

Sept 07 (Batch 2008)

Reg. No.

## MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – AUGUST 2008

SUBJECT: PHYSIOLOGY – I (ESSAY)

Monday, August 11, 2008

Time : 2 Hours

Max. Marks: 60

- ✍ Answer ALL questions.
  - ✍ Write brief, relevant and legible answers.
  - ✍ Draw diagram, flow charts wherever appropriate.
1. Jim, a 24-year-old student who met with a road accident showed signs of left lower extremity paralysis, left Babinski sign and loss of pain and temperature sensations in the right leg below the knee.
    - 1A. Mention the possible site of spinal lesion in Jim and give the physiological basis for the clinical manifestations.
    - 1B. Draw a cross-section of spinal cord to show the location of tracts that are damaged in Jim.

(3+2 = 5 marks)
  2. Draw diagram to illustrate the structure and nerve supply of muscle spindle. Explain the significance of the same.

(2+3 = 5 marks)
  3. Give physiological basis for the following:
    - 3A. Windkessel effect seen in large arteries.
    - 3B. Bradycardia in elevated intracranial pressure.

(2+3 = 5 marks)
  4. Draw and label the intraventricular pressure and volume changes in the left ventricle during a cardiac cycle.

(3+2 = 5 marks)
  5. Explain the importance of absolute refractory period in different excitable tissues.

(5 marks)
  6. What is near point of vision? Explain its location in normal eye and in different refractive errors.

(1+4 = 5 marks)

7. Jones, a 40-year-old man recently notices small reddish spots on his skin. He also notices that when he cut himself the wound would bleed for a prolonged period of time. His platelet count is 30000 per  $\text{mm}^3$  and has a prolonged bleeding time.

7A. Give the normal platelet count and explain the importance of platelets in stopping bleeding.

7B. Name the condition that Jones is suffering from.

(4+1 = 5 marks)

8. Explain the metabolic abnormalities in uncontrolled diabetes mellitus.

(5 marks)

9. Mention the different types of carrier mediated transport mechanisms across the cell membrane. Describe any *one* of them using an example.

(2+3 = 5 marks)

10. Explain the different types of small intestinal movements.

(5 marks)

11. Explain the factors affecting the affinity of oxygen to hemoglobin using 'oxygen-dissociation curve'.

(5 marks)

12. A married woman who had regular 28-day-menstrual cycles misses her period and consults her gynecologist. The gynecologist confirms pregnancy following the pregnancy test.

12A. Give the physiological basis and principle of the pregnancy test that is performed.

12B. Explain the cause of amenorrhea in the above case.

12C. When is placenta formed? Enumerate the endocrine functions of placenta.

(1+2+2 = 5 marks)



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## MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – AUGUST 2008

SUBJECT: PHYSIOLOGY – II (MCQs)

Monday, August 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.

### Resting membrane potential

101. Is due to difference in the concentration of potassium in ECF and ICF
102. Increases in magnitude if the permeability of the membrane to sodium ions increases
103. Is unstable in visceral smooth muscles
104. Decreases in magnitude if the activity of sodium potassium ATPase pump is inhibited

### Action potential in a nerve fibre

105. Is an all or none response
106. Is conducted with decreasing amplitude if the axon is unmyelinated
107. Is due to transient changes in membrane permeability to sodium ions
108. Is generated at the threshold potential

### Regarding receptors for autonomic neurotransmitters

109. Muscarinic type of cholinergic receptors are present in skeletal muscle
110. Adrenaline can bind to both alpha and beta adrenergic receptors
111. Blockers of nicotinic receptors cause failure of transmission across autonomic ganglia
112. Atropine blocks the cholinergic receptors at smooth muscles

### Regarding visceral smooth muscle

113. Shows basic electric rhythm
114. Mechanical stretch elicits contraction in an isolated preparation
115. Troponin is the calcium binding protein
116. Behaves as a functional syncytium

### Heat gain in the body

117. Is increased by shivering
118. Can be decreased by stimulation of sympathetic nervous system
119. Is increased by activity of brown adipose tissue
120. Is directly proportional to the degree of cutaneous vasodilation

### Skeletal muscle fibers of diaphragm are

121. Voluntary in function
122. Striated
123. Supplied by somatic nerves
124. Made up of myofibrils

### Airway resistance is

125. More when the radius of the airways increases
126. Decreased by adrenalin
127. More during expiration than during inspiration
128. High in bronchial asthma

