

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN NURSING (UPGRADING)

NURU 118: MEDICAL PHYSIOLOGY IV

STREAMS: Y1T2

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 5/12/2018

8.30 A.M - 10.30 A.M.

INSTRUCTIONS:

1. Do not write anything on the question paper.
2. Mobile phones and any other reference materials are NOT allowed in the examination room.
3. The paper has three sections. Answer ALL the questions.
4. All your answers for Section I (MCQs) should be on page one of the answer booklet. Number ALL your answers and indicate the order of appearance in the space provided in the cover page of the examination answer booklet.
5. Write your answers legibly and use your time wisely

SECTION 1: MULTIPLE CHOICE QUESTIONS (20MARKS)

1. Secretion of HCl by gastric parietal cells is needed for:
 - (a) Activation of salivary amylase
 - (b) Activation of intrinsic factor
 - (c) Activation of pepsinogen to pepsin
 - (d) Activation of pancreatic lipases
2. When parietal cells are stimulated, they secrete:
 - (a) HCl and HCO₃
 - (b) HCl and intrinsic factor
 - (c) HCl and pepsinogen
 - (d) HCO₃ and intrinsic factor
3. Micelle formation is necessary for the intestinal absorption of:
 - (a) Galactose
 - (b) Glycerol
 - (c) Leucine
 - (d) Bile acids

4. Concerning the function of the glomerular mesangial cells:
 - (a) Mesangial cells can contract and cause some decrease in total glomerular filtration area
 - (b) Mesangial cells play a major role in systemic angiotensin II production
 - (c) Mesangial cells are phagocytic and play a role in the clearing of proteins and immune-deposits entrapped in the mesangium
 - (d) A and C are correct

5. The first hormone secreted at the onset of puberty is:
 - (a) Follicle-stimulating hormone
 - (b) Interstitial cell-stimulating hormone
 - (c) Gonadotropin-releasing hormone
 - (d) Testosterone

6. The following statements about peptide or protein hormone is true:
 - (a) They have longer half-lives than steroid hormones
 - (b) They have receptors on the cell membrane
 - (c) They have a slower onset of action than both steroid and thyroid hormones
 - (d) They are not stored in endocrine-producing glands

7. The following enzymes does not digest any nutrients:
 - (a) Chymotrypsin
 - (b) Lingual lipase
 - (c) Carboxypeptidase
 - (d) Enterokinase

8. Fertilization of ovum normally occurs in:
 - (a) Uterus
 - (b) Cervix of uterus
 - (c) Fallopian tube
 - (d) None of the above

9. The cotransport of glucose derives energy from
 - (a) Na⁺ concentration gradient
 - (b) The glucose molecule being transported
 - (c) Ca²⁺ gradient
 - (d) The membrane voltage

10. A patient with duodenal ulcer is treated successfully with cimetidine. The basis for cimetidine inhibition of gastric H⁺ is that:
 - (a) It blocks muscarinic receptors on parietal cells
 - (b) It enhance the action of acetylcholine on parietal cells
 - (c) It blocks the H⁺/K⁺ ATPase on the parietal cell
 - (d) It blocks H₂ receptors on the parietal cells

NURU 118

11. Use the values below to answer the following question:

Glomerular capillary hydrostatic pressure = 47 mm Hg

Bowman's space hydrostatic pressure = 10 mm Hg

Bowman's space oncotic pressure = 0 mm Hg

At what value of glomerular oncotic pressure would glomerular filtration stop?

- (a) 57 mm Hg
 - (b) 47 mm Hg
 - (c) 37 mm Hg
 - (d) 10 mm Hg
12. Which of the following changes would tend to increase C_a^{++} reabsorption in the renal tubule?
- (a) Extracellular fluid volume expansion
 - (b) Increased plasma parathyroid hormone concentration
 - (c) Increased blood pressure
 - (d) Decreased plasma phosphate concentration
13. All of the following contribute to the absorptive surface area of the small intestine except
- (a) Its length
 - (b) The brush border
 - (c) Haustra
 - (d) Circular folds
14. The term "Glycocalyx" refers to
- (a) The negatively charged carbohydrate chains that protrude into the cytosol from glycolipids and integral glycoproteins
 - (b) The negatively charged carbohydrate layer on the outer cell surface
 - (c) The layer of anions aligned on the cytosolic surface of the plasma membrane
 - (d) A mechanism of cell-cell attachment
15. What is the glomerular filtration rate (GFR)?
- (a) 25 ml/min
 - (b) 50 ml/min
 - (c) 100 ml/min
 - (d) 125 ml/min
16. FSH secretion begins to rise and new follicles begin to grow during
- (a) The premenstrual phase
 - (b) The menstrual phase
 - (c) The preovulatory phase
 - (d) The luteal phase

NURU 118

17. The following nephron segment reabsorbs the highest amount of water under normal conditions:
- (a) Proximal convoluted tubule
 - (b) Ascending limb of the loop of Henle
 - (c) Distal convoluted tubule
 - (d) Collecting ducts
18. Very early in embryonic development, testosterone is formed within the male embryo. What is the function of this hormone at this stage of development?
- (a) Stimulation of bone growth
 - (b) Stimulation of development of male sex organs
 - (c) Stimulation of development of skeletal muscle
 - (d) Inhibition of luteinizing hormone secretion
19. A “birth control” compound for men has been sought for several decades. Which of the following would provide effective sterility?
- (a) Substance that mimics the actions of luteinizing hormone
 - (b) Substance that blocks the actions of inhibin
 - (c) Substance that blocks the actions of follicle-releasing hormone
 - (d) Substance that mimics the actions of gonadotropin-releasing hormone
20. Which of the following substances must be further digested before it can be absorbed by specific carriers in intestinal cells?
- (a) Tripeptides
 - (b) Alanine
 - (c) Sucrose
 - (d) Fructose

SECTION B: SHORT ANSWER QUESTIONS - [30 MARKS]

1. State five functions of liver in lipid metabolism. [5 Marks]
2. Explain how the following hormones influence pregnancy: [3 Marks]
- (a) Progesterone [3 Marks]
 - (b) Relaxin [3 Marks]
3. Describe how dietary proteins are digested in the small intestine. [5 Marks]
4. Explain the physiologic effects of testosterone in the male reproductive system. [5 Marks]
5. State three (3) main stimulants of hydrochloric acid secretion in the stomach. [3 Marks]
6. Briefly describe the processes of reabsorption and secretion at the distal convoluted tubule of the nephron. [6 Marks]

SECTION C: LONG ANSWER QUESTIONS - [20 MARKS]

1. Glomerular filtration is the first step in the renal processing of urine:

(a) Define glomerular filtration [2 Marks]

(b) Describe the adaptations of the renal corpuscle that increase the efficiency of filtration. [6 Marks]

(c) Describe the hormonal regulation of glomerular filtration [12 Marks]

2. Discuss the hormonal regulation of the female reproductive cycle. [20 Marks]

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