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POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

POSTGRADUATE DIPLOMA IN MEDICAL PHYSIOLOGY
SECTION II EXAMINATION – JUNE 2017

STRUCTURED ESSAY QUESTION (SEQ) PAPER

Date: 17th June 2017 **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 Explain the role of the counter-current multiplier mechanism in the loop of Henle in the concentration of urine. (50%)

1.2 Explain the physiological basis of the diuretic action of the following:
1.2.1 Spironolactone (25%)
1.2.2 Carbonic anhydrase inhibitors (25%)

2.

2.1 Explain the action of the following in the regulation of sodium balance by the kidney.
2.1.1 Tubulo-glomerular feedback (30%)
2.1.2 Atrial natriuretic peptide (30%)

2.2 Explain the basis for using para aminohippuric acid (PAH) clearance in the assessment of renal plasma flow. (40%)

Contd..../2-

3. A 40-year-old farmer from the north central province presented with reduced passage of urine. On examination his blood pressure was 160/ 100 mmHg.

   Investigation results were as follows:

   - Haemoglobin concentration - 10 g/dL
   - Serum creatinine - 3 mg/dL (0.2 – 0.8 mg/dL)
   - Serum calcium - 6 mg/dL (8.5 – 10.5 mg /dL)

   He was diagnosed as having chronic kidney disease.

   Explain the pathophysiological basis for the following in this patient:

3.1	Blood pressure	(40%)
3.2	Haemoglobin concentration	(20%)
3.3	Serum creatinine concentration	(20%)
3.4	Serum calcium concentration	(20%)

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STRUCTURED ESSAY QUESTION (SEQ) PAPER

Date: 17th June 2017 **Time:** 12.00 noon – 1.00 p.m.

GASTROINTESTINAL PHYSIOLOGY

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

1. A 40-year-old man experiences heartburn after meals. He is diagnosed to have gastro-oesophageal reflux disease.

   1.1 Describe the physiological mechanisms underlying the oesophageal phase of swallowing. (50%)
   1.2 Outline how reduced oesophageal motility aggravates gastro-oesophageal reflux disease. (20%)
   1.3 Briefly describe three (03) anti-reflux mechanisms. (30%)

2. A 65-year-old patient presents with anorexia, recent loss of weight, yellow discoloration of the eyes and fatty stools. Ultrasound scan of abdomen reveals a mass in the ampulla of Vater.

   2.1 Explain the basis for the yellow discoloration of the eyes. (15%)
   2.2 Outline the mechanisms of digestion and absorption of lipids in the small intestine in a healthy individual. (60%)
   2.3 Explain the basis of fatty stools in this person. (25%)

Contd.../2-

3.

3.1 Outline the defecation reflex. (60%)

3.2 Compare and contrast voluntary defecation with involuntary defecation in healthy individuals. (20%)

3.3 List four (04) abnormalities in defecation in a patient 6 months after a complete spinal cord transection at the 10^{th} thoracic vertebral level. (20%)

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STRUCTURED ESSAY QUESTION (SEQ) PAPER

Date: 17th June 2017 **Time:** 3.00 p.m. – 4.00 p.m.

ENDOCRINE PHYSIOLOGY

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

1. A 30-year-old woman presented to the outpatient department with a history of recent weight loss. On examination she was found to have warm moist skin, exophthalmos and a goiter. Her heart rate was 110 beats/minute and her blood pressure was 140/60mmHg.

   Her investigation findings are as follows:

		(Reference range)
Free T4	18mg/dL	(5-12 mg/dL)
Free T3	215 ng/dL	(80-200 ng/dL)
TSH	< 0.05 U/L	(0.3-5 U/L)

1.1 State the most likely endocrine disorder in this patient. (20%)

1.2 Explain the pathophysiological basis of the following in this patient:

1.2.1 Weight loss (10%)
1.2.2 Warm moist skin (20%)
1.2.3 Widening of pulse pressure (40%)
1.2.4 Exophthalmos (10%)

Contd..../2-

2.

2.1 List three (03) hormones secreted by the endocrine pancreas and state the cell type they are secreted from. (15%)

2.2 A patient complained of polyuria, increased hunger and recent weight loss. He was found to have increased blood levels of glucose and free fatty acids.

2.2.1 What is the endocrine disorder he is likely to have? (05%)

2.2.2 Explain the pathophysiological basis for the following:

Hyperglycemia (20%)

Polyuria (20%)

Increased free fatty acids (20%)

Weight loss (20%)

3. Explain the pathophysiological basis for the following:

3.1 Hyperpigmentation of skin creases in Addison disease. (20%)

3.2 Increased susceptibility for fractures in Cushing syndrome. (40%)

3.3 Hypertension in pheochromocytoma. (40%)

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STRUCTURED ESSAY QUESTION (SEQ) PAPER

Date: 18th June 2017 **Time:** 10.00 a.m. – 11.00 a.m.

REPRODUCTIVE PHYSIOLOGY

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

1.

1.1 Outline the process of spermatogenesis giving its hormonal regulation. (40%)
1.2 List three (03) occupational factors that contribute to male infertility. (15%)
1.3 Explain three (03) mechanisms by which environmental pollutants harm male reproductive functions. (45%)

2. Write short notes on the following:

2.1 Anti müllerian hormone. (35%)
2.2 Actions of oestrogen on bone. (35%)
2.3 Mechanisms that prevent excessive bleeding during menstruation. (30%)

3. Explain the physiological basis of the following:

3.1 Ankle oedema in pregnancy. (35%)
3.2 Use of oxytocin for induction of labour. (30%)
3.3 Explain the neuro-endocrine regulation of lactation. (35%)