

**MANIPAL UNIVERSITY****MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2008****SUBJECT: PHYSIOLOGY – I (ESSAY)**

Monday, February 11, 2008

Time: 2 Hours

Max. Marks: 60

- ✍ **Answer ALL questions. Write brief, relevant and legible answers.**  
✍ **Draw diagram, flow charts wherever appropriate.**

1. Compare the abnormalities in movement that are seen in cerebellar disease with those seen in Parkinson's disease. Mention the principle of treatment of Parkinson's disease.

(4+1 = 5 marks)

2. A 20-year-old girl complained of fatigue and loss of stamina. Her monthly menstrual flow was always heavy and prolonged since the age of twelve years. Relevant laboratory findings included the following:

RBC count	2 million cells / mm <sup>3</sup> of blood
PCV	15%
Hemoglobin	5 g%
Serum Iron	Less than normal
Peripheral smear	Small and pale red cells with anisocytosis and poikilocytosis

2A. Give the diagnosis based on the history and laboratory findings.

2B. Calculate mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) from the given data. Comment on the results.

(1+4 = 5 marks)

3. A 50-year-old man was brought to the emergency reporting headache, nausea and fatigue. The physician noted that the man was slightly disoriented and his pulse was rapid and the skin and nail beds were cherry red in color. Upon questioning, he mentioned that he had spent the night in a small, unventilated apartment that was heated by two kerosene space heaters.

3A. Mention the condition that the above person has developed. Mention the type of hypoxia that the person is experiencing.

3B. Draw a labeled graph of the normal O<sub>2</sub>-Hb dissociation curve. Mention the effect of the above condition on the O<sub>2</sub>-Hb dissociation curve.

3C. Mention the role of oxygen therapy in this case.

(1+3+1 = 5 marks)

4. Explain the reflex and voluntary control of micturition using a diagram.

(5 marks)

5. Give physiological basis for the following:

5A. Pain of appendicitis is commonly felt around the umbilicus.

5B. Use of local anesthetic drugs for minor surgical procedures.

5C. Destruction of lateral hypothalamic area produces anorexia.

5D. Parasympathetic nervous system is 'anabolic' in its action.

5E. Glomerular filtrate is protein-free.

(1×5 = 5 marks)

6. 25-year-old Jane consulted her physician with complaints of sleepiness, constipation, cold intolerance, excess menstrual bleeding and weight gain in spite of loss of appetite. On examination her pulse rate was found to be 50/minute. Laboratory tests revealed low plasma  $T_3$  and  $T_4$  but elevated plasma TSH levels.
- 6A. Diagnose the above endocrine disorder based on clinical manifestations and lab findings.  
 6B. Is this a primary or secondary endocrine disorder? Give reason for your answer.  
 6C. Give the physiological basis for any **two** clinical features mentioned above.  
 (1+2+2 = 5 marks)
7. Nina, a school teacher noticed that 8 year old Jack used to come closer to the blackboard to see the writing on the board whenever he was seated in back benches while his bench mates didn't have this problem. Nina reported the matter to Jack's mother and advised her to take him to an ophthalmologist. After careful examination of Jack's eyes, the ophthalmologist prescribed corrective lenses for a refractory error in the boy.
- 7A. Name the refractive error present in Jack.  
 7B. Draw the diagram showing the image formation in this condition.  
 7C. Which type of corrective lenses did the ophthalmologist prescribe to Jack and why?  
 (1+2+2 = 5 marks)
8. With the help of a diagram outline the cellular mechanism of gastric HCl secretion. Name the chemicals that influence this process. Add a note on postprandial alkaline tide.  
 (5 marks)
9. Give the sequence of events of 'excitation-contraction coupling' in skeletal muscle fibers in the form of a flow chart. Add a note on the role of ATP in this process.  
 (5 marks)
- 10A. Explain briefly the regulation of mean arterial pressure by the baroreceptor reflex mechanism. What is the purpose of this regulation?  
 10B. Give the physiological basis for the following:  
 i) Cardiac muscle can not be tetanised.  
 ii) Slope of the pacemaker potential decreases following stimulation of vagus to heart.  
 (3+2 = 5 marks)
- 11A. Give the physiological basis for the following:  
 i) Lactation amenorrhoea.  
 ii) Removal of ovary before the 6<sup>th</sup> week of pregnancy leads to abortion.  
 11B. Describe the regulation of testicular functions.  
 (2+3 = 5 marks)
12. Give the physiological basis for the following:  
 12A. Glucose passes across certain membranes by secondary active transport.  
 12B. Gamma efferent activity increases 'Ia' afferent discharge from muscle spindles.  
 12C. Increased cardiac activity increases coronary blood flow.  
 12D. Hyperpigmentation in Addison's disease.  
 12E. Metabolic alkalosis in Conn's syndrome.  
 (1×5 = 5 marks)



Reg. No.

