

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

**POSTGRADUATE DIPLOMA IN MEDICAL PHYSIOLOGY**  
**EXAMINATION – OCTOBER 2015**

**STRUCTURED ESSAY QUESTION (SEQ) PAPER**

Date :- 10<sup>th</sup> October 2015

Time :- 9.30 a.m. – 10.30 a.m.

**RENAL PHYSIOLOGY**

Answer all three (03) questions.

Answer each question in a separate book.

1.
  - 1.1. Outline the role of the following in the concentration of urine
    - 1.1.1. Antidiuretic hormone (40%)
    - 1.1.2. Vasa recta (30%)
  - 1.2. Explain the mechanism of diuresis following administration of mannitol. (30%)
2. Discuss the following statements :
  - 2.1. Creatinine clearance is used to assess renal function. (40%)
  - 2.2. Anaemia seen in chronic kidney disease is usually of a mixed type. (30%)
  - 2.3. Glycosuria is observed when plasma glucose is more than 180 mg/dL. (30%)
3. The following are arterial blood gas values of a patient treated in the intensive care unit. His serum creatinine was 4.2 mg/dL (Normal range 0.6 – 1.4 mg/dL)

pH	7.29
PCO <sub>2</sub>	30 mmHg
Plasma [HCO <sub>3</sub> <sup>-</sup> ]	16 mmol/L

  - 3.1. State the acid-base disorder in this patient, giving reasons for your answer. (30%)
  - 3.2. Explain the physiological basis for the HCO<sub>3</sub><sup>-</sup> value in this patient. (30%)
  - 3.3. Outline the normal handling of H<sup>+</sup> by the kidney. (40%)

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Date :- 10<sup>th</sup> October 2015

Time :- 12.00 noon – 1.00 p.m.

**GASTROINTESTINAL PHYSIOLOGY**

Answer all three (03) questions.

Answer each question in a separate book.

1. A young female experiences burning epigastric pain. Investigations reveal antral gastritis. She was treated with a proton pump inhibitor and her symptoms resolved.
  - 1.1. Using a clearly labelled diagram, outline the mechanism of gastric acid secretion. (40%)
  - 1.2. Describe the regulation of acid secretion in the stomach. (40%)
  - 1.3. Explain the role of proton pump inhibitors in relieving her symptoms. (20%)
  
2. A week-old baby with severe diarrhoea is diagnosed to have congenital lactose intolerance.
  - 2.1. Outline how lactose is digested in the small intestine. (30%)
  - 2.2. Explain the mechanisms of absorption of the end products of lactose digestion. (40%)
  - 2.3. Outline the basis for diarrhoea in this baby. (30%)
  
3.
  - 3.1. Compare the mechanisms of swallowing and vomiting. (50%)
  - 3.2. Explain the basis for steatorrhoea in a patient following resection of the terminal ileum. (50%)

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**Date :-** 10<sup>th</sup> October 2015

**Time :-** 3.00 p.m. – 4.00 p.m.

**ENDOCRINE PHYSIOLOGY**

Answer all three (03) questions.

Answer each question in a separate book.

1.
  - 1.1. State the bone disease seen in chronic vitamin D deficiency in adults. (10%)
  - 1.2. Describe the functions of vitamin D in relation to calcium homeostasis. (50%)
  - 1.3. Explain the regulation of parathyroid hormone secretion. (40%)
  
2.
  - 2.1. List five (05) stimuli that increase the secretion of growth hormone. (10%)
  - 2.2. Briefly describe the direct actions of growth hormone. (60%)
  - 2.3. Outline the feedback regulation of growth hormone with the aid of a flow diagram. (30%)
  
3. Explain the pathophysiological basis of the following.
  - 3.1. Kussmaul breathing in diabetic ketoacidosis. (35%)
  - 3.2. Abdominal striae in Cushing syndrome. (35%)
  - 3.3. Absence of oedema in Conn syndrome. (30%)

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**Date :- 11<sup>th</sup> October 2015**

**Time :- 11.00 a.m. – 12.00 noon**

**REPRODUCTIVE PHYSIOLOGY**

Answer all three (03) questions.  
Answer each question in a separate book.

1. State the physiological basis of the following.
  - 1.1. Urine hCG level is used to diagnose pregnancy in the first trimester. (30%)
  - 1.2. Diastolic blood pressure of 85 mmHg is considered high during pregnancy. (40%)
  - 1.3. The risk of deep vein thrombosis in leg veins increases during pregnancy. (30%)
  
2.
  - 2.1. List four (04) factors essential for spermatogenesis. (20%)
  - 2.2. Describe the role of two (02) factors mentioned in 2.1. (40%)
  - 2.3. Explain the hypothalamo-pituitary-testicular axis and its regulation. (40%)

Contd..../2-

3. A 20-year-old woman is investigated for absent menstruation. She is otherwise healthy. She has minimal pubic and axillary hair.

Her investigations are as follows:

Serum testosterone	Elevated
Oestrogen	Low
Testosterone	High (above adult male levels)
Dihydrotestosterone	High (above adult male levels)
Karyotype	46,XY
SRY	present

- 3.1. State the normal chromosomal make up of a male and female. (10%)
- 3.2. Outline the development of the normal male and female gonads. (30%)
- 3.3. Outline the role of testosterone and Mullerian inhibiting hormone in the development of the male internal and external genitalia. (40%)
- 3.4. State the diagnosis in this patient, giving reasons. (20%)