

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

**MD (ANAESTHESIOLOGY) PART IB (BASIC SCIENCES)**  
**EXAMINATION – MARCH 2021**

**Date:-** 5<sup>th</sup> March 2021

**Time:-** 9.30 a.m. – 12.30 p.m.

**ESSAY PAPER**

**Answer each question in a separate book.**

**Answer two (02) questions from each part, marked A, B and C.**

**Each question carries equal marks.**

**PART A – PHARMACOLOGY**

1.

- 1.1. Outline the mechanisms of drug interactions, giving examples for each group. (30%)
- 1.2. Define the terms
- 1.2.1. Receptor down regulation (10%)
- 1.2.2. Spare receptors (10%)
- 1.2.3. Tachyphylaxis (10%)
- 1.2.4. Tolerance (10%)
- 1.3. Explain briefly how suxamethonium acts on the neuromuscular junction highlighting the action at receptor level. (30%)

2.

- 2.1. Explain the second gas effect of nitrous oxide. (20%)
- 2.2. What are the factors that affect the potency of inhalational anaesthetics? (10%)
- 2.3. What are the factors that increase the speed of onset of an inhalational agent? (20%)
- 2.4. How does structural isomers of isoflurane affect the potency? (10%)
- 2.5. Outline the cardiovascular effects of isoflurane. (20%)
- 2.6. Explain with reasons why sevoflurane is better for inhalational induction than halothane. (20%)

3.

- 3.1. Write the mechanism of action of following drugs
- 3.1.1. Frusemide (15%)
- 3.1.2. Mannitol (15%)
- 3.2. What are the side effects of above drugs? (10%)

Contd..../2-

- 3.3. Write the mode of action and the pharmacological basis of using following drugs in the treatment of angina pectoris
- 3.3.1. Atenolol (20%)
- 3.3.2. Diltiazem (20%)
- 3.4. List the indications for  $\beta$  blockers with relevant examples. (20%)

### PART B – PHYSIOLOGY

- 1.
- 1.1.
- 1.1.1. Outline the basic elements of the respiratory control system. (15%)
- 1.1.2. Briefly describe how the structural organization matches its function. (15%)
- 1.2. Describe the role of sensors on the regulation of respiration with relevant illustration. (40%)
- 1.3. Briefly describe the compensatory mechanisms that will occur at high altitude. (30%)
- 2.
- 2.1.
- 2.1.1. Define autoregulation of blood flow to an organ with an illustration. (15%)
- 2.1.2. How does it change in a person with hypertension? (05%)
- 2.1.3. Explain the theories involved. (20%)
- 2.2. Briefly describe the factors which determine the coronary blood flow. (40%)
- 2.3. Explain myocardial oxygen consumption at rest. (20%)
- 3.
- 3.1. List the types of cells in the stomach indicating their secretions. (20%)
- 3.2. Briefly explain how gastric acid secretion is stimulated in the stomach. (30%)
- 3.3. Describe the mechanism of hydrochloric acid secretion with an illustration to show the ionic movements in the cell. (50%)

**PART C – PHYSICS, CLINICAL MEASUREMENT AND CLINICAL  
CHEMISTRY**

1.
  - 1.1. Define ultrasound and illustrate how the sound wave is propagated. (20%)
  - 1.2. Explain the physical principle of the ultrasound transducer. (40%)
  - 1.3. Outline how different characteristics of the sound wave and the body tissue determine the quality of the ultrasound image. (40%)
  
2.
  - 2.1. Describe the physical principle of Polarographic electrode with a labelled diagram. (40%)
  - 2.2. What are its limitations? (20%)
  - 2.3. Briefly explain how the Fuel cell differs from Polarographic electrode. (20%)
  - 2.4. What are the disadvantages of a Fuel cell? (20%)
  
3. Write short notes on:
  - 3.1. Temperature compensation in modern vaporizers. (30%)
  - 3.2. The skewed distribution of data. (30%)
  - 3.3. Working principle of the surgical diathermy. (40%)