

Reg. No.

--	--	--	--	--	--	--	--	--	--

MANIPAL UNIVERSITY

MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2012

SUBJECT: PHYSIOLOGY – I (ESSAY)

Monday, February 13, 2012

Time: 09:00 – 11:00 Hrs

Max. Marks: 60

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

- 1A. Draw a neat labeled diagram of the pathway carrying crude touch and pressure sensations from the right great toe.
- 1B. Explain why it is risky to perform lumbar puncture when CSF pressure is raised. (3+2 = 5 marks)
- 2A. Describe the dynamic response by muscle spindle.
- 2B. Describe the gate control theory of pain relief with the help of a diagram. (2+3 = 5 marks)
3. John, a 56 year old man was admitted to the hospital by his family members following mild chest pain. The cardiologist recorded John's electrocardiogram (ECG) and informed his family that the ECG showed depression of ST segment but was otherwise normal. The cardiologist prescribed medications for John and advised him to take rest and avoid any strenuous activity.
 - 3A. What does depressed ST segment in John's ECG indicate?
 - 3B. Draw a neat labeled diagram of an ECG from limb lead II. Indicate the two major intervals and ST segment in the same ECG. (1+4 = 5 marks)
4. Describe the stages of erythropoiesis. Add a note on the regulation of erythropoiesis. (3+2 = 5 marks)
5. Give physiological basis for the following:
 - 5A. Alveoli do not collapse during expiration.
 - 5B. The hematocrit of venous blood is normally 3% greater than that of arterial blood.
 - 5C. Apex of the lungs provide a favorable environment for growth of tuberculosis bacteria. (2+2+1 = 5 marks)
6. Define countercurrent mechanism. Explain the genesis of medullary osmotic gradient and its role in concentration of urine. (5 marks)

(5 marks)

7. Reena, a 25 year old woman consulted her physician with complaints of sleepiness, puffiness of the face, constipation, cold intolerance and irregular menstrual cycles. On examination, her heart rate was found to be low. Her plasma T₃ and T₄ levels were low but TSH and cholesterol levels were increased.

7A. Name the above clinical condition.

7B. Give physiological basis for any three clinical features seen in Reena.

7C. What is the cause for increased plasma TSH level?

(1+3+1 = 5 marks)

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

8B. Depict the cellular mechanism of HCl secretion with the help of a diagram.

(2+3 = 5 marks)

9A. Draw a neat labeled diagram of an action potential recorded from a nerve fiber.

9B. Mention the normal body temperature. List two heat gain mechanisms.

(3+2 = 5 marks)

10A. Mention the cause and give the physiological basis of treatment of myasthenia gravis.

10B. Classify smooth muscles giving one example for each type.

(3+2 = 5 marks)

11. In the form of a flow chart, explain the basis of sex determination and sex differentiation in males and females.

(5 marks)

12A. Mention any two functions of middle ear.

12B. Explain the sequence of changes that occur in the eyes, when a person tries to focus on a near object.

(2+3 = 5 marks)



Reg. No.

--	--	--	--	--	--	--	--	--	--

MANIPAL UNIVERSITY**MBBS PHASE I STAGE I DEGREE EXAMINATION – FEBRUARY 2012****SUBJECT: PHYSIOLOGY – II (MCQs)**

Monday, February 13, 2012

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.

In cardiac muscle

101. Resting membrane potential is -70 Mv
102. Action potential has long refractory period
103. 'T' system is located at A-I junction
104. Influx of extracellular Ca^{2+} is required for contraction

In a resting skeletal muscle

105. Myosin head contains tightly bound ADP
106. Troponin C is bound with Ca^{2+}
107. Myosin head is attached to actin filament

Sympathetic nervous system

108. Is craniosacral in origin
109. Has long preganglionic and short postganglionic fibers
110. Releases acetylcholine at the preganglionic nerve endings

$Na^+ - K^+$ ATPase pump

111. Is an electrogenic pump
112. Is an example for secondary active transport
113. Extrudes two K^+ from the cell and takes three Na^+ into the cell

Cushing's syndrome is/are characterized by

114. Decreased plasma glucocorticoid levels
115. Osteoporosis
116. Hypertension
117. Central obesity

Growth hormone

118. Has protein anabolic action
119. Decreases blood glucose level
120. In excess after epiphyseal closure causes enlargement of soft tissues
121. Secretion is increased by somatostatin
122. Is secreted by posterior pituitary

Aldosterone

123. Increases Na^+ secretion from renal tubules
124. Deficiency leads to hypokalemia
125. Secretion is increased by low dietary Na^+
126. Deficiency decreases ECF volume
127. Secretion is decreased by angiotensin II

