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POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

SELECTION EXAMINATION FOR MD (EMERGENCY MEDICINE)
OCTOBER 2023

Date:- 23rd October 2023

Time:- 9.00 a.m. – 12.00 noon

ESSAY PAPER

Answer **all six (06)** questions.
Answer each question in a separate book.

1.
 - 1.1. A 40-year-old man is admitted to the surgical casualty with pain at the right hip and inability to move the limb following a road traffic accident. On examination the limb is medially rotated, flexed, and adducted at the hip joint. There is evidence of a nerve injury and the clinical diagnosis of right hip dislocation with an injury to a nerve is made. X-ray of the hip shows posterior dislocation of the hip and fracture of the posterior lip of the acetabula fossa.
 - 1.1.1. State the muscles responsible for deformities observed. (10 marks)
 - 1.1.2. What is the nerve injured? (10 marks)
 - 1.1.3. Name the muscles that are paralyzed due to the injured nerve you stated in 1.1.2. (20 marks)
 - 1.1.4. State
 - (a) one (01) deformity (05 marks)
 - (b) area of sensory loss (05 marks)
 - (c) affected joints and their movements (10 marks)occurs due to complete injury to the nerve stated in 1.1.2 above.
 - 1.2. A 60-year-old man is admitted to a surgical casualty following a stab to the left hypochondrium. He complains of abdominal pain which radiate to the left shoulder when supine. Ultrasound examination of the abdomen shows ruptured spleen with hemoperitoneum. He is treated with splenectomy.
 - 1.2.1. What is the anatomical basis for shoulder pain in this patient? (10 marks)
 - 1.2.2. How will you surface mark the spleen? (10 marks)
 - 1.2.3. Name the blood vessels that need to ligate during splenectomy. (10 marks)
 - 1.2.4. Name four (04) visceral organs related to the spleen. (10 marks)

Contd...../2-

2.

2.1. A 10-year-old child with a history of repeated respiratory tract infections was brought to the hospital. On examination she was found to have a wide-fixed second heart sound and an ejection systolic murmur best heard in the pulmonary area. The attending doctor explained to the parents that he suspects that their daughter is likely to have a congenital cardiac defect and she probably will have to undergo a cardiac surgery after a cardiology referral. He further explained that if she does not undergo this surgery she may develop cyanosis in the future.

2.1.1. What is the most likely condition she is suffering from? (05 marks)

2.1.2. Explain the physiological basis of the following signs in her.

(a) Wide-fixed second heart sound. (15 marks)

(b) Ejection systolic murmur in the pulmonary area. (15 marks)

2.1.3. Explain the physiological basis for the possible development of cyanosis if she is left untreated. (15 marks)

2.2. A 40-year-old man presented with severe epigastric pain and loose motions. After investigations he was diagnosed as having peptic ulcer disease due to Zollinger-Ellison syndrome. His loose motions was diagnosed as steatorrhoea.

2.2.1. Briefly explain the regulation of acid secretion by the stomach. (20 marks)

2.2.2. Give physiological explanations for the development of following in Zollinger-Ellison syndrome.

(a) Peptic ulcers (10 marks)

(b) Steatorrhoea (20 marks)

3.

3.1. Explain the pharmacological basis for the following treatment recommendations in the given conditions.

3.1.1. Acute severe asthma - Salbutamol nebulization. (25 marks)

3.1.2. Organophosphate poisoning - Atropine. (25 marks)

3.2. Name three (03) classes of medicines indicated in the treatment of acute heart failure (AHF) giving their mode of action in AHF.

3.3. Explain the pharmacokinetic basis of the following:

3.3.1. Selecting sublingual route to give glyceryl trinitrate in angina. (10 marks)

3.3.2. Giving a loading dose first when giving phenytoin for status epilepticus. (10 marks)

- 4.
- 4.1. Outline the physical principles of capnography. (40 marks)
- 4.2. Draw and label a normal capnography trace. (20 marks)
- 4.3. Illustrate (using diagrams) eight (08) different capnography patterns with diagnostic information which are useful in clinical practice. (40 marks)

5.

