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## MANIPAL UNIVERSITY

### MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2014

#### SUBJECT: PHYSIOLOGY – I (ESSAY)

Monday, February 10, 2014

Time: 09:00 – 11:00 Hrs

Max. Marks: 60

1. Jimmy, a 27 year old gymnastic instructor presents with complaints of muscle weakness in his face which appears intermittently, but has been getting worse over the past one month. Physical examination revealed notable ptosis of both eyelids after repeated blinking. Electromyogram obtained from his distal arm muscles showed decreased amplitude. His symptoms were almost reversed by administration of acetylcholinesterase inhibitor.
  - 1A. Name the above clinical condition and give the cause for the same.
  - 1B. What is the rationale behind conducting electromyography on Jimmy?
  - 1C. Name the acetylcholinesterase inhibitor used in the above case. How does it improve skeletal muscle function?
 

(2+1+2 = 5 marks)
  
- 2A. List four factors essential for erythropoiesis.
- 2B. Describe the fibrinolytic system in the form of a flow chart.
 

(2+3 = 5 marks)
  
- 3A. Describe Na, K ATPase pump.
- 3B. Mention any two differences between simple and facilitated diffusion.
 

(3+2 = 5marks)
  
- 4A. In the form of a flow chart, describe the mechanism of quiet inspiration.
- 4B. Depict the intrapleural and intrapulmonary pressure changes during quiet respiration in the form of graph/s.
 

(3+2 = 5 marks)
  
5. Explain any two types of small intestinal movements with neat labeled diagrams. Mention the significance of each.
 

(4+1 = 5 marks)
  
6. John, a 45 year old bank manager met with a road traffic accident on his way to work and was severely injured. He was rushed to the nearby hospital. On examination, his blood pressure was found to be 90/50 mmHg and respiratory rate was 30 breaths /minute. His skin had turned cold and pale and his pulse rate was 100 beats per min.
  - 6A. Identify the clinical condition in John.
  - 6B. Mention the principle of treatment for this condition.
  - 6C. Give the physiological basis for any three clinical observations seen in John.
 

(1+1+3 = 5 marks)

- 7A. Describe the regulation of growth hormone secretion in the form of a flow chart.  
7B. Mention four actions of insulin on adipose tissue. (3+2 = 5 marks)
8. List any two substances reabsorbed in the PCT. Describe the mechanism of reabsorption of a substance which is completely reabsorbed in PCT normally. (1+4 = 5 marks)
9. Give physiological basis for the following:  
9A. In an anovulatory cycle, cervical mucus shows fern pattern on the 20<sup>th</sup> day of a menstrual cycle.  
9B. Withdrawal bleeding is seen when chronic estrogen therapy is discontinued.  
9C. Tubectomy prevents pregnancy.  
9D. Initiation of lactation after delivery.  
9E. Cryptorchidism causes sterility in males. (1×5 = 5 marks)
10. Explain referred pain with an example and give its basis. Describe the convergence theory of referred pain. (3+2 = 5 marks)
- 11A. Draw a labeled diagram of the pathway which carries fine touch sensation.  
11B. Describe the effects of stimulation of gamma efferents on muscle spindle sensitivity. (3+2 = 5 marks)
12. Describe how middle ear is able to:  
12A. Amplify the sound.  
12B. Protect the hair cells from loud sound. (3+2 = 5 marks)



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**MANIPAL UNIVERSITY****MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2014****SUBJECT: PHYSIOLOGY – II (MCQs)**

Monday, February 10, 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 <b>Correct</b> response	1 mark is awarded
For every <b>Wrong</b> response	0.5 mark is deducted
For every <b>Don't Know</b> 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.



### **Nerve action potential is**

- 101. The potential difference across nerve cell membrane during rest
- 102. Produced in response to threshold stimulus
- 103. Non-propagating in nature

### **Body heat is produced by**

- 104. Muscular activity
- 105. Vaporization of sweat
- 106. Radiation and conduction
- 107. Basic metabolic processes

### **Single unit smooth muscle**

- 108. Is present in ureter
- 109. Contracts on stretching
- 110. Has a stable resting membrane potential
- 111. Is innervated by autonomic nerves

### **T-tubule/s**

- 112. Are located at A-I junctions in skeletal muscle
- 113. Together with two terminal cisterns constitutes a triad in skeletal muscle
- 114. Transmit action potential from sarcolemma to all skeletal muscle fibrils

### **Neutrophils**

- 115. Are the most numerous of the leukocytes
- 116. Have a life span of about 120 days
- 117. Are increased in allergic diseases
- 118. Contain granules that stain only with acidic dyes

### **Plasma protein/s**

- 119. Contribute to buffering capacity of blood
- 120. Function as carriers for various hormones
- 121. Are mostly synthesized in kidney
- 122. Levels are high in blood in nephrosis

### **Lymph**

- 123. Is a specialized tissue fluid
- 124. Contains clotting factors
- 125. Helps in absorption of water-insoluble fats
- 126. Contains lymphocytes

