

MANIPAL UNIVERSITY
MELAKA MANIPAL MEDICAL COLLEGE (MANIPAL CAMPUS)
MBBS PHASE – I STAGE – I DEGREE EXAMINATION – MARCH 2017

SUBJECT : PHYSIOLOGY – PAPER I (ESSAY)

Saturday, March 11, 2017

Time : 9.00 - 11.00 Hrs.

Max. Marks : 60

1. Donald, a chronic smoker aged 50 years, visited the physician with complaints of shortness of breath while engaging in normal activities like brisk walking and climbing stairs. Various investigations revealed the following data:
 - Respiratory rate = 25 breaths/minute
 - Dead space = 200 mL
 - FEV1 = 1500 mL
 - Tidal volume = 300 mL
 - Vital capacity = 3000 mL
- 1A. Name the type of respiratory illness in Donald. Justify your answer from the above data.
- 1B. Calculate alveolar ventilation in Donald using the above data. Compare this value with the normal value of alveolar ventilation.
- 1C. Comment on the tidal volume value in Donald.

(2+2+1 = 5 marks)
- 2A. Describe the third phase of deglutition.
- 2B. In the form of a flow chart describe the regulation of gastric phase of gastric juice secretion.

(2+3 = 5 marks)
- 3A. Describe primary active transport with a suitable example.
- 3B. Write two differences between simple diffusion and facilitated diffusion.

(3+2 = 5 marks)
4. Describe the left ventricular pressure changes during cardiac cycle with the help of a labeled graph.

(5 marks)
- 5A. Write the pathway of blood coagulation which is initiated when blood is exposed to glass.
- 5B. With the help of a flow chart describe the fibrinolytic system.

(3+2 = 5 marks)
- 6A. Describe the changes that occur in the eyes, when an individual looks at a near object.
- 6B. Describe the role of cochlea in pitch discrimination of sound.

(3+2 = 5 marks)

7. Give physiological basis for the following:

7A. Cardiac muscle cannot be tetanized

7B. Denervation hypersensitivity

7C. Rigor mortis

(1+2+2 = 5 marks)

8A. Describe the role of hypothalamus in regulation of food intake.

8B. Draw a neat labeled diagram of stretch reflex.

(2+3 = 5 marks)

9. Ben, a 65-year old man consulted a neurologist, with complaints of difficulty in walking and initiating voluntary movements. He also reported that he felt very stiff and had developed tremors in his hands, which were found to be absent when he starts to perform any task. While talking, the doctor noticed that Ben showed very little facial expression. Ben had a stooped posture and a shuffling gait when asked to walk. The doctor prescribed him L-dopa and asked him to come for review after a month.

9A. Name the above clinical condition and mention the cause for the same.

9B. Mention two functions of the part of the brain affected in the above condition.

9C. List two hyperkinetic features seen in Ben.

9D. What is the rationale behind prescribing L-dopa?

(1+2+1+1 = 5 marks)

10. Give physiological basis for the following:

10A. Tetany in hypoparathyroidism

10B. Mental retardation in cretinism

10C. Weight loss in hyperthyroidism

10D. Aldosterone escape phenomenon

10E. Osteoporosis in Cushing's syndrome

(1x5 = 5 marks)

11. Explain the endometrial changes during a normal menstrual cycle indicating the hormones responsible for the same.

(5 marks)

12A. Mention any two special features of renal circulation

12B. Describe the mechanism of glucose reabsorption in nephron.

(2+3 = 5 marks)



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MBBS PHASE – I STAGE – I DEGREE EXAMINATION – MARCH 2017
SUBJECT : PHYSIOLOGY – PAPER II (MTF)

Saturday, March 11, 2017

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.

Cones are

101. Responsible for scotopic vision
102. Responsible for color vision
103. Extremely sensitive to light when compared to rods
104. Mainly distributed in the peripheral portions of retina

Regarding vestibular apparatus

105. Crista ampullaris is located in semicircular canals
106. Macula of utricle responds to horizontal acceleration
107. Sensory signals are conveyed via auditory division of VIII cranial nerve
108. Excessive vestibular stimulation causes symptoms of motion sickness

Regarding processing of neural signals for speech

109. Wernicke's area is required to comprehend auditory and visual signals
110. Broca's area projects to facial area of primary motor cortex
111. Angular gyrus processes signals from words that are heard
112. Wernicke's area projects to Broca's area via arcuate fasciculus

Tabes dorsalis is characterized by

113. Cavity formation around the central canal of spinal cord
114. Dissociated anaesthesia
115. Lightning pain
116. Loss of deep reflexes

State if the following matches are true or false

117. Acetylcholine : Produces EPSP by opening sodium channels
118. GABA: Produces EPSP by opening calcium channels

119. Glutamate: Produces EPSP by opening calcium channels
120. Glycine: Produces IPSP by opening chloride channels

Muscle tone is

121. The resistance offered by the muscle to passive stretch
122. Lost in lower motor neuron lesion
123. Increased in cerebellar lesion
124. Increased by increasing the activity of gamma motor neurons

