



GREAT LAKES UNIVERSITY OF KISUMU
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FACULTY OF HEALTH SCIENCES
SCHOOL OF NURSING AND MIDWIFERY

JAN - APRIL 2024 Academic Semester
END OF SEMESTER FINAL EXAMINATION
CODE: HNS 121B NAME: MEDICAL PHYSIOLOGY II

TIME: 3 HOURS

Instructions to candidates

1. Read the Instructions carefully and answer only what is asked for.
2. Enter your examination number and course code in the space provided in the answer sheet.
3. All questions are compulsory **unless specified**.
4. Part one MCQ, Each MCQ is 1 mark.
5. For Part Two, Short answer questions, answer each question following each other
6. For Part Three, Long Answer questions, answer each subsections following each other.
7. Omission of or wrong numbering of questions or part of the question will result in 5% marks deduction from the relevant part.

MULTIPLE CHOICE QUESTIONS

1. Water filtration by the kidney:
 - A. Is 180 l/hr
 - B. Is 125 ml/min
 - C. Up to 90% is reabsorbed
 - D. Most drugs have MW less than 600 and are freely filtered
2. Which ONE of the following is not involved in the regulation of glomerular filtration rate (GFR)?
 - A. Juxtaglomerular apparatus
 - B. Arterial pressure
 - C. Efferent arteriolar tone
 - D. Na content in distal tubule
3. Increased GFR is caused by
 - A. Increased cardiac output
 - B. Afferent arteriolar vasoconstriction
 - C. Efferent arteriolar vasodilatation
 - D. Increased chloride delivery to the macula densa
4. Resistance to renal blood flow is chiefly determined by:
 - A. Renal artery
 - B. Afferent & efferent arterioles
 - C. Interlobular & arcuate arteries
 - D. Peritubular capillaries
5. Kidneys produce:
 - A. Erythropoietin

- B. ADH
 - C. Angiotensin II
 - D. ANP
6. Glomerular filtration rate (GFR):
 - A. Is independent of the size of the capillary bed
 - B. Depends only on the hydrostatic and osmotic pressure differences across the capillary
 - C. Is determined by the same forces governing filtration across all other capillaries
 - D. Depends only on the permeability of the capillary
 7. Biggest contribution to urine concentration by:
 - A. Na⁺ absorption in thick ascending limb
 - B. Passive diffusion of urea in collecting ducts
 - C. Chloride absorption in distal convoluted tubule
 8. Glycosuria is most likely to occur with:
 - A. increased GFR and increased blood glucose level
 - B. decreased GFR and increased blood glucose level
 - C. decreased GFR and decreased blood glucose level
 - D. increased GFR and decreased blood glucose level
 9. Which of these is most completely re-absorbed in the kidneys
 - A. Albumin
 - B. Glucose
 - C. Calcium
 - D. Potassium
 10. The minimum pH that the urine can create is
 - A. 3.0
 - B. 3.5
 - C. 4.0
 - D. 4.5
 11. Carbon monoxide is dangerous because?
 - a. It binds strongly to hemoglobin, making it unavailable to oxygen.
 - b. It binds strongly to plasma, making it unavailable to carbon dioxide.
 - c. It raises the blood's pH level, causing a person to hyperventilate
 - d. It dissociates readily after binding to hemoglobin.
 12. Which of the following statement is NOT true?
 - a. During inhalation or exhalation air is pulled towards or away from the lungs, by several cavities, tubes, and openings.
 - b. The organs of the respiratory system make sure that oxygen enters our bodies and carbon dioxide leaves our bodies.
 - c. The respiratory tract is the path of air from the nose to the lungs.
 - d. The lower respiratory tract consists of the nasal cavity, epiglottis, Trachea, Bronchi, Bronchioles, and the Lungs.
 13. Pulmonary ventilation involves the following except?
 - a. Breathing.
 - b. External respiration.
 - c. Exchange of respiratory gases between the atmosphere and the lungs.
 - d. Cellular respiration.
 14. Pulmonary ventilation equals to
 - a. 6000mLs

