

# Question Paper

Exam Date & Time: 27-Jul-2024 (10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - JULY 2024**  
**SUBJECT: PY 101THP1 - PHYSIOLOGY - PAPER - I**  
**(PY - 1 CBME BATCH)**

**Marks: 80**

**Duration: 160 mins.**

**All questions are compulsory.**

**Write brief, clear and legible answers.**

**Illustrate your answers with diagrams and flow charts wherever appropriate.**

## Essay Questions

1. 52-year male came with complaint of swelling in legs since few days. He gave a history of long-standing deficient protein intake. On examination, bilateral pitting edema was present. Blood tests revealed albumin: globulin = 0.8:1.

- 1A) Comment on the blood report. Mention its normal range (1)
- 1B) Explain the Starling's forces and process of normal tissue fluid formation at a capillary with the help of a diagram (5)
- 1C) Justify the cause of edema observed in this case (2)
- 1D) List the other functions of plasma proteins (2)

2. A 75-year patient has a stroke volume of 50 ml and a heart rate of 90 beats/min.

- 2A) Comment on the given value of stroke volume and calculate the cardiac output in the above case. (2)
- 2B) Briefly explain how venous return regulates cardiac output (3)
- 2C) On sudden standing up from lying down position this patient complains of giddiness. Explain the mechanism normally preventing this symptom in a healthy adult. (5)

## 3. Short answer questions:

3A. A 75 year old man was seen by a diabetologist for his foot gangrene. After a detailed history, clinical examination and with relevant laboratory tests, the treating physician advises the patient to go for below knee amputation. At the time, the patient tells him that his friend who is being treated as a God Father in his village, told him that his condition can be cured without any surgery. The doctor explained that he has done everything correctly and that the patient requires surgery. The patient told him that he cannot make a decision unless he talks to his friend once again. The physician was offended and told the patient that he does not wish to see the patient any longer.

Answer the following questions based on the knowledge from your AETCOM sessions,

- i) Is the behavior of the doctor justified? Give your comments. (1)

- ii) Could an effective communication skill from the doctor's side made the situation better? Explain. (1.5)
- iii) Discuss the role of empathy in a good doctor-patient relationship which might have been helpful in making these situations better from the patient's treatment compliance. (1.5)
- 3B) Explain rheobase and chronaxie with suitable graphs and give their significance (3+1 = 4)
- 3C) A 25-year female complained of easy fatigability, breathlessness, tingling numbness in limbs since few weeks. She said she is on vegan diet since few years. Blood tests revealed hemoglobin - 6 gm/dL, MCV - 116 fL and RBC count - 2.7 million cells/ cu mm of blood.
- i) Comment on the given values with reference to normal range and give the probable diagnosis (1)
- ii) Briefly explain the physiological basis for the clinical features and lab results observed in this case. Mention the treatment for the condition (3)
- 3D. A person undergoing treatment with coumarin compounds was deemed unfit for elective surgery.
- i) Which hemostasis-related test will likely be abnormal in this case? (1)
- ii) Explain the physiological basis for this abnormality? (3)
- 3E) Compare and contrast excitation-contraction coupling in skeletal muscle and smooth muscle (4)
- 3F) Explain the various sources of energy for skeletal muscle contraction. Add a note on oxygen debt. (2+2 = 4)
- 3G. A 68-year-old male with aortic valve stenosis exhibited a murmur upon auscultation.
- i) Explain the basis for the murmur heard in this condition (2)
- ii) Explain normal heart sounds and correlate them with the underlying cardiac events causing them? (2)
- 3H) Describe the phases of ventricular systole during the cardiac cycle. (4)
- 3I) Mention the salient features of coronary circulation. Using graph, discuss the phasic flow of blood through the coronary arteries (2+2 = 4)
- 3J) Explain with suitable graphs, the changes that can occur in static and dynamic lung volumes and lung capacities in a chronic smoker complaining of breathlessness due to emphysema. (4)
- 3K) Explain the chemical regulation of respiration. (4)
- 3L) If a normal person wants to go deep sea diving, what precautions need to be advised? If precautions are not followed, what signs and symptoms will the person present with following deep sea diving? (2+2 = 4)
- 3M) Explain renal tubular mechanism of glucose reabsorption. Draw a graph and explain the concept of renal threshold for glucose and renal tubular maximum. (2+2 = 4)
- 3N) Explain counter current multiplier system in kidneys with a suitable diagram. (4)
- 3O) Define renal clearance. Mention any two criteria of a substance used for estimating GFR using renal clearance. Using the formula calculate the renal clearance for substance 'X' if concentration of substance 'X' in plasma is 13 mg/ml and in urine is 48 mg/ml and volume of urine produced is 34 ml/min. (1+1+2 = 4)

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# Question Paper

Exam Date & Time: 29-Jul-2024 (10:20 AM - 01:00 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**  
**FIRST PROFESSIONAL YEAR MBBS DEGREE EXAMINATION - JULY/AUGUST 2024**  
**SUBJECT: PHYSIOLOGY - PAPER - II**  
**(CBME BATCH)**

**Marks: 80**

**Duration: 160 mins.**

**Answer all the questions.**

## Essays

1. A 52-year-old man was admitted with sudden loss of voluntary movement on the left side of his body. On examination, his higher functions were normal, vital signs were normal. Neurological examination revealed left-sided hemiplegia.
  - 1A) Draw a diagram to depict the origin, course and termination of the pathway affected in the above case. (5)
  - 1B) Mention the functions of this pathway. (1)
  - 1C) Explain the differences between the features of upper motor neuron lesion and lower motor neuron lesion. (4)
  
2. A 37-year-old male complains of enlarging hands and feet and changes in his facial contour. On examination, he is noted to have coarse facial features, large tongue, frontal bossing of his forehead, protrusion of lower jaw. There was enlargement of liver and spleen.
  - 2A) Describe the normal physiological actions and the cellular mechanism of action of the hormone whose secretion is altered in the above patient. (6)
  - 2B) Explain how the secretion of the above hormone is regulated. (4)
  
3. **Short answer type:**
  - 3A) Explain the theories of referred pain using suitable examples. (4)
  - 3B) List the dominant rhythms and clinical uses of EEG. (4)
  - 3C) Explain spatial and temporal summation with regard to synaptic transmission. (4)
  - 3D) Describe the role of hypothalamus in feeding behaviour. (4)
  - 3E) Explain the effective techniques that can be used by a doctor to open a discussion and gather information during a patient interview. (4)
  - 3F) Give the cause for Cushing's syndrome. With basis, explain all the clinical features observed in this condition. (4)
  - 3G) Explain carbohydrate digestion in the gastrointestinal tract. (4)
  - 3H) Using a diagram, explain the regulation of salivary secretion. (4)
  - 3I) Explain the functions of large intestine. (4)
  - 3J) Draw pathway to illustrate how taste sensation is conveyed to the brain. (4)

- 3K) Draw diagram to indicate the image formation in myopia for a far object. Explain the correction of this error. (4)
- 3L) Explain the middle ear functions. (4)
- 3M) Describe the functions of sertoli cells. (4)
- 3N) Describe the physiological basis and principle of immunological test for diagnosis of early pregnancy. (4)
- 3O) Describe the different contraceptive methods in females. (4)

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