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MANIPAL UNIVERSITY
MELAKA MANIPAL MEDICAL COLLEGE (MANIPAL CAMPUS)

MBBS PHASE - I STAGE - I DEGREE EXAMINATION - SEPTEMBER 2016

SUBJECT : PHYSIOLOGY - PAPER I (ESSAY)

Tuesday, September 06, 2016

Time : 9.00 - 11.00 Hrs.

Max. Marks : 60

1. John, a mason, returned to his house in the evening after a day's work. It had been a cold day and he turned on his old kerosene-fueled heater in a closed room. During dinner, he noticed that his vision became progressively blurred. When he got up to go to the kitchen, he felt lightheaded, disoriented and unsteady. John's friends who stopped by his house about 8 pm found him unconscious on the kitchen floor. He was rushed to the hospital where he was diagnosed with carbon monoxide poisoning.
 - 1A. Name the type of hypoxia in John.
 - 1B. Draw the oxygen hemoglobin dissociation curve in a normal person and in John in the above condition.
 - 1C. Will the respiratory chemoreceptor mechanism be stimulated in John? Justify your answer.

(1+2+2 = 5 marks)

- 2A. Describe the second phase of deglutition.
- 2B. Describe defecation reflex in the form of a flow chart.

(2+3 = 5 marks)

- 3A. Draw and describe the length-tension relationship in skeletal muscle.
- 3B. List four properties of cardiac muscle.

(3+2 = 5 marks)

4. Describe the mechanism of glucose reabsorption in the renal tubule with the help of a labeled diagram.

(5 marks)

- 5A. Describe the regulation of thyroid hormone secretion in the form of a flow chart.
- 5B. Mention the cause and any two clinical features of pheochromocytoma.

(3+2 = 5 marks)

6. A 30 year old man presented to an ophthalmologist complaining of visual disturbances. When confrontation test was done, the patient was unable to see the finger of the examiner when it was moved towards the lateral side of both the eyes. Further tests confirmed loss of vision in the temporal field of both the eyes.

6A. Name the type of visual field defect seen in the above patient.

6B. Draw a labeled diagram of the visual pathway and show the site of lesion which has caused this particular visual defect in the above case.

(1+4 = 5 marks)

7. Give physiological basis for the following:

7A. Polycythemia in high altitude

7B. Macrocytic anemia in vitamin B₁₂ deficiency

7C. Low plasma albumin produces edema

7D. Bleeding time is prolonged in thrombocytopenia

7E. Increased hematocrit in dehydration.

(1x5 = 5marks)

8. Mention any three uses of EEG. Add a note on alpha block.

(3+2 = 5 marks)

9. Describe the cause, three clinical manifestations and principle of treatment of Parkinson's disease.

(1+3+1 = 5marks)

10A. Name any three neuroglia. Mention one function of each.

10B. Mention the histological changes in the cell body of a neuron after peripheral nerve injury.

(3+2 = 5marks)

11A. Draw the normal Frank-Starling curve of the heart. Superimpose the effects of stimulation of autonomic nerves on this curve.

11B. Describe the basis of postural hypotension.

(3+2 = 5 marks)

12A. Describe the regulation of testicular functions in the form of a flow chart.

12B. Mention any two features of Turner syndrome

(3+2 = 5 marks)



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MBBS PHASE – I STAGE – I DEGREE EXAMINATION – SEPTEMBER 2016**

SUBJECT : PHYSIOLOGY – PAPER II (MTF)

Tuesday, September 06, 2016

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.

During repolarization phase of a nerve action potential

101. Voltage gated Na^+ channels open
102. K^+ diffuses out of the nerve cell
103. The membrane potential moves towards +30 mV

Facilitated diffusion

104. Requires ATP
105. Is carrier mediated
106. Follows saturation kinetics
107. Occurs along the electrochemical gradient

White muscle fiber/s

108. Do not fatigue easily
109. Are ideally suited for brief forceful contractions
110. Has slow myosin ATPase activity
111. Are also called fast muscle fibers

Depolarizing type of neuromuscular blocker/s

112. Include curare
113. Do not have acetylcholine-like biological activity
114. Cause persistent depolarization at endplate region

Extrinsic pathway of blood coagulation

115. Is initiated when blood comes in contact with glass surfaces
116. Leads to formation of factor Xa
117. Is inhibited by tissue factor pathway inhibitor
118. Requires calcium ions

Erythrocyte

119. Count is more in infants than in adults
120. Swells up when suspended in hypertonic solution

121. Contains nucleus
122. Production is stimulated by androgens

Features of erythroblastosis fetalis include

123. Polycythemia
124. Increased plasma bilirubin
125. Edema
126. Splenomegaly

SA node

127. Is supplied mainly by the left vagus nerve
128. Activity is decreased by digitalis
129. Has a stable resting membrane potential
130. Action potential is due to calcium influx
131. Discharge rate determines the heart rate

