

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

Monday, August 16, 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. While examining sensory system of her friend, Maria, in a physiology practical class, Sandra found that her friend had decreased perception of vibration and fine touch sensations in her left lower limb. But Maria's pain and temperature perceptions were normal in that limb. When Maria was asked to stand with her feet close together and eyes closed, Sandra noticed that her friend was swaying. Sandra brought this to her teacher's notice, who advised Maria to see a neurologist. When Maria consulted the neurologist, he confirmed the above findings in Maria. Examinations revealed no motor disturbances and her reflexes were normal.
  - 1A. Name the sensory tract that is affected in Maria. Justify your answer.
  - 1B. Trace the pathway of the tract that is in damaged in this condition.
 

(2+3 = 5 marks)
- 2A. Name any two excitatory and two inhibitory neurotransmitters involved in synaptic transmission.
- 2B. Draw the neural circuit to illustrate the 'inverse stretch reflex' and mention its significance.
 

(2+3 = 5 marks)
3. Define the terms, 'direct light reflex' and 'indirect light reflex'. Draw labeled diagrams of the pathways involved for the same.
 

(5 marks)
4. Explain the chemical regulation of respiration.
 

(5 marks)
5. Explain the steps involved in blood coagulation when blood is taken in a test tube.
 

(5 marks)
6. A 21-year-old woman with recent tiredness and difficulty in concentrating had also experienced a decline in memory over the last few months. She also noticed decreased frequency of bowel movements and increasing body weight. On physical examination, her resting pulse rate was found to be 50 beats per minute and her blood pressure was 102/78. She had a slightly puffy face and her eyebrows were sparse, especially at the lateral margins. Her voice was hoarse. She felt chilled without light sweater, even in warm weather.
  - 6A. Name the above endocrine disorder. Give the physiological basis for three manifestations seen in the above clinical disorder.
  - 6B. In the form of a flow chart explain the regulation of secretion of the hormone that is involved in the above case.
 

(3+2 = 5 marks)

7. Give the physiological basis for the following:
- 7A. At moderate rate of salivary flow, the final salivary secretion becomes hypotonic compared to plasma
  - 7B. Gall bladder bile is more concentrated compared to hepatic bile
  - 7C. Sight or smell of food increases gastric secretion
  - 7D. Resection of ileum causes macrocytic anemia
  - 7E. Omeprazole is used in the treatment of peptic ulcer

(1×5 = 5 marks)

8. With the help of a diagram, explain the cystometrogram.

(5 marks)

- 9A. Describe the regulation of secretion of ovarian hormones in the form of a flow chart.
- 9B. Explain the role of foetal testis in sexual differentiation.

(3+2 = 5 marks)

10. Ahmed, a 50 year old man was admitted to the hospital following a road traffic accident. Clinical examination revealed the following findings in Ahmed: Heart rate 98 beats/min, Blood pressure 90/50 mmHg

- 10A. Explain the most rapid mechanism by which blood pressure returns back to normal in Ahmed.
- 10B. Mention the cause for tachycardia in him.

(3+2 = 5 marks)

- 11A. Describe the wallerian degeneration.

- 11B. Name any two types of neuroglia. Mention the function of any one.

(3+2 = 5 marks)

12. In the form of a flow chart, write the sequence of events during neuromuscular transmission in skeletal muscle. Explain the basis of 'myasthenia gravis'.

(3+2 = 5 marks)



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

Monday, August 16, 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 **04 pages**. Please make sure that the question paper provided to you has all the pages.

### Evacuation of the urinary bladder

101. Depends on the integrity of a sacral spinal reflex arc
102. Occurs by activating sympathetic nerves to the bladder
103. Is prevented by destruction of the sensory nerves supplying the bladder
104. Is assisted by the contraction of perineal muscles

### The proximal convoluted tubules

105. Reabsorb most of the water and salts of the glomerular filtrate
106. Completely reabsorb glucose from the glomerular filtrate
107. Contain juxtaglomerular cells
108. Reabsorb normal amount of water during osmotic diuresis

### Spermatogenesis

109. Is reduced in cryptorchidism
110. Begins from birth
111. Takes an average of 74 days
112. Takes place in the Leydig cells

### During secretory phase of the menstrual cycle

113. Estrogen secretion becomes more than progesterone secretion
114. Cervical mucus dries in a fern-like pattern
115. Gonadotropin secretion increases
116. Graafian follicle is formed

### Hydrochloric acid

117. Is secreted by the chief cells of stomach
118. Secretion is increased when  $H^+K^+$  ATPase pump is blocked
119. Secretion increases upon stimulation of vagal efferents to the stomach

### Pancreatic juice secretion

120. Is rich in bicarbonate when secretin acts on the duct cells of the pancreas
121. Is normally acidic
122. Contains protein digesting enzymes

### Myenteric plexus

123. Is also called Auerbach's plexus
124. Is present within the submucosal layer of the gastrointestinal tract
125. Forms a part of the enteric nervous system
126. Is concerned primarily with the motor control of the gastrointestinal tract

