



THE COLLEGES OF MEDICINE OF SOUTH AFRICA

Incorporated Association not for gain
Reg No 1955/000003/08

Part I Examination for the Fellowship of the
College of Emergency Medicine of South Africa

25 August 2009

Paper 1 (a) Anatomy (2 hours)

All questions to be answered. Each question is to be answered in a separate book (or books if more than one is required for the answer)

- 1 Using diagrams where appropriate, write short notes on the relevant anatomy of the following emergency situations
- a) Ruptured oesophageal varices. (5)
 - b) Thrombosed haemorrhoids. (5)
 - c) Ruptured popliteal fossa varicose veins. (5)
 - d) Testicular torsion. (5)
 - e) Severe epistaxis. (5)
- [25]
- 2 a) Fractures of the humerus may commonly result from trauma due to falls or traffic accidents.
- i) Draw a picture to illustrate the osteological features of the humerus. (7)
 - ii) Discuss potential nerve injuries due to fractures of the humerus. (3)
- b) The spleen is an important intra-abdominal organ for the emergency physician.
- i) Describe the anatomical position of the spleen and its relation to other organs. (4)
 - ii) Describe the arterial blood supply of the spleen. (4)
 - iii) In what circumstances could the spleen rupture spontaneously? (4)
- c) Describe the boundaries of the anatomical snuff box and give one clinical application of this anatomical area. (3)
- [25]
- 3 The ankle block is a useful technique in the emergency department to provide anaesthesia to the foot. It is accomplished by five injections at the level of the ankle crease.
- a) What are the 2 deep and 3 superficial nerves that are blocked in this procedure? (5)
 - b) What area of the foot does each nerve innervate? (10)

FCEM(SA) Part I

25 August 2009

Paper 1 (a)

(2 hours)

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- c) What are the anatomical landmarks used for the two deep nerve-block injections, and how are they positioned relative to the nerves? (8)
- d) What specific movement of the foot accentuates the appropriate tendon landmarks? (1)
- e) Does this block provide anaesthesia to the ankle joint? (1)
- [25]
- 4 a) With the aid of relevant diagrams, name the five nerves that form each of the following
- i) Cervical plexus. (5)
- ii) Brachial plexus. (5)
- iii) Sacral plexus. (5)
- b) Name 5 muscles that are associated with the larynx, and the main action of each. (10)
- [25]



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Paper 2 (a) Pathology (2 hours)

All questions to be answered. Each question is to be answered in a separate book (or books if more than one is required for the answer)

- 1 In the context of malaria, write short notes on:
- a) the pathological process involved in cerebral malaria (10)
 - b) the pathological differences between the 4 strains of malaria (8)
 - c) the mechanisms whereby immunity might develop in a patient (4)
 - d) the theoretical mechanism of a malaria vaccine. (3)
- [25]
- 2 a) With respect to infective endocarditis, write short notes on:
- a) the macroscopic pathological features (5)
 - b) the microbiology of acute infective endocarditis. (5)
- b) Write short notes on the pathological findings in:
- i) pulmonary embolism (4)
 - ii) pulmonary infarction. (4)
- c) Write short notes on the important pathological features of abdominal aortic aneurysm. (7)
- [25]
- 3 A 37-year-old male patient is brought into the emergency department by ambulance after falling down some stairs. He has an obvious mid-shaft fracture of his left femur.
- a) List the systemic and local complications that can occur as a result of fractures. (10)
 - b) Describe the process of fracture healing. (10)
 - c) What factors influence fracture healing? (5)
- [25]

- 4 a) Write short notes on the pathological process involved in the development of the following conditions
- i) Meconium ileus. (4)
 - ii) Meckel's diverticulum. (4)
 - iii) Hirschsprung's disease. (4)
 - iv) Sjogren's syndrome . (4)
- b) Name the pathological conditions that may result from deficiencies of the following
- i) Antithrombin III deficiency. (3)
 - ii) Protein C deficiency. (2)
 - iii) Leucocyte adhesion deficiency. (2)
 - iv) IgA deficiency. (2)
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Paper 3 (a) Physiology (2 hours)

All questions to be answered. Each question is to be answered in a separate book (or books if more than one is required for the answer)

