



FCEM(SA) Part I

## 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

23 March 2010

Paper I(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)*

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- 1 a) Describe, with the aid of a diagram, the fibrous skeleton of the heart. (10)  
b) An accurate assessment of cervical spinal function is essential in the emergency department and requires a good knowledge of the anatomy of the cervical spinal nerve roots  
i) Describe the area of sensory innervation of the nerve roots of C5 to T1. (10)  
ii) Describe the best muscles to test to evaluate the motor function of each of the nerve roots of C5 to T1. (5)  
[25]
- 2 With the aid of diagrams, describe the relevant anatomy and neurovascular structures that might be damaged for each of the following joint dislocations  
a) Elbow. (10)  
b) Knee. (10)  
c) Proximal interphalangeal joint. (5)  
[25]
- 3 a) The carotid sheath contains several clinically important structures. Name them and describe their positions in the sheath. (7)  
b) Write short notes on the blood supply of the thyroid gland. (7)  
c) A patient was stabbed in his face in the area of his parotid gland. Name the areas in the face supplied by the facial nerve to be tested for intact function of the nerve. (5)  
d) A patient was stabbed in the neck resulting in paralysis of the ipsilateral part of his diaphragm.  
i) Name the nerve that was injured. (1)  
ii) Briefly describe the pathway of the nerve in the neck. (5)  
[25]

- 4 a) An athlete presents to your emergency department complaining of backache. Name the principal muscles producing movement of the thoracic and lumbar intervertebral joints, under the following headings
- i) Flexion. (2)
  - ii) Extension. (2)
  - iii) Lateral bending. (4)
  - iv) Rotation. (4)
- b) A patient arrives at your department complaining of an inguinal hernia. Tabulate the characteristic differences between a direct (acquired) and indirect (congenital) hernia, under the following headings
- i) Predisposing factors. (4)
  - ii) Frequency. (1)
  - iii) Exit from abdominal cavity. (4)
  - iv) Course. (2)
  - v) Exit from anterior abdominal wall. (2)
- [25]



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Paper II(a)

Pathology

(2 hours)

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- 1 A 25-year-old female patient presents to the emergency department after having spilt some hot oil onto her left forearm. There is a 30mm x 30mm full thickness burn to her volar forearm
- a) From a pathophysiological perspective this burn could be considered to consist of a central area of necrosis surrounded by an area of stasis which, in turn, is surrounded by an area of hyperaemia. Describe the pathological processes occurring in each of these zones. (15)
  - b) Name 5 chemical mediators of inflammation. (5)
  - c) Describe the process of healing by granulation, and the factors that might delay wound healing. (5)
- [25]
- 2 Write short notes on the following topics relating to acute life threatening sepsis
- a) Gas gangrene. (5)
  - b) Tetanus. (5)
  - c) Nosocomial fungal infections. (5)
  - d) Methicillin resistant Staphylococcus Aureus. (5)
  - e) Prevention of nosocomial infections. (5)
- [25]
- 3
- a) What are the major causes of acute pancreatitis? (6)
  - b) What are the basic histological changes that occur in acute pancreatitis? (4)
  - c) Tabulate the blood tests you would request for a patient with acute pancreatitis and the findings that would predict poor prognosis (Ranson's criteria) (15)
- [25]

- 4 a) A patient arrives at your emergency department with bilaterally swollen legs. List the causes of lymphoedema using the following headings
- i) Primary lymphoedema. (3)
  - ii) Secondary lymphoedema. (6)
- b) A patient is noted to be jaundiced. In the form of a table, explain how you would determine whether the cause was pre-hepatic, hepatic or post-hepatic. (9)
- c) Name the syndromes of multiple endocrine neoplasia, giving examples of each. (7)
- [25]



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Paper III(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)*

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- 1 a) The law of Laplace defines the relationship between distending pressure and wall tension in a hollow, fluid-filled structure
- i) Explain this physical principle. (5)
  - ii) Describe how the law of Laplace applies to a dilated cardiomyopathy. (5)
  - iii) Describe how the law of Laplace applies to a patient with acute lung injury. (5)
- b) Ketone bodies can be formed as a result of impaired glucose metabolism
- i) Name the three types of ketone bodies. (3)
  - ii) Describe under what conditions and by what mechanisms these substances accumulate to result in ketosis. (7)
- [25]
- 2 In the context of vestibular function – write short notes on
- a) The physiological cause of motion sickness. (7)
  - b) Spatial disorientation in an aviation environment. (6)
  - c) Nystagmus and its association with central nervous system lesions. (6)
  - d) Vertigo. (6)
- [25]
- 3 a) A patient is found by paramedics and brought to your emergency department. He is unconscious and hypoventilating. With the aid of a table, illustrate the effects of various factors that may effect the respiratory centre. (8)
- b) Describe Chvostek's sign. (3)
  - c) A patient has had a thyroidectomy but the parathyroids were also accidentally removed. Explain why this patient may develop hypocalcaemia and hyperphosphataemia. (8)
  - d) Write short notes how the body acclimatizes to the hypoxia of high altitude. (6)
- [25]

- 4 a) With respect to pulmonary capillary wedge pressures (PCWP)
- i) How is PCWP determined? (2)
  - ii) What is the reason for measuring the PCWP, and what are the normal values? (4)
  - iii) What factors can lead to erroneous measurements? (3)
- b) Briefly explain the following physiological terms
- i) Water diuresis. (3)
  - ii) Water intoxication. (3)
  - iii) Osmotic diuresis. (5)
  - iv) Free water clearance. (5)
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Paper IV(a)

Pharmacology

(2 hours)

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- 1 Diuretics are commonly used in the emergency department. There are 5 classes of diuretics
  - a) Describe the mechanism of action of the drugs in each class of diuretic. (10)
  - b) Give an example of a drug in each class as well as a potential clinical application of that drug. (5)
  - c) Discuss the emergency use of sodium nitroprusside in terms of indications, contra-indications, side-effects and dosage. (10)[25]
  
- 2 Regarding the use of muscle relaxants in emergencies, write short notes on both depolarising and non-depolarising muscle relaxants, using the following sub-headings
  - a) Mechanism of action. (5)
  - b) Indications. (5)
  - c) Cardiovascular effects. (5)
  - d) Features of toxicity. (5)
  - e) Dose and reversal agent. (5)[25]
  
- 3
  - a) Write short notes on the indications and contra-indications of ketamine in the emergency department. (10)
  - b) What is the mechanism of cocaine toxicity? (5)
  - c) Why can beta-blockers not be used in the management of cocaine induced hypertension? (2)
  - d) What are the effects of digitalis on the heart? (2)
  - e) Which electrolyte disturbances commonly increase digitalis toxicity? (6)[25]

- 4 a) Discuss the drugs that can be used in the management of a thyrotoxic crisis. Include the mechanism of action, sequence of administration, and specific precautions. (9)
- b) Dopamine antagonists are commonly used in the treatment of nausea and vomiting. Compare and contrast the relative potency of chlorpromazine with prochlorperazine with regard to their sedative, anticholinergic and extrapyramidal effects. (6)
- c) With regard to the use of anticholinergics, using a scale of “o” to “+++”, compare the relative effects of the following three anticholinergics; hyoscine, atropine and glycopyrrolate
- i) Anti-emetic potency.
  - ii) Sedation/amnesia.
  - iii) Anti-sialagogue effect.
  - iv) Mydriasis.
  - v) Placental transfer.
  - vi) Bronchodilation.
  - vii) Effect on heart rate. (10)

[25]