

**POSTGRADUATE INSTITUTE OF MEDICINE**  
**UNIVERSITY OF COLOMBO**

**SELECTION EXAMINATION FOR MD (EMERGENCY MEDICINE)**  
**SEPTEMBER /DECEMBER 2020**

**Date:- 27<sup>th</sup> Nov 2020**

**Time:- 10.00 a.m. – 1.00 p.m.**

**ESSAY PAPER**

**Answer all six (06) questions.**

**Answer each question in a separate book.**

1. A 45-year-old man was brought to the surgical casualty following a motorcycle accident. He had severe pain at the right hip. On examination it was noted that he could not move the limb at the hip. The lower limb was medially rotated, adducted and shortened. A plain radiograph of the antero-posterior view of the pelvis revealed posterior dislocation of the hip.

1.1.

1.1.1. Explain the anatomical basis of the deformities stated above. (25 marks)

1.1.2. What is the nerve that is most liable to be injured? (05 marks)

1.1.3. Describe the deformities, dysfunctions and area of sensory loss that could result due to the nerve injury stated in 1.1.2. (30 marks)

1.2

1.2 .1. Describe the surface projections of the spleen. (15 marks)

1.2.2. Describe the peritoneal ligaments related to the spleen. (25 marks)

2. A 35-year-old woman with a previous history of rheumatic valvular disease for 10 years is admitted to the hospital with an episode of faintness and severe constricting chest pain associated with sweating. This occurred while she was climbing to the 3<sup>rd</sup> floor of a building from ground level, one hour ago.

On examination, her pulse rate is 120/ minute, regular and low volume. She has a blood pressure of 100/60 mmHg. Auscultation reveals a harsh ejection systolic murmur in the aortic area.

2.1. Explain the origin and the mechanism for the ejection systolic murmur. (20 marks)

2.2. Describe pathophysiological mechanisms for the occurrence of her chest pain. (80 marks)

3.

- 3.1. Briefly describe the basic characteristics (physical features) of a sound wave with the aid of a clearly labeled diagram. (20 marks)
- 3.2. Briefly describe the scientific basis of the generation of ultrasound waves. (20 marks)
- 3.3. Explain the mechanism of developing an ultrasound image with the aid of a diagram. (30 marks)
- 3.4. How do you improve the clarity of the ultrasound image with the use of different probes? (20 marks)
- 3.5. Outline the features and uses of M mode Scan. (10 marks)

4.

4.1.

- 4.1.1. Explain the terms pharmacological antagonism and physiological antagonism. Give one (01) example with indication for each type of antagonism. (15 marks)
- 4.1.2. Describe the pharmacological basis of using the antagonists you have stated above in the given indications. (30 marks)

4.2. Discuss the pharmacological basis for the following treatment strategies

- 4.2.1. Aspirin for acute myocardial infarction. (20 marks)
- 4.2.2. Salbutamol for acute asthma (15 marks)
- 4.2.3. Sodium bicarbonate for aspirin poisoning (20 marks)

5.

- 5.1. List three (03) classes of biological warfare agents giving one example for each. (10 marks)
- 5.2. State five (05) characteristics that would make an organism an ideal biological warfare agent. (25 marks)
- 5.3. List five (05) epidemiological clues to suggest that the organism involved in an outbreak, is a potential biological warfare agent. (25 marks)
- 5.4. Some claimed that COVID-19 outbreak was a biological warfare attack. Critically analyse this statement giving two (02) reasons for and two (02) reasons against this claim. (40 marks)

6. The biochemical profile of a 54-year-old man presenting with severe vomiting for 24 hours is given below. He is a patient with diabetes mellitus reported to be poorly adherent to treatment.

Plasma	Day 1	Day 2	2 weeks	Reference range
Random plasma glucose (mg/dL)	367	145	125	
Serum sodium (mmol/L)	135	135	134	135-145
Serum potassium (mmol/L)	5.5	4.5	3.8	3.5-5.1
Serum chloride (mmol/L)	90	101	102	97-107
Serum urea (mg/dL)	41	16	12	7-20
Serum creatinine (mg/dL)	2.91	1.75	1.59	0.84-1.21
eGFR (mL/min/1.73m <sup>2</sup> )	23	43	48	
Serum AST (IU/L)	56	41	38	5-40
Serum ALT (IU/L)	41	39	39	7-56
Urine glucose	Positive	Negative	Negative	
Urine ketones	Positive	Negative	Negative	
Urine protein	Positive	Positive	Positive	
24-hour urine protein (g/day)			3.8	

- 6.1. Explain with reasons for the differences between the urea and creatinine values on day 1 and day 2 and comment on the eGFR on both days. (15 marks)
- 6.2. Describe the pathophysiological basis for the normalization of serum electrolytes within a day. (15 marks)
- 6.3. Following discharge, he was reviewed after 2 weeks in the diabetes clinic and his reports are given in the table above.
- 6.3.1. Explain the pathogenesis of proteinuria in this patient. (05 marks)
- 6.3.2. Describe the microscopic changes you would expect to see in a renal biopsy performed on this patient. (25 marks)
- 6.4. His lipid profile shows high total cholesterol and triglycerides. Describe macroscopy and microscopy of vascular changes expected to be seen in this patient. (30 marks)
- 6.5. State the best biochemical parameter to monitor his glycaemic control and explain its biochemical basis. (10 marks)