### Parathyroid hormone

127. Is secreted by oxyphil cells of parathyroid gland
128. Increases blood calcium level
129. Inhibits excretion of calcium
130. Stimulates osteoblasts in bone

### Growth hormone

131. Level when increased in adults results in gigantism
132. Actions on bones is mediated by somatomedins
133. Increases amino acid transport into the cell
134. Secretion is inhibited by somatostatin

### Thyroid stimulating hormone

135. Level increases in primary hypothyroidism
136. Level decreases in iodine deficiency goiter
137. Is released from hypothalamus
138. Level increases in a person exposed to cold temperature

### Erythropoietin

139. Is produced mainly by the kidneys
140. Inhibits production of erythrocytes
141. Is released in response to hypoxia
142. Is a glycoprotein
143. Causes early differentiation of stem cells in bone marrow

### Packed cell volume

144. Increases during excessive sweating
145. Decreases in polycythemia
146. Is usually higher in males than females
147. Is increased in pregnancy
148. Value is used to classify anemias

### Regarding Brown-sequard syndrome

149. It occurs due to hemisection of spinal cord
150. There will be loss of pain and temperature sensations below the level of lesion on the same side
151. There is extensive motor loss below the level of lesion on the opposite side

### Structure/s forming Papez circuit include

152. Hippocampus
153. Mamillary bodies of hypothalamus
154. Cerebellum
155. Cingulate gyrus

### Cerebellar lesion is characterized by

- 156. Increased muscle tone
- 157. Resting tremors
- 158. Ataxia
- 159. Pendular knee jerk
- 160. Festinant gait

### Withdrawal reflex

- 201. Is a monosynaptic reflex
- 202. Occurs in response to a noxious stimulus
- 203. Is a protective reflex

### Intracranial pressure

- 204. Ranges between 100 to 200 mm H<sub>2</sub>O
- 205. When high is associated with papilloedema
- 206. When less than 70 mm H<sub>2</sub>O leads to a condition called hydrocephalus

### Regarding auditory pathway

- 207. It is bilateral throughout its course
- 208. Medial lemniscus fibers start from cochlear nucleus and terminate in inferior colliculus
- 209. Specific sensory nucleus in thalamus that receives ascending auditory pathway is lateral geniculate body
- 210. It is mixed with olivocochlear fibres

### Aqueous humour is

- 211. Secreted by the ciliary process
- 212. Found in the posterior chamber of the eye
- 213. The principal determinant of intraocular pressure
- 214. Useful in maintaining the spherical shape of the eyeball

### The central respiratory chemoreceptor/s

- 215. Are aortic and carotid bodies
- 216. Are stimulated by an increase in blood H<sup>+</sup> concentration
- 217. Stimulation leads to increase in rate and depth of breathing
- 218. Are not stimulated by an increase in blood PO<sub>2</sub>

### Surfactant

- 219. Is secreted by type II alveolar cells
- 220. Decreases surface tension in the lung
- 221. Increases compliance of the lung
- 222. Production increases when glucocorticoids are administered

### Cyanosis is seen in

- 223. Carbon monoxide poisoning
- 224. Cyanide poisoning
- 225. Anemic hypoxia
- 226. Hypoxic hypoxia

### Tachycardia occurs

- 227. During inspiration
- 228. Following stimulation of cardioinhibitory centre
- 229. During excitement
- 230. In exercise

### Cardiac output

- 231. Is increased when the venomotor tone is decreased
- 232. Determines the systolic blood pressure
- 233. Increases to as high as to 35 L in a normal adult during severe exercise
- 234. Changes with posture
- 235. Decrease following infusion of norepinephrine

### Coronary blood flow

- 236. To the posterior aspect of left ventricle is derived from right coronary artery in about 50 % of individuals
- 237. Is primarily regulated by the myocardial metabolism
- 238. Is improved by 'nitrates' in patients suffering from angina

### Baroreceptors

- 239. Are supplied by branches of glossopharyngeal and vagus nerves
- 240. Are located in the arch of aorta
- 241. Are responsible for the normal vagal tone
- 242. When stimulated by stretch, cause vasodilation

### Sarcoplasmic reticulum

- 243. Is well developed in cardiac muscles
- 244. Stores Na<sup>2+</sup> in it
- 245. Is a modified endoplasmic reticulum
- 246. Is concerned with Ca<sup>2+</sup> movement and muscle metabolism

### Multiunit type of smooth muscles

- 247. Show continuous contractions that are independent of the nerve supply
- 248. Contain large number of low resistance gap junctions between individual muscle cells.
- 249. Function as functional syncytium
- 250. Are not sensitive to circulating chemical substances
- 251. Are located in the viscera

## Osmosis

- 252. Occurs from a region of higher water concentration to a region of higher solute concentration.
- 253. Requires a membrane which is permeable to solutes and impermeable to water.
- 254. Is the mechanism by which reabsorption of water takes place in the gut
- 255. Causes the cells to shrink when they are suspended in a hypertonic solutions

## The mechanism of heat production (thermogenesis) include

- 256. Cutaneous vasoconstriction
- 257. Brown fat metabolism
- 258. Reducing surface area (curling up) of the body
- 259. Shivering
- 260. Hunger