- 5.1. A 50-year-old obese man who is also a smoker presented with severe retrosternal chest pain of one hour duration. He gives a history of being on medication for diabetes, hypertension and angina pectoris for the past three years. Electrocardiogram (ECG) and serological tests were done at the emergency treatment unit to confirm the clinical diagnosis of a myocardial infarction.

A coronary angiogram showed that he had a block in the left anterior descending artery.

- 5.1.1. Describe the pathological changes that you would expect to see in the coronary vessels of this patient, outlining the pathogenesis of these changes. (35 marks)
- 5.1.2. Outline the early complications of myocardial infarction. (15 marks)
- 5.2. A 40-year-old man was admitted with multiple fractures and abdominal injuries following a road traffic accident. On admission he was pale with a pulse rate of 110 beats/minute and a blood pressure of 60/40 mmHg. His abdomen was distended and tender. His haemoglobin was 5g/dL and ultrasound scan of abdomen revealed free fluid in the abdomen. He was taken to theatre for exploratory laparotomy and management of fractures. He was found to have a liver laceration which was repaired. He required 4 units of blood transfusion.

In the emergency department he was catheterised and noted to have minimal urine output. During surgery the urine output remained low despite volume resuscitation. His serum creatinine was elevated.
 - 5.2.1. Name the pathological change that is expected in this patient's kidneys. (10 marks)
 - 5.2.2. Explain the pathogenesis of the change mentioned in 5.2.1. in this patient. (25 marks)
- 5.3. List three (03) other renal pathological conditions that can result in acute kidney injury. (15 marks)

Contd...../4-

6.

- 6.1. An 80-year-old man was admitted to hospital in an acute confusional state. No history was available. His physical examination showed signs of a right sided pleural effusion. His hydration was normal.

The following basic investigations were carried out:

Serum

Sodium	114 mmol/L	(135 - 145)
Potassium	3.6 mmol/L	(3.5 - 4.5)
Urea	8.1 mg/dL	(5 - 20)
Creatinine	0.9 mg/dL	(0.7 - 1.3)
Glucose	82 mg/dL	
Total protein	48 g/L	
Osmolality	236 mOsm/kg	(285 - 295)

Urine

Osmolality	350 mOsm/kg
Sodium	50 mmol/L

- 6.1.1. Write the most likely electrolyte disorder seen in this patient. (10 marks)
- 6.1.2. Indicate four (04) clinical features that supported your diagnosis in this patient. (20 marks)
- 6.1.3. Mention two (02) possible underlying pathological causes which could have led to the electrolyte disorder in this patient. (20 marks)
- 6.2. A 21-year-old man was admitted to hospital after multiple injuries following a road traffic accident. He was given IV fluids and blood, and surgery was done which included a laparotomy.

He was hypotensive and had fever post operative day 1. His investigations on post operative day 1 is given.

Serum

Sodium	130 mmol/L	(135 -145)
Potassium	5.9 mmol/L	(3.5 - 4.5)
Creatinine	2.4 mg/dL	(0.7 - 1.3)
Urea	59 mg/dL	(7 - 20)
Albumin	2.8 g/L	(3.4 - 5.4)
Calcium	6.5 mg/dL	(8.6 - 10.3)
Phosphate	8.8 mg/dL	(2.5 - 4.5)

Contd...../5-

Arterial blood gas

pH	7.29	
PCO ₂	26 mmHg	(35 - 45)
HCO ₃ ⁻	16 mmol/L	(22 - 26)

- 6.2.1. Mention the most likely diagnosis. (10 marks)
- 6.2.2. Write one (01) mechanism for each change seen in potassium, albumin, calcium and phosphate in this patient. (20 marks)
- 6.2.3. What is the acid base disorder seen in this patient? (10 marks)
- 6.2.4. Write two (02) principles applied during management of this patient. (10 marks)