



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

24 August 2010

Combined Basic Sciences

Anatomy, Pathology, Physiology and Pharmacology

Paper I

(3 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 a) A patient presents with a swollen limb. Write short notes on the anatomy of the venous drainage of the lower limb below the knee. (7)
b) Write short notes on how the calf muscles and venous valvular system maintains successful venous circulation in the lower limb. (5)
c) Describe the pathological processes responsible for the formation of venous thrombus. (7)
d) Compare and contrast the pharmacology of enoxaparin in comparison to unfractionated heparin with respect to dose, side-effects, half-life and monitoring. (6)
[25]

- 2 A 55-year-old patient presents to your emergency department in acute pulmonary oedema.
a) Discuss the pathophysiology of non-cardiogenic pulmonary oedema (7)
b) Write short notes on 2 of the drugs you would use to treat acute cardiogenic pulmonary oedema. In your answer explain how the drugs work for this condition. (8)
c) Write short notes on the regulation of alveolar capillary blood flow. (5)
d) With the aid of a diagram, write short notes on the structural unit of the lung (the bronchopulmonary segment). (5)
[25]

- 3 A 55-year-old male is involved in a motor vehicle collision. His injuries include a large pulmonary contusion, a splenic laceration, a right hip dislocation and a left femur fracture.
a) With reference to the equation explaining delivery of oxygen to the tissues, discuss why this patient will have reduced tissue oxygenation. (6)
b) With the aid of a diagram, explain the blood supply to the head and neck of the femur, explaining why this patient may develop avascular necrosis from his hip dislocation. (6)
c) Discuss briefly the formation of a temporary haemostatic plug. (4)
d) Regarding colloids
i) Classify the available types of colloids. (2)
ii) For each type, explain their formulation and mechanism of action. (4)
iii) What side effects may colloids have? (3)
[25]

- 4 A mother brings her 6-month-old child into the emergency department with a history of severe vomiting and diarrhoea for two days.
- a) Describe the pathophysiological processes associated with diarrhoea caused by bacterial enterocolitis. (12)
 - b) Discuss the pharmacology of ondansetron as it might be used in this clinical scenario. (5)
 - c) Give examples of the different types of anti-diarrhoeal medications that are safe to use in infants. (3)
 - d) You elect to insert an intraosseus line into the proximal tibia. Describe the surface landmarks for this technique, as well as each tissue layer that will need to be penetrated to position the needle correctly. (5)
- [25]



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Paper II

(3 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
 - a) Describe the surface anatomy of the liver and gallbladder. (6)
 - b) Discuss the physiology of bilirubin metabolism. (8)
 - c) List the pathological consequences of gallstones. (7)
 - d) Write short notes on the effects of opioids on the biliary system. (4)[25]

- 2 A 55-year-old patient presents to your emergency department with a repeated attack of pancreatitis
 - a) Discuss the pathophysiology of acute pancreatitis and relate it to the pancreatic enzyme levels that you would observe in this patient. (8)
 - b) Write short notes on the homeostatic control of insulin synthesis and release. (6)
 - c) As part of this patient's treatment, you give him insulin. What drug interactions do you need to be aware of when prescribing insulin? (6)
 - d) Describe the anatomical position of the pancreas and explain why it is prone to injury in blunt abdominal trauma. (5)[25]

- 3 In the context of an adult patient who has been stabbed in the precordial area of the left chest, write short notes on
 - a) The anatomical structures incised in order to do an emergency thoracotomy. (7)
 - b) The physiological development of shock should the patient develop cardiac tamponade. (6)
 - c) Analgesia for a stable ambulatory patient with an intercostal drain in situ. (6)
 - d) The process whereby this patient might develop intra-cardiac thrombi. (6)[25]

- 4 A 75-year-old male patient presents to the emergency department with a left sided hemiplegia. His symptoms started 60 minutes prior to presentation. His blood pressure is persistently 170/116mmHg.
 - a) Draw a diagram of the circle of Willis. (6)
 - b) What are the predominant neurological features that would be associated with an occlusion of the anterior, middle and posterior cerebral artery? (6)
 - c) As he is a candidate for fibrinolysis, you elect to treat his hypertension with labetalol. Briefly discuss the pharmacology of labetalol using the following headings: mechanism of action; dosage and administration; metabolism and excretion. (6)
 - d) Discuss the pathophysiology of cerebrovascular accidents associated with the rupture of a cerebral artery (berry) aneurysm. (7)[25]