

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2011

SUBJECT: PHYSIOLOGY – I (ESSAY)

Monday, February 14, 2011

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. Mrs. Linda met with a minor accident on her way back home from the office. She hurt her left hand and she was taken to the nearby hospital. She explained to the attending physician that the pain was dull and diffused all over her left hand.

- 1A. Identify the type of pain experienced by Mrs. Linda
- 1B. Trace the pathway responsible for the above type of pain.
- 1C. Describe briefly the endogenous pain relief system.

(1+2+2 = 5 marks)

2. Mention any four clinical manifestations of cerebellar disorders and describe the physiological basis of any three manifestations.

(2+3 = 5 marks)

3. Mention the different types of transport mechanisms across the cell membranes and explain any one of them with the help of an appropriate example.

(2+3 = 5 marks)

4. With the help of a neat labeled diagram, explain the pressure changes in the left ventricle during various phases of cardiac cycle.

(5 marks)

5. Give physiological basis for the following:

- 5A. Occurrence of macrocytic anemia following complete gastrectomy.
- 5B. Both parents with blood group 'A' can have a child with group 'O'
- 5C. Bleeding time is prolonged in thrombocytopenia
- 5D. Polycythemia occurs in high altitude
- 5E. Occurrence of kernicterus in infants with erythroblastosis fetalis

(1×5 = 5 marks)

6. Samuel, a 50 year old man underwent a thyroid surgical procedure. Appropriate thyroid hormone therapy was given following the surgery. Three days later, postoperatively Samuel developed spasms in the extremities and larynx. Laboratory investigations revealed a plasma calcium level which was lower than normal.

6A. Mention the clinical condition developed in Samuel postoperatively.

6B. Mention the normal plasma calcium level.

6C. Name any two hormones that regulate plasma calcium level

6D. Give the basis for the laryngeal spasm.

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

7. With the help of a diagram, explain the sequence of events during neuromuscular transmission in a skeletal muscle. Mention any two neuromuscular blockers.

(4+1 = 5 marks)

8A. Describe defecation reflex in the form of a flow chart.

8B. Describe the hormonal regulation of pancreatic juice secretion.

(3+2 = 5 marks)

9. A 23 year old woman, who got married recently, visited the gynecologist for consultation, regarding family planning. The lady stated to her gynecologist that her menstrual cycle was of 28 days duration.

9A. Mention the days during the cycle suggested by the gynecologist as safe and unsafe period. Describe the basis of unsafe period.

9B. Draw a graph depicting changes in plasma estrogen and progesterone levels during a normal menstrual cycle.

(3+2 = 5 marks)

10. Describe the mechanism of ventilation.

(5 marks)

11. Describe micturition reflex in the form of a flow chart.

(5 marks)

12A. With the help of suitable diagrams, depict the visual field defects which arise due to lesions at:

i) the left optic tract

ii) the optic chiasm

iii) the geniculocalcarine tract

12B. Mention any two functions of middle ear.

(3+2 = 5 marks)



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MANIPAL UNIVERSITY**MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2011****SUBJECT: PHYSIOLOGY – II (MCQs)**

Monday, February 14, 2011

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 **03 pages**. Please make sure that the question paper provided to you has all the pages.

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Mechanism/s that are activated by heat include/s

- 101. Cutaneous vasoconstriction
- 102. Sweating
- 103. Shivering

Parasympathetic nervous system

- 104. Originates from the thoracolumbar part of spinal cord
- 105. Stimulation increases heart rate
- 106. Stimulation causes bronchoconstriction
- 107. Activity increases during stressful situation

Packed Cell Volume (PCV) increases in

- 108. Anemia
- 109. Excessive sweating
- 110. High altitude
- 111. Pregnancy

Eosinophil/s

- 112. Decrease in number following ACTH therapy
- 113. Count increases in allergy
- 114. Contain fine granules
- 115. Are normally considered as the first line of defense

Regarding Haemophilia A

- 116. It is due to deficiency of clotting factor VIII
- 117. Patients show increased bleeding time
- 118. It is a genetic disorder
- 119. Females are carriers of the disease

Second heart sound

- 120. Is produced by closure of semilunar valves
- 121. Has a longer duration compared to that of first heart sound
- 122. Is heard best over mitral area
- 123. Has low pitch compared to that of first heart sound
- 124. Marks the beginning of ventricular diastole

Cardiac output is

- 125. The product of end diastolic volume and heart rate
- 126. Increased when after load is increased
- 127. 1 liter/min normally
- 128. Decreased during exercise

Factor/s increasing venous return include/s

- 129. Decreased venous tone
- 130. Skeletal muscle pump
- 131. Stronger right atrial contraction
- 132. Inspiration

Regarding blood vessels

- 133. Arterioles are the major sites of resistance to blood flow
- 134. Velocity of blood flow is greatest in the capillaries
- 135. Veins are called capacitance vessels
- 136. Blood flow is laminar, when Reynold's number is more than 3000
- 137. Capillaries exert Windkessel effect

