

**POSTGRADUATE INSTITUTE OF MEDICINE**  
**UNIVERSITY OF COLOMBO**

**SELECTION EXAMINATION FOR MD (EMERGENCY MEDICINE)**  
**NOVEMBER/DECEMBER 2025**

**Date:-** 11<sup>th</sup> December 2025

**Time:-** 9.00 a.m. - 12.00 noon

**ESSAY PAPER**

Answer **all six (06)** questions.

Answer each question in a separate book.

1. A 32-year-old man is admitted to the Emergency Department with a stab injury to his left thigh. On examination the stab is just below the inguinal ligament and a swelling is noted around the stab wound. Ultrasound scan is suggestive of an injury to the artery in the region.
  - 1.1. Name the injured artery. (05 marks)
  - 1.2. How do you surface mark the artery you stated in 1.1. at the groin? (10 marks)
  - 1.3. Name two (02) other important structures that could have been injured in the area. (10 marks)
  - 1.4. Name the main branch of the artery stated in 1.1. (05 marks)
  - 1.5. Outline the arterial anastomosis in the posterior thigh. (30 marks)
  - 1.6. Describe briefly the structural arrangement at the inlet of thorax. (40 marks)

Contd...../2-

2. A 48-year-old woman is brought to the Emergency Department after collapsing at home. On arrival, she is drowsy, pale and has a blood pressure of 80/50 mmHg.

Initial investigations show the following:

Serum sodium	122 mmol/L	(135-145)
Serum potassium	6.4 mmol/L	(3.5 -5.1)
Random blood glucose	2.4 mmol/L	(4.0-6.0)
Serum creatinine	82 $\mu$ mol/L	(80 - 120)
ALT	35 IU/L	(<40)
AST	45 IU/L	(<50)
Serum cortisol (8.00 a.m.)	58 nm/L	(138-690)

- 2.1. What is the most likely diagnosis? (10 marks)
- 2.2. List four (04) clinical or laboratory findings given above, that support your diagnosis. (20 marks)
- 2.3. Explain the pathophysiological basis for three (03) abnormal investigation findings stated in 2.2. (30 marks)
- 2.4. State two (02) other biochemical investigations useful in confirming the diagnosis. (10 marks)
- 2.5. Outline the principles of management in the Emergency Department. (30 marks)
3. A 55-year-old man with diabetes presented to the Emergency Department with a history of fever and productive cough for 4 days. On examination, his respiratory rate was 20/minute, with bronchial breathing and coarse crepitations over the right lower zone. He was diagnosed with right lower lobe pneumonia.
- 3.1. Briefly describe the pathological changes (macroscopic and microscopic) seen in the four stages of lobar pneumonia. (40 marks)
- 3.2. Over the next few days, his condition deteriorates, and he is suspected to have acute respiratory distress syndrome (ARDS).  
Describe the pathogenesis of ARDS in this patient. (45 marks)
- 3.3. List three (03) other complications of lobar pneumonia. (15 marks)

4. A 70-year-old man develops a constricting chest pain radiating to the left arm. He is a diagnosed patient with ischaemic heart disease. He is given aspirin and taken to the hospital 4 hours after the onset of pain. ECG revealed extensive anterior ST elevations. Thrombolytic agent is administered to him.
- 4.1. What is the mechanism of action of aspirin? (15 marks)
- 4.2. Name two (02) fibrin-specific fibrinolytics that can be used in this patient. (10 marks)
- 4.3. Describe the mechanism of action of fibrin specific fibrinolytics. (20 marks)
- 4.4. Name three (03) other medications that should be considered in the immediate management of this patient. (15 marks)
- 4.5. Over the next hour the patient develops acute heart failure.
- 4.5.1. List two (02) medications that should be prescribed for this patient. (10 marks)
- 4.5.2. Name three (03) adverse effects for each of the two (02) medications listed in 4.5.1. (30 marks)
- 5.
- 5.1. Draw and label the components of a defibrillator. (30 marks)
- 5.2. Outline the mechanism of action of each of the components labelled in 5.1. (40 marks)
- 5.3. List the factors that will ensure a safe and effective delivery of a shock during a ventricular fibrillation (VF) cardiac arrest. (30 marks)

Contd...../4-

6. A 39-year-old woman presents to the Emergency Department with generalised muscle cramps, perioral numbness, and progressive shortness of breath. She had undergone a total thyroidectomy 8 days ago for multinodular goitre.

On examination her airway is patent but she has intermittent stridor with a respiratory rate of 28/minute. Her SpO<sub>2</sub> is 95% on room air. Her pulse is 112 beat/minute and regular and her blood pressure is 142/88 mmHg. Her ECG shows prolonged QTc. Her GCS is 14/15, and she has hyperreflexia. Carpopedal spasms and Chvostek sign are observed.

Her investigation results include the following:

Arterial pH	7.46	
Serum ionized calcium	0.92 mmol/L	(1.1-1.3)
Serum magnesium	0.58 mmol/L	(0.85-1.1)
Serum phosphate	1.9 mmol/L	(0.8-1.5)
Random blood glucose	5.8 mmol/L	(<7.8)
Serum potassium	3.3 mmol/L	(3.5-5.1)

- 6.1. What is the most likely diagnosis? (10 marks)
- 6.2. Outline the regulation of plasma calcium in health. (30 marks)
- 6.3. Using a diagram, outline the basis for the phases of the action potential of ventricular muscle. (20 marks)
- 6.4. Outline the mechanism causing a long QT interval in this patient with hypocalcaemia. (20 marks)
- 6.5. Outline the basis for tetany in a patient with hypocalcaemia. (20 marks)