POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (ANAESTHESIOLOGY) PART IB (BASIC SCIENCES) EXAMINATION
MARCH 2018

Date :- 9th March 2018 **Time :-** 1.00 p.m. – 4.00 p.m.

ESSAY PAPER

Answer each part in a separate book, marked A, B, C.
Answer two questions from each part.
Each essay carries equal marks.

PART A – PHARMACOLOGY (BOOK 'A')

1.

1.1.

1.1.1. Define an isomer (10%)

1.1.2. Outline the significance of isomers in relevance to neuromuscular blocking agents. (30%)

1.1.3. Define tautomerism (10%)

1.1.4. Give two (02) examples of intravenous induction agents which show tautomerism indicating its clinical significance. (25%)

1.2.

1.2.1. Define clearance (10%)

1.2.2. List the factors that determine the clearance of a drug in compartment models. (15%)

Contd..../2-

2.

2.1.

2.1.1. Outline the pharmacokinetic properties of propofol. (30%)

2.1.2. State with reasons why propofol is a better induction agent for day case surgery. (10%)

2.2.

2.2.1. Explain the mechanism of action of local anaesthetics. (15%)

2.2.2. Outline the significance of the pKa of local anaesthetics with examples. (20%)

2.3.

2.3.1. Explain the mechanism of action of non steroidal anti inflammatory drugs(NSAIDs). (15%)

2.3.2. List the advantages and limitations of COX -2 specific inhibitors over conventional NSAIDs. (10%)

3. Explain the pharmacological basis of the following

3.1. Tranexamic acid in the management of haemorrhage. (20%)

3.2. Ondansetrone in prevention of post operative nausea vomiting. (20%)

3.3. Magnesium sulphate in the management of bronchial asthma . (20%)

3.4. Noradrenaline in the management of septic shock. (20%)

3.5. Carbimazole in the management of thyrotoxicosis. (20%)

Contd..../3-

PART B – PHYSIOLOGY (BOOK 'B')

1.

1.1. List the factors which affect the mechanical performance of the left ventricle in a healthy person. (10%)

1.2. Explain with illustrations the Frank-Starling law of the heart. (25%)

1.3. Draw the venous return curve and outline the factors which determine the venous return. (35%)

1.4. Describe the cardiovascular changes during Valsalva manoeuvre. (30%)

2.

2.1.

2.1.1. Briefly describe work of breathing. (30%)

2.1.2. Illustrate work of breathing using a pressure volume curve. (20%)

2.1.3. State how the above curve changes in: (10%)

(a) increased respiratory rate

(b) high airway resistance

2.2. State the energy requirement needed to perform work of breathing in: (10%)

2.2.1. normal quiet breathing

2.2.2. exercise

2.3. Outline the mechanisms involved in providing energy for work of breathing during exercise. (30%)

3.

3.1. Name five (05) basic types of sensory receptors with their modalities of sensory stimulation. (15%)

3.2. Explain briefly the pathway of stimulation in a cut injury of the finger to the brain with illustrations. (30%)

3.3. Compare the above with the pain due to acute appendicitis. (30%)

3.4. Briefly explain the physiological pain suppression (analgesia) pathway. (25%)

Contd..../4-

PART C – PHYSICS, CLINICAL MEASUREMENT AND CLINICAL CHEMISTRY (BOOK 'C')

1.

1.1. Outline the physical principle used in magnetic resonance imaging (MRI). (45%)

1.2. State the SI unit of measurement used in MRI and indicate what it measures. (10%)

1.3. Briefly explain three (03) limitations which preclude the use of unspecified equipment and devices in relation to the physical environment in the MRI suite. (30%)

1.4. Indicate how the above problems can be minimised. (15%)

2.

2.1. List the component systems of active scavenging techniques. (20%)

2.2. Describe the structure and functions of each component system. (50%)

2.3. How do you confirm the scavenging system is in working order? (10%)

2.4. Mention other measures that can be taken to reduce operating theatre pollution. (20%)

3.

3.1. Describe how the structure of the ECG electrode and leads relates to their function . (40%)

3.2. List the factors that may interfere with ECG monitoring in the operating theatre. (25%)

3.3. Outline the features incorporated into the ECG monitoring system to minimize the above. (20%)

3.4. State additional measures that can be taken by the operator to improve the accuracy. (15%)