

Question Paper

Exam Date & Time: 14-Nov-2023 (10:20 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - NOVEMBER 2023
SUBJECT: PHYSIOLOGY - PAPER - I
(CBME BATCH - REGULARS)

Marks: 80

Duration: 160 mins.

Answer all the questions.

- 1) A 4-year-old child was complaining of weakness in the left upper limb, to evaluate the cause neurologist advised for nerve conduction study of nerves in the upper limb. When the technician stimulates the median nerve in the forearm, observed the weak contraction in muscles innervated by the median nerve. Upon increasing the strength of the stimulus, the muscle contraction grew stronger
 - 1A) Briefly explain the physiological basis for the increased force of muscle contraction upon increased strength of stimulus? (2)
 - 1B) Draw a neat, labeled diagram of the Neuromuscular junction and describe the process of transmission of nerve signals across the neuromuscular junction (2+4 = 6 marks)
 - 1C) Add a note on Lambert Eaton Myasthenic Syndrome (2)

- 2) A 16-year-old boy, on his way back home after SSLC board examination in the afternoon in May, had rashes, giddiness, profuse sweating, cold clammy skin, muscle cramps and micturates small amount of dark yellow urine.
 - 2A) What would be the most probable physiological causes for the above symptoms? (2)
 - 2B) Explain the physiological mechanism involved in forming the dark yellow urine (6)
 - 2C) Add a note on Diabetes Insipidus (2)

- 3) **Short Notes:**
 - 3A) Define action potential and explain the ionic basis of nerve action potential (1+3 = 4 marks)
 - 3B) Name the types of intercellular communication and explain them with an example (1+3 = 4 marks)
 - 3C) Enumerate the functions of plasma proteins (4)
 - 3D) A 12-year-old boy sustained an injury to his leg while playing football and started bleeding from the site of injury, explain the steps involved in the spontaneous arrest of this bleeding with the help of a flowchart (4)
 - 3E) A 2-year-old beta Thalassemia minor patient visits the hospital for a regular blood transfusion of B positive blood. The blood bank officer collects a bag of B-positive blood from the refrigerator .
 - i) What is the next step of action by the blood bank officer before handing over the blood for transfusion
 - ii) Explain the rationale behind his actions (1+3 = 4 marks)

- 3F) Describe the pressure and volume changes in the left ventricle during the cardiac cycle with the help of a graph (4)
- 3G) A 25-year-old athlete has a resting heart rate of 54 beats/minute, and after completing the 100 m sprint his heart rate was 78 beats/minute.
- i) Describe the ionic basis of pacemaker potential
- ii) Illustrate how it is altered in this athlete (3+1 = 4 marks)
- 3H) Define cardiac output. Explain the measurement of cardiac output by dye dilution technique (1+3 = 4 marks)
- 3I) Describe the mechanism of long-term regulation of blood pressure (4)
- 3J) Describe the causes and features of right sided heart failure (1+3 = 4 marks)
- 3K) Define compliance, and explain how alteration in compliance affects the process of alveolar Ventilation (1+3 = 4 marks)
- 3L) Explain the physiological process of CO₂ transport from tissues to the lungs in blood. (4)
- 3M) Define and classify hypoxia. Explain the physiological basis of any **ONE**. (1+1+2 = 4 marks)
- 3N) Describe the compensatory changes that ensue in an individual when he travels to a high altitude (4)
- 3O) Describe the process of acidification of urine (4)

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Question Paper

Exam Date & Time: 16-Nov-2023 (10:20 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION
FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - NOVEMBER 2023
SUBJECT: PHYSIOLOGY - PAPER - II
(CBME BATCH - REGULARS)

Marks: 80

Duration: 160 mins.

Answer all the questions.

- 1) A 45-year-old business executive has a very erratic & stressful lifestyle. He used to have frequent business trips, frequently misses his regular meals, and mostly relies on junk foods & has lack of sleep due to pressure of work from his office. He also has history of chronic smoking & alcohol intake. One day while he was presenting a new project in front of his team, he suddenly started having severe chest pain associated with profuse sweating. He also experienced pain in his jaw region and inner aspect of his left upper arm. He was rushed to a nearby superspecialist hospital where his ECG showed massive myocardial infarction.
- 1A) Give reasoning based on your knowledge of Physiology, why he was experiencing pain in his jaw and inner aspect of left upper arm? (2)
- 1B) What this type of pain is called? (1)
- 1C) Describe the pathway of acute pain (5)
- 1D) Add a note on gate control theory of pain inhibition (2)
- 2) A 44-year-old woman was referred to a Gastroenterology Clinic from primary care provider due to consistent discomfort and significant weight loss. She had a tarry stool in the early morning which she had never experienced before. She presented with a 2-month history of burning pain in the epigastric region and chest which radiated toward her back. Her pain worsened after drinking coffee and was relieved after taking antacids. She had previously lost 4.5 kgs in 2 months due to decreased intake caused by the feeling of bloating, early fullness, and stomachaches between meals. She also reported nausea and vomiting. She expressed concern especially because the food appeared undigested when she vomited. She looked pale and exhausted when she entered the clinic. She also had a history of *Helicobacter pylori* infection.
- 2A) What is the probable diagnosis? (1)
- 2B) Give the composition of gastric juice. (2)
- 2C) Explain the cellular mechanism of secretion of gastric juice (5)
- 2D) Add a note on Sham feeding. (2)
- 3A) Compare and contrast EPSP and IPSP (4)
- 3B) Explain the property of receptors which facilitate tactile localization. (4)
- 3C) Describe in detail the connections of Basal ganglia (4)

- 3D) Compare and contrast Decerebrated and Decorticated rigidity (4)
- 3E) Explain the mechanism of occurrence of post rotatory nystagmus (4)
- 3F) Trace the pathway for taste sensation with a neat, labelled diagram (2+2 = 4 marks)
- 3G) Explain the theories of color vision (4)
- 3H) Explain role of growth hormone in growth (4)
- 3I) Explain the mechanism of action of thyroid hormone (4)
- 3J) Explain the role of glucagon in our body and mention its clinical application (3+1 = 4 marks)
- 3K) A 30-year-old man met with a Road traffic accident sustained head injury and was hospitalized for a month and was discharged after recovery. On follow up he complains of increased frequency of micturition. The urine osmolarity was 190 mOsm/kg, Specific gravity of 1.004, absence of glucose, pus cells or casts.
- i) What could be the probable diagnosis?
- ii) Explain the physiological basis for the above presentation (1+3 = 4 marks)
- 3L) Describe the cause and features of Congenital Adrenal hyperplasia (1+3 = 4 marks)
- 3M) Compare and contrast true and pseudo precocious puberty (4)
- 3N) Describe in detail the Foeto-placental unit (4)
- 3O) Enumerate the types of hormonal contraceptive methods available for men and women. Explain the rationale in supplementing iron tablets with oral contraceptive pills (3+1 = 4 marks)

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