Glomerular filtration rate

128. Is measured by inulin clearance
129. Is approximately 180 L/day in an average sized normal man
130. Increases with an increase in hydrostatic pressure in Bowman's capsule
131. Decreases with an increase in glomerular capillary hydrostatic pressure

The actions of angiotensin II include/s

132. Peripheral vasodilatation
133. Stimulation of thirst
134. Stimulation of ADH secretion
135. Increased $NaCl$ reabsorption in renal tubule

Gastric emptying

136. Time is short for fatty food than carbohydrate rich food
137. Is delayed by hyperosmolar contents in the duodenum
138. Is stimulated by cholecystokinin
139. Is enhanced by acid in the duodenum

Lower esophageal sphincter

140. Is tonically active during swallowing
141. Prevents regurgitation of food from stomach
142. Constricts due to the release of acetylcholine from vagal endings

Gastrin

143. Secretion in stomach is inhibited by atropine
144. Stimulates growth of gastric mucosa
145. Inhibits parietal cells

Slow wave sleep is associated with

146. Rapid, roving movement of eyes
147. Dreams
148. Sleep spindles
149. Rhythmic slow waves indicating synchronization

Basal ganglia

150. Is involved in the planning and programming of movements
151. Does not have any role in regulating muscle tone
152. Controls subconscious associated movements
153. Disorders are characterized by ataxia

Fast pain differs from slow pain in that it is

154. Poorly localized
155. Dull and intense in nature
156. Conducted by $A\delta$ myelinated nerve fibers
157. Felt in most of the deeper tissues

Lower motor neuron lesion is characterized by

158. Exaggerated deep reflexes
159. Spastic paralysis
160. Muscular atrophy
201. Fasciculations

Hypoxia of

- 202. Hypoxic type occurs in high altitude
- 203. Anemic type is characterized by cyanosis
- 204. Histotoxic type is due to inhibition of tissue oxidative processes
- 205. Stagnant type is due to slow circulation

Oxygen hemoglobin dissociation curve shifts to the right when there is

- 206. Increase in PaCO₂
- 207. Increase in 2,3 BPG concentration
- 208. Decrease in PaO₂
- 209. Increase in temperature

Peripheral chemoreceptor/s

- 210. Help in the regulation of blood pressure
- 211. Include aortic and carotid bodies
- 212. Are stimulated when PaO₂ is decreased
- 213. Stimulation results in decreased pulmonary ventilation

End-diastolic volume

- 214. Decreases when intrathoracic pressure is less negative
- 215. Determines the preload
- 216. Decreases when the total blood volume decreases
- 217. Reduces immediately upon standing

Arteriole/s

- 218. Are also termed as exchange vessels
- 219. Contain less smooth muscle in the wall compared to other types of blood vessels
- 220. Are innervated by noradrenergic nerve fibers
- 221. Have maximum total cross-sectional area compared to other types of blood vessels
- 222. Are further divided into metarterioles

Coronary blood flow

- 223. In left ventricle decreases during diastole compared to systole
- 224. Increases during local hypoxia
- 225. At rest is 250 mL/min in normal adults
- 226. Exhibits autoregulation

Hypertension

- 227. Increases the incidence of atherosclerosis
- 228. Is seen in pheochromocytomas
- 229. Is managed using α -adrenergic blockers
- 230. Occurs due to decreased secretion of aldosterone
- 231. Of sustained nature results in left ventricular hypertrophy

Platelets

- 232. Aggregate at the site of vascular injury
- 233. Are formed from megakaryocytes
- 234. Lack nuclei
- 235. Undergo destruction in spleen

Blood group/s

- 236. 'B' contains anti-A antibodies
- 237. Antigens are also termed "agglutinogens"
- 238. AB can be donated to O group individual
- 239. Of both parents with B type (heterozygous) can have a child with genotype "OO"

Pernicious anemia is

- 240. Caused by deficiency of intrinsic factor
- 241. A form of megaloblastic anemia
- 242. Characterized by an increase in MCHC
- 243. Treated using folic acid

Progesterone

- 244. Has an antiestrogenic effect on myometrium
- 245. Helps to maintain pregnancy
- 246. Makes cervical mucus thin and watery
- 247. In large doses stimulate LH secretion
- 248. Is thermogenic

Corpus luteum

- 249. Is formed in the follicular phase of ovarian cycle
- 250. Secretes estrogen
- 251. Regresses on the 14th day of a 28 day menstrual cycle
- 252. Persists if pregnancy occurs

Olfactory epithelium

- 253. Is the place in the body where nervous system is closest to the external world
- 254. Is located in the roof of nasal cavity
- 255. Covers a larger area of nasal mucosa in humans than in animals
- 256. Contains olfactory sensory neurons

Semicircular canals

- 257. Are perpendicular to each other on each side of the head
- 258. Have an expanded end called cupula
- 259. Contain crista ampullaris
- 260. Detect rotational acceleration