Regarding the dynamics of blood flow

132. Velocity of blood flow is greatest in the aorta
133. If Reynolds number is more than 3000, blood flow becomes turbulent
134. Blood flow is directly proportional to radius of the blood vessel

First heart sound

135. Is heard best over pulmonary area
136. Has a longer duration compared to that of second heart sound
137. Is produced by closure of semilunar valves
138. Has a higher pitch compared to that of second heart sound

Mean arterial blood pressure

139. Is normally around 60 mm Hg
140. Falls very slightly in large and medium sized arteries
141. Refers to the minimum pressure in aorta and large arteries during each cardiac cycle

Circulatory shock

- 142. Of distributive type is also called "cold shock"
- 143. Is characterized by inadequate tissue perfusion
- 144. Of hypovolemic type is characterized by hypotension

Carbon dioxide

- 145. Content of venous blood is 15 mL/100 mL
- 146. Transport from the tissues into the venous blood is facilitated by Bohr effect
- 147. Is transported in the blood in carboxyhemoglobin form
- 148. Diffuses through alveolocapillary membrane much easily compared to oxygen

Alveolar ventilation is

- 149. The product of tidal volume and respiratory rate
- 150. The amount of air inspired or expired during quiet breathing
- 151. Increased in rapid shallow breathing
- 152. Normally less than pulmonary ventilation

Compliance of the lung is

- 153. A measure of elastic recoil of the lungs
- 154. Decreased by surfactant
- 155. Slightly greater during deflation compared to inflation of lungs
- 156. Decreased in pulmonary edema

Basic electrical rhythm (BER)

- 157. Is initiated by pacemaker cells in the stomach
- 158. Coordinates peristaltic activity of the gastrointestinal tract
- 159. Is 100/min in the small intestine

Bile

- 160. Secretion is increased by bile acids
- 201. Formation is decreased by vagal stimulation
- 202. From liver is more acidic than that in the gall bladder
- 203. Acids help in emulsification of fats

Saliva

- 204. Facilitates swallowing
- 205. Secretion is controlled by autonomic nerves
- 206. Is always hypotonic compared to plasma

Glucocorticoids

- 207. Maintain responsiveness of vascular smooth muscle to catecholamines
- 208. In excess cause osteoporosis
- 209. Have anti-stress effect

Growth hormone secretion is increased by

- 210. Hypoglycemia
- 211. Excess cortisol
- 212. Protein rich diet
- 213. Exercise

Conn's syndrome is associated with

- 214. Hyperkalemia
- 215. Hypertension
- 216. Acidosis

Calcitonin

- 217. Secretion is stimulated by a decrease in the plasma calcium level
- 218. Decreases urinary phosphate excretion
- 219. Inhibits the activity of osteoclasts
- 220. Increases calcium excretion in urine

Angiotensin II stimulates

- 221. Thirst
- 222. Aldosterone secretion
- 223. Renin secretion
- 224. ADH secretion

Clearance

- 225. Of inulin gives a measure of renal plasma flow
- 226. Is the volume of plasma completely cleared of a substance per unit time
- 227. Of creatinine is 180 mL/min
- 228. Of glucose is 100 mL/min

Corpus luteum in a non-pregnant female

- 229. Secretes hormone relaxin
- 230. Degenerates before the onset of next menstrual cycle
- 231. Requires hCG for its formation
- 232. Transforms into corpus hemorrhagicum

Spermatozoa

- 233. Formation takes around 74 days
- 234. Acquire motility in epididymis
- 235. Contain haploid number of chromosomes
- 236. Undergo capacitation in epididymis

In Brown-Sequard syndrome, below the level of lesion

- 237. Fine touch is lost on the opposite side
- 238. Pain and temperature sensations remain intact on the same side
- 239. Spastic paralysis occurs on the opposite side

Lower motor neuron lesion is characterized by

- 240. Hypertonia
- 241. Positive Babinski sign
- 242. Exaggerated deep reflexes
- 243. Marked muscle atrophy

Regarding the blood-brain barrier

- 244. It is impermeable to O₂ and CO₂
- 245. Circumventricular organs lie outside the blood-brain barrier
- 246. It protects the brain from endogenous toxins

Receptor potential

- 247. Is a graded potential
- 248. Magnitude increases with increase in strength of stimulus
- 249. Is conducted decrementally

Fast pain is

- 250. Carried by 'C' fibers
- 251. Poorly localized
- 252. Dull and aching in nature

Functions of middle ear include

- 253. Impedance matching
- 254. Protection of hair cells from loud sounds
- 255. Equalization of pressure on either side of tympanic membrane
- 256. Pitch discrimination of sound

Vestibular apparatus

- 257. Contains the otolith organs
- 258. Detects linear acceleration with the help of semicircular canals
- 259. Has connections with cerebellum
- 260. When excessively stimulated causes motion sickness