### **Infant respiratory distress syndrome is**

- 127. Due to surfactant deficiency in infants at birth
- 128. Characterized by decreased surface tension in the alveoli
- 129. Also called hyaline membrane disease
- 130. Characterized by atelectasis

### **Vital capacity is**

- 131. The sum of tidal volume and residual volume

- 132. The maximum amount of air that can be inhaled after a normal tidal expiration
- 133. Useful to assess the strength of respiratory muscles
- 134. Decreased in restrictive lung diseases

### **In hypoxic hypoxia**

- 135. PaO<sub>2</sub> is normal
- 136. The arterial percentage saturation of hemoglobin is decreased
- 137. Cyanosis is absent
- 138. Hemoglobin content is normal

### **AV nodal delay**

- 139. Is about 1 second normally
- 140. Is prolonged by stimulation of sympathetic nerves to heart
- 141. Provides sufficient time for ventricular filling

### **Regarding cardiac cycle**

- 142. During isovolumetric ventricular contraction phase, mitral valve is open
- 143. End systolic ventricular volume is around 130 ml
- 144. Peak ventricular pressure is attained during reduced filling phase
- 145. Duration of diastole is 0.3 seconds in a cardiac cycle of 0.8 second duration
- 146. Dicrotic notch in aortic pressure curve is produced during rapid ejection phase

### **Cardiac output is**

- 147. The amount of blood pumped out by each ventricle per beat
- 148. The product of stroke volume and heart rate
- 149. Increased with high environmental temperature
- 150. Decreased during inspiration

### **Coronary blood flow**

- 151. At rest is about 250 mL/min
- 152. To the left ventricle increases during systole
- 153. Shows autoregulation

### **Cardiovascular changes during exercise include**

- 154. Increased blood flow to the contracting skeletal muscle
- 155. Decrease in heart rate at the onset of exercise
- 156. Increased venous return by mobilization of blood from the viscera

### **Pancreatic secretion**

- 157. Is primarily under neural control
- 158. From the acini is rich in enzymes
- 159. Is rich in bicarbonate when stimulated by secretin
- 160. Is inhibited by CCK

**Peptic ulcer is**

201. Primarily due to breakdown of gastric mucosal barrier
202. Caused by intake of drugs inhibiting prostaglandin production
203. Treated with drugs which inhibit the  $H^+ - K^+$  ATPase

**Achalasia cardia**

204. Is associated with inability of lower esophageal sphincter to relax
205. Is due to defective release of nitric oxide (NO) and VIP
206. Causes heartburn

**Estrogen**

207. Produces growth of ducts in the breasts
208. Causes epiphyseal closure
209. Has a plasma cholesterol increasing action
210. Facilitates the growth of ovarian follicles

**Sertoli cells secrete**

211. Mullerian inhibiting substance (MIS)
212. Inhibin
213. Testosterone
214. Androgen-binding protein (ABP)

**Cushing's syndrome is characterized by**

215. Increased circulating lymphocyte count
216. Buffalo hump
217. Increased protein breakdown
218. Hypotension
219. Pendular abdomen

**Thyroid hormone/s**

220. Decrease heart rate
221. Deficiency is associated with heat intolerance
222. Secretion is decreased in Grave's disease
223. In excess result in weight gain
224. Are essential for normal development of brain

**Parathyroid hormone**

225. Decreases the renal excretion of phosphate
226. Is synthesized by chief cells of parathyroid gland
227. Increases renal tubular reabsorption of calcium
228. Inhibits the formation of 1,25-dihydroxycholecalciferol

**In presence of ADH,**

229. Permeability of collecting ducts to water is increased
230. Urine is hypotonic to plasma
231. Permeability of collecting ducts to urea is increased
232. Plasma osmolality is increased

**Renal blood flow is**

233. About 25% of cardiac output
234. Autoregulated between mean arterial pressure of 90 to 220 mmHg
235. Modulated by hormonal factors
236. Measured by infusing inulin

**Thalamus is involved in**

237. Memory
238. Emotions
239. Regulation of body temperature

**Non-fluent Aphasia**

240. Is characterized by slow speech with limited words
241. Results from a lesion in the Wernicke's area
242. Is due to motor paralysis

**During REM sleep**

243. The EEG waves show high amplitude and slow wave pattern
244. Threshold for arousal by sensory stimuli is low
245. Skeletal muscle tone in the neck is markedly reduced

**Cerebellar disease is characterized by**

246. Ataxia
247. Scanning speech
248. Resting tremor
249. Past pointing

**State whether the following matches between receptor cell types and their sensory modalities are true/false**

250. Meissner corpuscles: Touch
251. Rods and Cones: Vision
252. Muscle spindles: Balance

**Macular**

253. Representation in the visual cortex is larger compared to that of peripheral retinal representation
254. Fibres end in the visual cortex separately from the fibres subserving peripheral vision
255. Sparing refers to loss of macular vision with intact peripheral vision
256. Region is devoid of cones

**State whether the following matches are true/false**

257. Trichromats - People with normal color vision
258. Protanomaly - weakness of blue cone
259. Deuteranomaly - weakness of green cone
260. Tritanopia - weakness of red cone