- b. 4200mls
 - c. 500mls
 - d. 350mls
15. Alveolar ventilation equals to
- a. 4200mls
 - b. 6000mls
 - c. 500mls
 - d. 350mls
16. Alveolar ventilation (VA)/Perfusion (Q) ratio normal equals to
- a. 0.84
 - b. 0.67
 - c. 0.5
 - d. 0.1
17. The following statements about pleura are true which one is NOT.
- a. The parietal pleura are attached to the thoracic wall whereas the visceral pleura are attached to the lung itself.
 - b. The right lung is completely enclosed in a sac called the pleural sac.
 - c. The intrapleural fluid lubricates the lungs to easy sliding.
 - d. Changing the pressure of intrapleural fluid allows the lungs and the thoracic wall to move together during normal breathing.
18. Which of the following is function of dead space?
- a. Humidification
 - b. Filtration
 - c. Purification.
 - d. All of the above.
19. The following factor determines lung compliance. Which one does NOT?
- a. Pleural effusion
 - b. Pneumothorax
 - c. Pulmonary edema
 - d. Hypoxia.
20. Which of the following statement is NOT true about surfactants?
- a. They function by overcoming the forces of surface tension.
 - b. They are secreted by alveolar type II epithelial cells.
 - c. Whose function is to MOP/remove water molecules from the alveolar sac to reduce the surface tension.
 - d. Insufficient production of surfactants prevents Respiratory Distress Syndrome in newborns.
21. Tidal volume equals to?
- a. 2900mls.
 - b. 500mls.
 - c. 150mls.
 - d. 350mls
22. Inspiratory reserve volume equals to?
- a. 1400mls
 - b. 500mls.
 - c. 150mls
 - d. 3300mls
23. Dead space equals to?
- a. 1400mls.
 - b. 150mls.

c. 2900mls.

d. 3300mls

24. Respiration involves one of the following sets of processes

- A. Insipiration, exchange of gases, expiration
 - B. Aspiration, inspiration, expiration
 - C. External, internal and expiration
 - D. None of the above
25. Oxygenated blood from lungs is carried to heart by
- A. Pulmonary artery
 - B. Pulmonary vein
 - C. Coronary vein
 - D. Pre-cavals
26. In humans, rib case and sternum move upwardly and outwardly during
- A. exercise
 - B. sudden back injury
 - C. expiration
 - D. inspiration

27. Which statement is not true about Endocrine system?
- ONE of the systems involved in coordination of body functions.
 - Systems involved include neural system, which release chemical substances (neurotransmitters) at axon terminals which act locally to control cell function.
 - Endocrine system has Glands or specialized cells that Release chemicals (hormones) into blood that have influence on cell function at another location.
 - Neuro-endocrine neurons secrete substances (neuro-hormone) which has positive feedback on endocrine system.
28. The following statements are true about Hormones, which one is not correct?
- Hormone is chemical substance serve as regulators & coordinators of various biologic functions in the body.
 - Hormones are highly potent, specialized organic molecules which carry out homeostasis.
 - Hormones are produced by endocrine cells in response to specific stimuli.
 - They exert their actions on specific target cells without receptors.
29. Which gland is correctly matched with the type of hormones produced?
- Adrenal cortex; Testosterone
 - Ovaries; Cortisol, aldosterone
 - Testes; Oestrogen, progesterone
 - Placenta; Oestrogen, progesterone
30. The following statement is not true about hypothalamus.
- Hypothalamus has neural control over hormone secretion by the posterior pituitary.
 - Trophic hormones are not synthesized and released by hypothalamus instead its pituitary glands.
 - Secretory activity of anterior pituitary is controlled by hypothalamic hormone.
 - Trophic hormones are secreted into hypothalamic-hypophyseal portal system and transported to specific glands to secrete specific hormones.
31. The following are Protein & polypeptides hormones except?
- Include hormones secreted by anterior pituitary.
 - The hormones secreted by pancreas (insulin, glucagon).
 - Hormones secreted by Parathyroid gland (PTH).
 - Hormones secreted by Adrenal cortex (Cortisol, aldosterone).
32. The following statements are true about Hormone – Receptor complex. Which one is not correct?
- Hormones produces their effects by combining with specific receptors.
 - The 1st step of hormone action is binding to receptor at the target cell.
 - Receptors can be located on target cell membrane, in the cytoplasm and in the nucleus.
 - Each hormone (type) has high affinity for different receptors on different target tissue that are affected.
33. The following statement is true about Location of different type of hormone receptors which one is not true?
- In or on surface of cell membrane-Protein & peptide hormone and Catecholamine
 - In the cell cytoplasm- Steroid hormone
 - In the nucleus- Thyroid hormones
 - All of the above statements are not true.
34. Which of the following is not true about sex determination