### Cyanosis is likely to be observed in

129. Severe anemia
130. Cyanide poisoning
131. Cardiac failure with low output
132. Hypoxic hypoxia

### Central chemoreceptors

133. Are stimulated by an increase in blood hydrogen ion concentration
134. That are situated in the pons regulate the depth of breathing
135. When stimulated bring about hyperventilation
136. Are supplied by parasympathetic nerve fibers

### Limbic system

137. Structures are situated in the postcentral gyrus
138. Is concerned with emotions and motivation
139. Receives input from anterior nucleus of thalamus
140. Includes Papez circuit

### Regarding synapses

141. IPSPs are produced by binding of the neurotransmitter glycine to postsynaptic membrane
142. Summation of EPSPs is required to produce an action potential in the postsynaptic neuron
143. There is a delay of 0.5 millisecond at a synapse
144. Muscle stretch reflex pathway is monosynaptic

### In Parkinson's disease

145. The nigrostriatal pathway is deficient in dopamine
146. The major motor deficit is ataxia
147. There is hypertonia
148. Babinski sign is positive bilaterally

### Ovulation

149. Occurs at 17<sup>th</sup> day in a 34-day-cycle
150. Requires high concentration of LH from anterior pituitary
151. Is detected by examining the cervical mucus pattern
152. Requires a positive feedback stimulation of anterior pituitary by estrogen

### Estrogen

153. Is responsible for proliferative changes in endometrium
154. Is thermogenic
155. Is secreted by placenta during first two weeks of pregnancy
156. Is responsible for female pattern of fat deposition

### In Turner's syndrome

157. Semeniferous tubules are defective in function
158. The karyotype is 47 XXY
159. The patient has short stature
160. Barr bodies are absent

### Secretin

201. Is secreted by the gastric mucosa
202. Causes the release of alkaline pancreatic juice
203. Binds to cytoplasmic receptors in target cells

### Enzymes of pancreas include

204. Trypsin
205. Pepsin
206. Enterokinase

### Gastric juice secretion is increased by

207. Proteins in stomach
208. Secretin
209. Acetylcholine
210. Somatostatin

### Myocardial contractility is increased by

211. An increase in end diastolic volume of ventricles
212. Norepinephrine
213. Vagal stimulation
214. Digitalis

### Sino-atrial node

215. Discharges impulses at a faster rate than any other part of the heart
216. Cells have unstable membrane potential
217. Is innervated by left vagus nerve
218. Has a conduction velocity of 3 m/s

### Concentration of urine occurs due to

219. The release of vasopressin
220. Osmotic gradient in the renal medullary interstitium
221. A high rate of blood flow through renal medulla
222. Reabsorption of urea from collecting duct

### Plasma proteins

223. Transport bilirubin in plasma
224. Account for the viscosity of blood
225. Have buffering capacity
226. Get freely filtered in the kidney

### Developing red cells show

227. Decrease in cell size
228. Change in staining characteristics of cytoplasm
229. Increased accumulation of golgi bodies
230. Increased condensation of nucleus

### Cellular immunity is

231. Mainly the function of T cells
232. Mediated through antibodies
233. A major defense against acute bacterial infections
234. Involved in graft rejection

### Excess glucocorticoids cause an increase in the circulating

235. Eosinophils
236. Lymphocytes
237. Neutrophils
238. Erythrocytes

### Addison's disease is likely to be characterized by

239. Hypotension
240. Eosinophilia
241. Water intoxication
242. Hyperglycemia

A 35-year-old woman complains of fatigue, weight loss and menstrual irregularities. Her thyroid hormone levels were elevated. Due to this, she is most likely to have

- 243. High BMR
- 244. Intolerance to cold
- 245. Tachycardia at rest
- 246. Elevated plasma cholesterol level

#### In the fovea centralis of retina

- 247. Receptors are mainly cones
- 248. Light passes through ganglion and bipolar cells before reaching the receptor
- 249. Convergence of neural elements is higher
- 250. Receptors are more sensitive to light than those in peripheral retina

Plasma concentration of glucose is 100mg/dl and the GFR is 125 ml/min. Urine flow rate is 1.2 ml/min. In this case,

- 251. Tubular load of glucose is 200 mg/min
- 252. All the filtered glucose is not reabsorbed if the urine flow rate is reduced to 50%
- 253. 2 mg glucose is excreted each minute
- 254. Clearance of glucose is zero

#### Semicircular canals

- 255. Are filled with endolymph
- 256. Receptors are located in the macula
- 257. Detect angular acceleration

#### Glucose reabsorption in renal tubular cells

- 258. Is an example for primary active transport
- 259. Increases when the tubular load exceeds tubular maximum for glucose ( $T_mG$ )
- 260. Requires insulin

