

POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

Master copy

MD (ANAESTHESIOLOGY) PART I B (BASIC SCIENCES)
EXAMINATION
MARCH, 2016

Date : 11 March 2016

Time : 1.00 p.m. – 4.00 p.m.

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 a) What is an agonist? (10%)
b) State the difference between an agonist and a partial agonist. (15%)
- 1.2 Give an account of GABA receptors comparing its subtypes. (25%)
- 1.3 "Benzodiazepines are not true agonists to GABA receptors". Explain this statement. (25%)
- 1.4 Outline the advantages of using benzodiazepines in premedication. (25%)

2

- 2.1 a) Explain the mechanism/s of lowering the blood pressure by angiotensin converting enzyme (ACE) inhibitors. (25%)
b) Outline the benefits of using ACE inhibitors. (25%)
- 2.2 a) Describe the antiarrhythmic action of adenosine. (20%)
b) State precautions that should be considered when administering adenosine. (20%)
c) List the indications for its use with relevant dosage/s. (10%)

- 3.1 What are the **pharmacokinetic features** of an ideal inhalational anaesthetic agent? (25%)
- 3.2 Outline the pharmacological properties of an inhalational agent required for
- a) induction of anaesthesia (15%)
 - b) maintenance of anaesthesia (30%)
- 3.3 Explain with reasons, the effects of **physico-chemical properties** of desflurane in relevance to anaesthesia. (30%)

PART B PHYSIOLOGY (BOOK 'B')

1.
 - 1.1. Illustrate with a diagram, the basic elements of the human respiratory control system. (10 %)
 - 1.2. Explain the role of the following in the control of ventilation. (45%)
 - a) arterial carbon dioxide
 - b) arterial oxygen
 - c) pH of the blood
 - 1.3. Briefly describe with relevant illustrations, the respiratory and cardiovascular changes that occur with strenuous exercise. (45%)
2.
 - 2.1 Define the terms osmosis, osmolarity and osmotic pressure. (15%)
 - 2.2 Briefly explain the importance of maintaining osmotic equilibrium between ECF and ICF compartments. (10%)
 - 2.3 Describe the mechanisms involved in maintaining osmotic equilibrium along the nephron. (75%)
3.
 - 3.1 Briefly describe the structural organization of the autonomic nervous system. (20%)
 - 3.2 Name the main chemical transmitters involved in the autonomic nervous system indicating their location. (20%)
 - 3.3
 - a) Describe the effects of autonomic nervous activity on the cardiovascular system. (30%)
 - b) Describe how the central nervous system controls the above autonomic activity. (30%)

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

1.
 - 1.1 List the types of calibration needed to obtain an optimal signal in a catheter transducer system. Give two examples that determine each. (20%)
 - 1.2 Describe critical and optimal damping (40%)
 - 1.3 Outline the advantages of optimal damping (20%)
 - 1.4 How does the heart rate of a patient influence the selection of the most appropriate catheter transducer system? (20%)
2.
 - 2.1
 - a) Explain the Isobestic point and its relevance in pulse oximetry. (15%)
 - b) Graphically illustrate the variation of absorption of light by oxyhaemoglobin and deoxyhaemoglobin according to the wavelength. (10%)
 - c) Outline the physical principle of pulse oximetry in obtaining a reading of oxygen saturation. (30%)
 - 2.2
 - a) Outline the physical principal of capnography (30%)
 - b) List the sources of error (15%)
3. Write short notes on
 - 3.1 Cryoprobe (35%)
 - 3.2 Pseudo-critical temperature (35%)
 - 3.3 Co-relation coefficient (30%)