- a. In genetic male Y chromosomes are present
- b. Sex determining region of the Y chromosome (SRY) is the critical messenger in male determination
- c. Testes determining factor is not important in genetic of an individual
- d. The absence of SRY leads to female gender
- 35. In the differentiation of the genitalia which of the following is true.
 - a. In males wolffian ducts persists
 - b. In males Mullerian duct persists
 - c. In females wolffian duct persists
 - d. In female Mullerian ducts regress
- 36. Regards to sex hormones which of the following is not true
 - a. Secretion of testosterone occurs in male fetus before birth
 - b. At puberty gonadotropins are secreted will help in activation and maturation of gonads
 - c. GnRH, pituitary gonadotropins and estrogens are secreted in high levels throughout childhood.
 - d. In female accessory organs remain non functional till puberty
- 37. The following is true about puberty in females except
 - a. First menstrual periods are irregular
 - b. First menstrual are anovulatory.
 - c. Thelarche is the development of axillary and pubic hairs
 - d. Pubarche involves the development of axillary and pubic hairs
- 38. Regarding precocious puberty the following is true except
 - a. Sexual maturation occurs before the age of 10 years in boys and 8 years in girls.
 - b. In Gonadal maturation Spermatogenesis and ovulation is not sufficient for procreation
 - c. Pseudo-precocity is the premature development of secondary sex characteristics.
 - d. Pseudo-precocity is due to excessive gonadal steroid from gonadal or adrenal tumors.
- 39. Which of the following is false regarding Sertoli cells
 - a. Forms the blood-testes-barrier
 - b. Allows movement Molecules from basal compartment into lumen and vice versa
 - c. Surround developing sperm cells
 - d. Synchronize the events of spermatogenesis
- 40. In spermatogenesis all of the following is true except
 - a. Stimulated by pituitary Gonadotropins beginning at puberty
 - b. Spermatogonia the primitive germ cells continually proliferate to replenish themselves
 - c. Spermatogonia Mature into primary spermatocyte by mitosis (46 chromosome)
 - d. Primary spermatocytes undergoes mitosis reducing the number of chromosomes
- 41. Gonadotropin hormones is involved in spermatogenesis the following is true except
 - a. Luteinizing hormone stimulate Leydig cells to produce testosterone
 - b. Luteinizing hormone secreted by ant. Pituitary
 - c. Follicle – stimulating hormone (FSH) is secreted by Sertoli cells in the pituitary
 - d. Follicle – stimulating hormone (FSH) Stimulate Sertoli cells to enable the process of spermiogenesis to occur
- 42. Testes secrete the following steroidal hormones except
 - a. Testosterone
 - b. Androstenedione
 - c. Estrogen

- d. Inhibin
- 43. Testosterone hormone is essential in all of the following except
 - a. It induces differentiation of male accessory reproductive organs and maintain their functions
 - b. It induces Morphology & function changes of entire male duct systems, glands and penis
 - c. Induces male secondary sex characteristics
 - d. Growth of scalp hair
- 44. Regarding estrogen the following is true except
 - a. Stimulates growth of ovarian follicles
 - b. Inhibits formation of progesterone receptor
 - c. Stimulates growth of smooth muscle of the uterus
 - d. Increases the endometrial thickness and growth of uterine glands
- 45. Estrogen and progesterone are responsible for development of the following except
 - a. Female secondary sex characteristics
 - b. Enlargement of breast, uterus, vagina
 - c. Broad shoulders & broad hips
 - d. Female distribution of fat and hair

SECTION B. 20MARKS (answer all questions)

1. Discuss briefly the functions of surfactants
2. Differentiate between pulmonary and alveolar ventilation
3. Describe types and functions of dead space

SECTION C (Answer one question)

1. Briefly explain the process of urine formation (10mrks)
2. Discuss the functions of the kidney (10marks)