- 1 Write short notes on the physiological effects on blood pressure in the following situations
- (a) A pregnant patient lying supine. (5)
 - (b) An elderly patient with an implanted pacemaker. (5)
 - (c) A dehydrated child. (5)
 - (d) A patient having taken an overdose of narcotic analgesics. (5)
 - (e) A hyperthermic patient. (5)
- [25]
- 2 a) Describe the normal conduction system of the heart. How will this system be affected by the Wolff-Parkinson-White syndrome? (10)
- b) Write short notes on:
- i) the cellular mechanisms for iodine transport (3)
 - ii) thyroxine formation (3)
 - iii) thyroxine release into blood. (4)
- c) What are the symptoms of cerebellar dysfunction? (5)
- [25]
- 3 A 65-year-old male patient presents to the emergency department with severe breathlessness. He has a history of heart failure for which he is supposed to take treatment but his medication ran out five days ago. His blood pressure is 130/85mmHg, his heart rate 91 beats per minute and his oxygen saturations are 82% on room air. His chest x-ray shows frank pulmonary oedema.
- a) Explain the physiology of systolic heart failure (systolic dysfunction) and diastolic heart failure (diastolic dysfunction). (10)
 - b) This patient has severe systolic dysfunction resulting in pulmonary oedema. He is given a bolus dose of furosemide and then started on intravenous infusions of furosemide, nitrates and dobutamine. Explain the physiological effects of these drugs and how they improve cardiac function. (9)
 - c) The patient is also treated with non-invasive ventilation in continuous positive airway pressure mode. How does this improve oxygenation and cardiac function? (6)
- [25]

PTO/Page 2 Question 4

- 4 a) Describe the physiology of swallowing under the following headings
- a) Oral stage. (2)
 - b) Pharyngeal stage. (3)
 - c) Oesophageal stage. (3)
- b) Discuss the regulation of gastric acid secretion under the following headings
- a) Cephalic phase. (2)
 - b) Gastric phase. (3)
 - c) Intestinal phase. (3)
- d) Briefly describe the functions of the following
- i) Intrinsic factor. (3)
 - ii) Prostaglandin E2. (3)
 - iii) Somatostatin. (3)
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Paper 4 (a) Pharmacology (2 hours)

All questions to be answered. Each question is to be answered in a separate book (or books if more than one is required for the answer)

- 1 In the pharmacological management of the acute psychiatric patient, write short notes on:
- a) the management of the acutely suicidal adult (7)
 - b) sedation and stabilisation of a patient who has taken an overdose of alcohol and narcotic analgesics (7)
 - c) catatonia (5)
 - d) a bipolar individual threatening violence in the emergency department. (6)
- [25]
- 2 a) Discuss the use of intravenous digoxin in the emergency department under the following headings
- i) Indications. (2)
 - ii) Cellular effects. (3)
 - iii) Interactions with potassium and calcium. (3)
 - iv) Features of toxicity. (3)
- b) Compare phenytoin with sodium valproate under the following headings:
- a) Mechanism of action. (4)
 - b) Clinical use. (4)
 - c) Side effects. (4)
 - d) Rate of administration. (2)
- [25]
- 3 A 4-year-old female patient presents to the emergency department with a deep laceration on her scalp that requires repair. You administer procedural sedation under controlled conditions with intramuscular ketamine. You elect to administer lignocaine to provide local anaesthesia.

PTO/Page 2 Question 3 (a)

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- a) The onset of action of a local anaesthetic is related to the pK_a of the agent. Explain this, as well as how the addition of the following substances can affect the onset of action
- i) Sodium bicarbonate.
 - ii) Adrenaline. (5)
- b) Explain the mechanism of action of lignocaine on nerve conduction. (5)
- c) What is the toxic dose of lignocaine, and what are the toxic effects of lignocaine in overdose? (10)
- d) EMLA (Eutectic Mixture of Local Anaesthetics) is a commonly used product. Describe what it is, and what is meant by "eutectic". (5)
- [25]
- 4 a) You are attending to an intubated, ventilated patient who has been given a non-depolarising muscle relaxant. Describe the interactions that may occur in the presence of the following
- a) Tetracyclines. (2)
 - b) Calcium channel blockers. (2)
 - c) Hypothermia. (2)
 - d) Hypermagnesaemia. (2)
- b) A male patient presents to your emergency department with gynaecomastia. Name 4 drugs used in emergency medicine that could induce such a phenomenon. (2)
- c) Write short notes on the recognition and initial emergency management of the following electrolyte abnormalities
- i) Hypermagnesaemia. (5)
 - ii) Hypophosphataemia. (5)
 - iii) Hybernatraemia. (5)
- [25]