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2008

SUBJECT: PHYSIOLOGY – II (MCQs)

Monday, February 11, 2008

Time: 1 Hour

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

John, while going to the car shed to take his car out, saw a cobra in the car shed. With respect to activation of autonomic nervous system, state whether the following statements are True or False.

101. Parasympathetic nervous system was activated in John when he saw the cobra
102. Catecholamines mediated the responses in John
103. John's Ascending Reticular Activating system was inhibited
104. There was reflex bradycardia in John due to fright

#### Intracellular fluid (ICF) compartment

105. Contains more  $\text{Na}^+$  than  $\text{K}^+$
106.  $\text{Cl}^-$  concentration is less than that in ECF
107. Osmolarity is essentially same as that of ECF
108. Volume is more than that of ECF

#### In untreated Pernicious anemia

109. Erythropoiesis is ineffective
110. Vitamin  $\text{B}_{12}$  is deficient in diet
111. Gastric parietal cell mass is often reduced
112. Oxygen carrying capacity of blood is decreased

#### Megakaryocytes

113. Are found in red bone marrow
114. Are phagocytic in function
115. Are seen in large numbers in peripheral blood in megaloblastic anemia
116. Differentiate into monocytes

#### Cyanosis is observed in

117. Hypoxic hypoxia due to decreased percentage saturation of hemoglobin
118. Anemia hypoxia due to decreased oxyhemoglobin
119. Histotoxic hypoxia due to decreased arteriovenous oxygen difference
120. Stagnant hypoxia due to excessive desaturation of capillary blood

#### During inspiration

121. Intrapleural pressure becomes more positive
122. Transpulmonary pressure remains constant
123. Intra-alveolar pressure becomes subatmospheric
124. Partial pressure of oxygen in alveoli increases

#### Glomerular filtration rate

125. Tends to increase when glomerular capillary hydrostatic pressure is increased
126. Tends to decrease when the afferent arteriole constricts
127. Is inversely proportional to the filtration coefficient
128. Is the volume of plasma cleared of a substance per unit time

#### Dysfunctioning of the nephrons results in the following features

129. Urine osmolarity increases
130. Urea clearance value increases
131. Plasma creatinine levels increase
132. Hematocrit increases

#### Golgi tendon organ

133. Functions to maintain muscle tension
134. Is oriented in series with extrafusal muscle fibers
135. Is innervated by unmyelinated 'C' fibers

#### During synaptic transmission

136. Calcium enters the postsynaptic membrane via voltage gated channels
137. Peptide neurotransmitters are released from the presynaptic nerve terminals
138. Excitatory postsynaptic potential is developed due to hyperpolarization of postsynaptic membrane
139. Temporal summation increases size of IPSP at an inhibitory synapse

#### Regarding corticospinal tract

140. Lateral corticospinal tract is concerned with the control of muscles in the distal portions of limbs
141. Lesion of the left lateral corticospinal tract at C1 level causes paralysis on left side
142. Ventral corticospinal tract is involved in postural adjustments

#### In Brown Sequard syndrome

143. Fine touch and tactile localization are intact on the same side below the level of lesion
144. Pain and temperature sensations remain intact on the opposite side below the level of lesion
145. Complete anaesthesia occurs on the same side at the level of lesion
146. Flaccid paralysis occurs on the opposite side at the level of lesion

### **Growth hormone**

- 236. Is a protein catabolic hormone
- 237. If excess after epiphysial closure causes prognathism
- 238. Secretion is inhibited by increased plasma amino acid levels in plasma
- 239. Effect on cartilage is mediated by somatomedins
- 240. Secretion is increased by hypoglycemia

### **Cushing's syndrome**

- 241. Shows elevated glucocorticoid level in plasma
- 242. Shows manifestations that indicate protein catabolism
- 243. Can present with features of osteoporosis
- 244. Patients are often hypertensive

### **Spermatogenesis**

- 245. Begins immediately after birth
- 246. Requires an average of 35 days
- 247. Occurs in seminiferous tubules
- 248. Requires a slightly higher temperature than the normal body temperature
- 249. Is inhibited by Follicle Stimulating Hormone

### **Estrogen**

- 250. Facilitates the growth of ovarian follicles
- 251. Inhibits the motility of uterine tubes
- 252. Lowers plasma cholesterol level
- 253. Stimulates duct growth in mammary glands

### **Visceral smooth muscle**

- 254. Is syncytial in nature
- 255. Is present in iris of eye
- 256. Exhibits plasticity
- 257. Is also called multiunit smooth muscle

### **Thermoregulatory responses**

- 258. Activated by exposure to cold, include cutaneous vasodilation
- 259. Activated in hot climate is mediated by posterior hypothalamus
- 260. Can be mediated by altered skin temperature

