
- 141. Fainting
- 142. Burns

### **End diastolic ventricular volume**

- 143. Is about 70 ml
- 144. Decreases in standing posture
- 145. Increases with increase in intrathoracic pressure
- 146. Increases with stronger atrial contraction

### **In normal ECG recorded in Limb Lead II**

- 147. P-R interval is about 0.40 to 0.43 sec
- 148. T wave indicates atrial depolarization
- 149. QT interval indicates ventricular depolarization plus ventricular repolarisation
- 150. P wave represents atrial repolarisation

### **Coronary blood flow**

- 151. Is about 5L/min
- 152. To left ventricle increases during diastole
- 153. Reduction results in myocardial ischemia

### **First heart sound**

- 154. Is high pitched
- 155. Is produced by the closure of semilunar valves
- 156. Corresponds to the carotid pulsation

### **Parathyroid hormone**

- 157. Increases the formation of 1,25-dihydroxycholecalciferol
- 158. Secretion is increased by low plasma Ca<sup>2+</sup> levels
- 159. Deficiency results in neuromuscular hyperexcitability
- 160. Increases plasma phosphate levels

### **Insulin**

- 201. Increases glucose entry in to adipose tissue
- 202. Decreases protein catabolism in muscle
- 203. Deficiency causes polyphagia
- 204. Secretion is stimulated by somatostatin

### **Cushing's syndrome is characterized by**

- 205. Central obesity
- 206. Decreased plasma glucocorticoid levels
- 207. Weight loss
- 208. Hypotension
- 209. Hyperglycemia

### **Sertoli cells secrete**

- 210. Androgen-binding protein
- 211. Inhibin
- 212. Mullerian inhibiting substance
- 213. Testosterone

### **In an anovulatory menstrual cycle**

- 214. Cervical mucus exhibits fern pattern
- 215. Corpus luteum is not formed
- 216. Menstruation does not occur
- 217. LH surge is absent

### **Function of Liver include**

- 218. Synthesis of plasma proteins
- 219. Detoxification
- 220. Provides immunity
- 221. Storage of bile

### **Gastric emptying is increased by**

- 222. Parasympathetic nerve stimulation
- 223. Hyperosmolarity of duodenal contents
- 224. CCK

### **Gastrin**

- 225. Secretion is inhibited by acid in the antrum
- 226. Secreted by mucosa of upper portion of small intestine
- 227. Secretion is increased by peptides and amino acids
- 228. Secretion is elevated in pernicious anemia

### **Factors decreasing GFR include**

- 229. Ureteral obstruction
- 230. Efferent arteriolar constriction
- 231. Hypoproteinemia
- 232. Contraction of mesangial cells

### **Regarding glucose**

- 233. It is completely reabsorbed in proximal tubule
- 234. Its renal threshold is 180mg/dl of plasma
- 235. It is secreted in distal convoluted tubules
- 236. Its reabsorption is controlled by ADH

### **Slowly adapting receptors include**

- 237. Free nerve endings
- 238. Touch receptors
- 239. Muscle spindles

### **Somatosensory cortex**

- 240. Is located in the precentral gyrus
- 241. Corresponds to Brodmann's areas 3, 1, 2
- 242. Damage abolishes pain sensation
- 243. Has largest representation from trunk region

### **Following are correctly matched between hypothalamic nuclei and their functions**

- 244. Medial nuclei: Satiety center
- 245. Suprachiasmatic nuclei: Sexual behavior
- 246. Anterior nuclei: Heat loss center
- 247. Supraoptic nuclei: Antidiuretic hormone secretion

### **Regarding speech**

- 248. Wernike's area is motor speech area
- 249. Damage to Broca's area leads to sensory aphasia
- 250. Damage to arcuate fasciculus lead to conduction aphasia

### **Fast pain differs from slow pain in that it is**

- 251. Poorly localized
- 252. Dull and aching in nature
- 253. Conducted by unmyelinated 'C' nerve fibers
- 254. Not felt in most of the deeper tissues

### **In hypermetropia**

- 255. Eye ball is too long
- 256. Parallel light rays are focused behind retina
- 257. Concave lens is used for correction

### **Conduction deafness is caused by**

- 258. Prolonged exposure to loud sound
- 259. Excess ear wax
- 260. Destruction of auditory ossicles