Cardiac muscle

- 138. Acts as a functional syncytium
- 139. Is involuntary in nature
- 140. Is innervated by somatic nerves
- 141. Can be tetanized

Red muscle fibers of skeletal muscle

- 142. Have shorter twitch duration
- 143. Are specialized for fine, rapid, precise movements
- 144. Are also called fast muscle fibers

Insulin

- 145. Decreases transport of K^+ into the insulin sensitive cells
- 146. Secretion from pancreas is increased by administration of the drug alloxan
- 147. Helps increase cell growth
- 148. Facilitates glucose entry into adipose tissue by increasing the number of glucose transporters
- 149. Secretion is stimulated by glucagon

Addison's disease is characterized by

- 150. Hyperpigmentation of gums
- 151. Hypertension
- 152. Hypokalemia
- 153. Fatigue

Growth hormone

- 154. Has protein anabolic action
- 155. Decreases blood glucose level
- 156. In excess causes enlargement of soft tissues
- 157. Secretion is increased by somatostatin
- 158. Is secreted by posterior pituitary

Testosterone

- 159. Is synthesized from Sertoli cells
- 160. Secretion is under the control of luteinizing hormone
- 201. Receptor complexes are responsible for maturation of wolffian duct
- 202. Maintains spermatogenesis

Human chorionic gonadotropin is

- 203. Detected in maternal urine six days after conception
- 204. Produced by syncytiotrophoblast cells
- 205. Increased to maximum level in maternal blood during the first trimester
- 206. A specific marker only for detection of pregnancy

Partial pressure

- 207. Of CO₂ in venous blood is 40 mm Hg
- 208. Is defined as the pressure exerted by any one gas in a mixture of gases
- 209. Of O₂ in alveolar air is 46 mm Hg
- 210. Of CO₂ in the blood leaving the lungs is 40 mm Hg

%FEV₁

- 211. Is about 20% in a healthy normal adult male
- 212. Is the fraction of the vital capacity expired during the first second of a forced expiration
- 213. Is increased in obstructive lung diseases
- 214. Measurement is useful in differentiating between restrictive and obstructive diseases
- 215. Is measured normally by peak flow meter

Chemoreceptors in the brain stem

- 216. Are stimulated by an increase in blood hydrogen ion concentration
- 217. Are situated in the medulla oblongata
- 218. When stimulated bring about hyperventilation

Sodium reabsorption

- 219. In PCT is about 99% of the filtered sodium
- 220. Occurs in the PCT under the influence of aldosterone
- 221. In thick ascending limb of loop of Henle is inhibited by furosemide
- 222. Is inhibited by atrial natriuretic peptide

Actions of angiotensin II include/s

- 223. Peripheral vasodilation
- 224. Stimulation of thirst
- 225. Inhibition of aldosterone secretion
- 226. Contraction of mesangial cells

In withdrawal reflex

- 227. Nociceptors are involved
- 228. Flexor muscles of the stimulated limb contracts and extensor muscles of the opposite limb relaxes
- 229. The limb stimulated is flexed and withdrawn
- 230. Only one synapse is involved

Postsynaptic inhibition

- 231. Is mediated by GABA
- 232. Which results during the course of an IPSP is called indirect inhibition
- 233. In the spinal cord is direct inhibition
- 234. Is associated with the influx of Cl⁻ ions into the postsynaptic membrane

Parkinson's disease is

- 235. A motor disorder
- 236. Due to lesion of the dopaminergic pathway in basal ganglia
- 237. Associated with athetosis
- 238. Often treated with L-DOPA

Limbic system has a role in

- 239. Learning and memory
- 240. Emotions
- 241. Temperature regulation
- 242. Water balance

State whether the following pairs are true or false

- 243. Helicotrema: Apex of cochlea
- 244. Otolith organ: Semicircular canal
- 245. Reissner's membrane: Organ of Corti
- 246. Footplate of Stapes: Oval window

Visual accommodation involves

- 247. A decrease in curvature of the lens
- 248. Relaxation of sphincter muscle of the iris
- 249. Contraction of ciliary muscle
- 250. Convergence of the eye ball

Bile

- 251. Is secreted from the gall bladder
- 252. Salts emulsify dietary fats
- 253. Salts are sodium and potassium salts of bile pigments
- 254. Secretion is stimulated by secretin

Regarding enteric nervous system

- 255. Myenteric plexus is present between the longitudinal & circular muscle layers of gut
- 256. Submucous plexus primarily controls motility of the gut
- 257. It is the intrinsic nervous system of the GIT

Gastrin

- 258. Stimulates the growth of mucosa of stomach
- 259. Secretion is stimulated by acid in the antrum
- 260. Secretion is inhibited by atropine

