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POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (ANAESTHESIOLOGY) PART I B (BASIC SCIENCES) EXAMINATION - MARCH 2017

Date : 10th March 2017 **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.

(a) State with illustrations the mode of action of vecuronium at the neuromuscular junction. (20%)

(b)

(i) Define potency of a neuromuscular blocking drug and relate it to the intubating dose. (10%)

(ii) Explain the above in relevance to the onset of action of rocuronium and vecuronium. (10%)

(c) State the life threatening side effects of suxamethonium. (10%)

1.2

(a) Outline the advantages and limitations of using sugammadex as an agent for reversal of neuromuscular blocking drugs. (30%)

(b) State the pharmacological basis of the drugs used to counteract the effects of organophosphate poisoning. (20%)

2. Explain the following

2.1. Outline the differences of pharmacological properties of ropivacaine and bupivacaine stating its relevance. (35%)

2.2. Compare the effects and limitations of phenylephrine and ephedrine in the management of hypotension following central neuraxial blockade. (30%)

2.3. Mode of action and side effects of metformin and pioglitazone in the management of diabetes mellitus (35%)

3.

3.1. State the changes of drug pharmacokinetics in liver dysfunction (40%)

3.2. Outline how liver dysfunction affects the pharmacokinetics of morphine. (40%)

3.3. State the modifications/precautions taken when morphine is administered in liver disease. (20%)

Contd...../3-

PART B – PHYSIOLOGY (BOOK 'B')

1.

1.1.

(a) Draw and label the action potential of a cardiac muscle cell. (20%)

(b) Describe the ionic changes occurring during various phases of depolarization of a cardiac muscle cell. (30%)

1.2.

(a) Briefly describe the ionic changes that occur during action potential of a pacemaker cell. (20%)

(b) List the differences of action potential in a pacemaker cell when compared with a cardiac muscle cell (10%)

1.3. Explain the effects of autonomic nervous system on pacemaker action potential. (20%)

2. Explain the physiological basis for the following highlighting the role of hormones involved:

2.1. Tetany following total thyroidectomy. (35%)

2.2. Retention of water following a major surgery. (30%)

2.3. Replacement of potassium while treating diabetic ketoacidosis. (35%)

3.

3.1. Enumerate the distribution of iron in the body. (10%)

3.2. Outline the absorption, metabolism and excretion of iron in the body and its regulation. (25%)

3.3. Briefly describe

(a) the structure of haemoglobin (20%)

(b) the interaction of haemoglobin with oxygen, relating it to the shape of the oxygen dissociation curve. (20%)

3.4. Explain the Bohr effect using the oxygen dissociation curve. (25%)

Contd...../4-

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

1.

1.1. List the factors which affect the electrical resistance of a wire. (20%)

1.2. Name the methods available to measure temperature by using change of resistance (05%)

1.3. Illustrate graphically how the resistance changes with temperature in each method. (25%)

1.4. List the advantages and disadvantages of the above methods. (25%)

1.5. Draw and describe the function of the bridge circuit used in measuring resistance. (25%)

2.

2.1. List the different types of flow. (05%)

2.2. Briefly describe the characteristic features of these flows. (40%)

2.3. Describe the physical principles of the Rotameter. (45%)

2.4. Enumerate the possible inaccuracies in a Rotameter. (10%)

3.

3.1. Enumerate the advantages in using a peripheral nerve stimulator for monitoring neuromuscular blockade. (05%)

3.2. What are the essential requirements to elicit peripheral nerve stimulation. (15%)

3.3. Briefly describe the features of an ideal nerve stimulator. (40%)

3.4. Explain the Post tetanic count with a graph. (25%)

3.5. Indicate the uses of post tetanic count. (15%)