

NURS 117

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR BACHELOR OF SCIENCE IN NURSING

NURS 117: MEDICAL PHYSIOLOGY III

STREAMS: Y1S2

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 16/04/2025

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 questions in sections A and B and one question in section C.
4. Number ALL your answers and indicate the order of appearance in the space provided in the cover page of the examination answer booklet.

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Reabsorption and secretion in the proximal tubule involve:
 - a) Diffusion through tight junctions and lateral intercellular spaces
 - b) Active transport involving proteins called transporters
 - c) Facilitated diffusion
 - d) All of the above
2. The following substance is NOT reabsorbed via cotransport with Na⁺ in the proximal convoluted tubule:
 - a) Lactate
 - b) Phosphate
 - c) Hydrogen
 - d) Amino acids
3. The following change increases glomerular filtration rate:
 - a) Moderate constriction of efferent arterioles
 - b) Moderate constriction of afferent arterioles
 - c) Increased Bowman's capsule pressure
 - d) Increased glomerular capillary osmotic pressure

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4. Regarding tubular function:
 - a) 30% of water is reabsorbed at the early distal convoluted tubule
 - b) 90% of the water is absorbed by the proximal convoluted tubule
 - c) The main mechanism of the Na⁺ reabsorption from the tubular fluid to proximal convoluted tubule is via Na/K/ATP a pump
 - d) The main mechanism of Na absorption in the ascending loop of Henle is via cotransport of Na/K/2Cl
5. On which of the following does aldosterone exert its greatest effect?
 - a) Proximal convoluted tubule
 - b) Thin ascending portion of loop of Henle
 - c) Thick ascending portion of loop of Henle
 - d) Cortical collecting system
6. The non-steroidal anti-inflammatory drugs (NSAIDs) use a relative contraindication in patients with chronic renal failure because of:
 - a) Direct toxic effects on proximal tubule
 - b) Inhibition of prostaglandin synthesis which is an important regulator of renal blood flow in arterioles
 - c) Direct toxic effects on collecting ducts
 - d) Inhibition of nitric oxide secretion
7. The characteristics of a substance suitable for measuring glomerular filtration rate do NOT include:
 - a) Freely filtered
 - b) Not metabolized
 - c) Low molecular weight
 - d) No effect on filtration rate
8. In the proximal tubule, water
 - a) Is actively reabsorbed
 - b) Is actively secreted
 - c) Reabsorption increases tubular concentrations of Cl⁻, K⁺, Ca²⁺ and urea
 - d) Content is decreased by about 50%
9. In which part of the nephron does antidiuretic hormone (ADH) have its main effect?
 - a) The proximal tubule
 - b) The descending limb of the loop of Henle
 - c) The ascending limb of the loop of Henle
 - d) The distal tubule and the collecting duct
10. Fluid entering the loop of Henle is normally _____ with plasma, and that entering the distal tubule is normally _____ with plasma.
 - a) Isotonic, hypertonic
 - b) Hypertonic, hypotonic
 - c) Isotonic, hypotonic
 - d) Hypotonic, hypertonic

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11. Plasma osmolality is:
 - a) Regulated by antidiuretic hormone (ADH)
 - b) Decreased in water deficiency
 - c) Increased by the ingestion of water
 - d) Controlled by osmoreceptors in the anterior pituitary
12. Which of the following statements is NOT true?
 - a) The control of body Na⁺ content by the kidney is the main regulator of body fluid volume
 - b) Stretch receptors on the low-pressure side of the heart detect changes in the central venous pressure which reflect changes in blood volume
 - c) Increased pressure in the renal afferent arterioles stimulates renin release
 - d) Angiotensin II is the primary hormone for Na⁺ homeostasis
13. Which of the following are accessory glands found in the human male reproductive system?
 - a) Prostate gland
 - b) Cowper's gland
 - c) Seminal vesicles
 - d) All of these
14. The following statements is true about the sperm concentration:
 - a) The number of sperm in millions per milliliter of semen
 - b) The analysis of the size, shape, and appearance of sperm
 - c) The total percentage of sperm in a sample that is moving
 - d) All of these
15. The following hormones stimulates the maturation of primordial germ cells in both males and females:
 - a) Estrogen
 - b) Follicle-stimulating hormone
 - c) Testosterone
 - d) Luteinizing hormone
16. What is the source and function of human chorionic gonadotropin (HCG)?
 - a) Uterus; cause labor
 - b) Ovary; stimulates FSH
 - c) Placenta; inhibits LH
 - d) Placenta; mimics LH
17. The following statement is not true concerning spermatogenesis:
 - a) Spermatogenesis begins with spermatogonia
 - b) Spermatogenesis begins with primary spermatocyte
 - c) Spermatogenesis begins during adolescence
 - d) Spermatogenesis takes 65–75 days in humans

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18. The following structure contains lysosomal-like enzymes:

- a) Sertoli cells
- b) Sperm head
- c) Acrosome
- d) Sperm tail

19. The following is not a function of testosterone:

- a) Loss of body hair
- b) Thickening of the larynx
- c) Anabolism of skeletal muscle
- d) Thickening of bones

20. Which of the following is not a function of estrogen?

- a) Decreased adipose tissue
- b) Breast development
- c) Increased skin blood vessels
- d) Widened pelvis

SECTION B: SHORT ANSWER QUESTIONS (30 MARKS)

1. Describe how estrogen hormone influences pregnancy (6 marks)
2. Outline three (3) characteristics of the proximal convoluted tubule cells that enhance the work of reabsorption and secretion (6 marks)
3. Describe how angiotensin II affects renal physiology (6 marks)
4. Describe the importance of seminal fluid in human reproduction (6 marks)
5. Describe three (3) functions of the duct system in male reproductive system (6 marks)

SECTION C: LONG ANSWER QUESTIONS (20 MARKS)

1. Glomerular filtration is the first step in the formation of urine:
 - a) Outline the forces influencing blood filtration in the glomerulus (6 marks)
 - b) Describe two (2) reasons that make proteins to be less likely filtered across the glomerular filtration barrier (6 marks)
 - c) Describe the renal autoregulation of glomerular filtration rate (8 marks)
 2. Discuss the changes that occur in the ovaries and the uterus during the specific phases of the female reproductive cycle (20 marks)
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