During inspiration

125. Internal intercostal muscles contract
126. Intrathoracic volume increases
127. Intrapleural pressure becomes more negative
128. Intraalveolar pressure becomes positive

Histotoxic hypoxia

129. Is due to decreased supply of oxygen to the tissues
130. Occurs in carbon monoxide poisoning
131. Is characterized by normal level of PO₂ in arterial blood
132. Is characterized by the presence of cyanosis

Respiratory adjustments to high altitude include/s

133. Hypoventilation
134. Increased myoglobin
135. Decrease in the number of mitochondria in tissues
136. Increased 2,3-DPG in red blood cell

Large intestine

137. Stores faecal material
138. Secretes water
139. Synthesizes vitamin E
140. Movements when increased result in constipation
141. Has villi on its mucosa

Segmentation movement/s

142. Are propulsive in nature
143. Frequency is determined by the basic electric rhythm
144. Help in mixing of chyme
145. Is inhibited by atropine
146. Is modulated by enteric nervous system

According to Poiseuille Hagen formula, blood flow in a vessel increases with increase in

147. Pressure difference between two ends of the vessel
148. Vascular resistance
149. Radius of the vessel
150. Viscosity of blood

Second heart sound

151. Is produced by closure of AV valves
152. Has shorter duration than the first heart sound
153. Has higher pitch than the first heart sound
154. Is heard best over the mitral area

Muscular exercise

155. Increases systolic blood pressure
156. Increases heart rate
157. Decreases sympathetic nerve activity
158. Enhances blood flow to active skeletal muscle

Peripheral chemoreceptors

159. Are present in the carotid and aortic bodies
160. On stimulation cause peripheral vasodilation
201. Are stimulated by stretch

Causes of hypertension include/s

202. Atherosclerosis
203. Renal failure
204. Adrenal medullary tumors
205. Decreased secretion of aldosterone

Hormones of the anterior pituitary include

206. Prolactin
207. Luteinizing hormone
208. Vasopressin
209. Adrenocorticotrophic hormone

Growth hormone

210. Secretion when increased after epiphyseal closure results in gigantism
211. Enhances protein anabolism
212. Release is regulated by IGF-1
213. Secretion decreases during fasting

Calcitonin

214. Is secreted by parafollicular cells of thyroid gland
215. Decreases Ca^{2+} excretion in urine
216. Inhibits bone resorption

Pheochromocytoma is associated with

217. Sustained hypotension
218. Glycosuria
219. Palpitations

Glomerular filtration rate is

- 220. Determined by PAH clearance
- 221. Normally 500 mL/min in an adult
- 222. Increased following constriction of renal afferent arteriole
- 223. Decreased when there is ureteral obstruction

The actions of angiotensin-II include

- 224. Peripheral vasodilation
- 225. Stimulation of thirst
- 226. Inhibition of aldosterone secretion
- 227. Stimulation of ADH secretion

Sertoli cells

- 228. Are a part of the blood-testis barrier
- 229. Secrete mullerian inhibiting substance
- 230. Nourish developing sperms
- 231. Secrete testosterone

Spermatogenesis is

- 232. The process of formation of mature spermatozoa
- 233. Initiated during adolescence
- 234. Maintained by follicle stimulating hormone
- 235. Inhibited by testosterone

Parasympathetic nerve/s

- 236. Have their ganglia situated close to the target organ
- 237. Release acetyl choline at both pre and postganglionic terminals
- 238. Originate from thoracolumbar segments of spinal cord
- 239. Transmission is blocked by atropine at postganglionic level

Nerve fibers of type

- 240. 'C' conduct faster than 'A'
- 241. 'A' are least susceptible to pressure
- 242. 'B' are most susceptible to hypoxia

A woman with blood group 'B'

- 243. Can donate blood to a person with 'A' blood group
- 244. Has AB genotype
- 245. Has anti-B antibody in the plasma
- 246. Can give birth to a child with 'AB' group

Red blood cells

- 247. Lack nuclei
- 248. Survive in circulation for an average of 200 days
- 249. Swell in hypertonic solutions
- 250. In normal young adults are formed mainly in the spleen and liver

In macrocytic anemia, the

- 251. Mean corpuscular hemoglobin concentration is decreased
- 252. Mean corpuscular volume is normal
- 253. Mean corpuscular hemoglobin is raised
- 254. Red cell count is markedly decreased

Motor unit/s

- 255. Are found only in cardiac muscle
- 256. Consists of a motor neuron and all the muscle fibers it supplies
- 257. Are largest in muscles responsible for fine graded movements

Myasthenia gravis is characterized by

- 258. Formation of antibodies against calcium channels at neuromuscular junction
- 259. Increase in number of nicotinic cholinergic receptors in the endplate of affected muscles
- 260. Skeletal muscle weakness that appears after sustained or repeated activity

