



KENYATTA UNIVERSITY

EXAMINATION FOR THE DEGREE OF BACHELOR PHARMACY (LEVEL II)

HMP 220: MEDICAL PHYSIOLOGY V

2ND SEMESTER 2022/2023

TIME: 3Hours

INSTRUCTIONS

1. Answer all questions in section A, B and C
2. Answer in the booklet provided

SECTION A - Multiple Choice Questions (1 mark each)

Answer all questions. Choose the single best response

1. Denervation supersensitivity of the muscle in LMN lesions is due to
 - a. Increased release of neurotransmitter from the degenerating nerve terminals
 - b. Decreased release of neurotransmitter from the degenerating nerve terminals
 - c. Increased number of transmitter receptors in fibers of the denervated muscle
 - d. Decreased number of transmitter receptors in fibers of the denervated muscle
2. Regarding the dominant cerebral hemisphere:
 - a. The speech and motor control areas are much more highly developed in the non-dominant hemisphere
 - b. In about 95% of the population, the right hemisphere is the dominant one
 - c. At birth, the area of the cortex that will become Wernicke's area is as much as 50 percent larger in the left hemisphere than in the right in more than one half of neonates
 - d. In about 5% of the population, the left hemisphere is the dominant one
3. Damage to which of the following structure would most likely lead to impaired coordination between cerebellum and the cortex.
 - a. Lateral cerebellar hemispheres
 - b. Flocculonodular lobe
 - c. Vermis
 - d. Cerebellar peduncle
4. The neurotransmitter affected in Parkinsonism is
 - a. Epinephrine
 - b. Dopamine
 - c. Acetylcholine
 - d. Nitric oxide

5. To provide quick response to stimuli, reflex responses may be carried out directly by
 - a. Frontal lobes
 - b. Amygdala
 - c. Spinal cord
 - d. Extrafusal fibres
6. The speed of conduction of an alpha motor neuron relative to the gamma motor neuron is
 - a. Faster
 - b. Slower
 - c. Both have the same speed
 - d. The alpha motor neuron can be faster in some cases and slower in others.
7. The control of axial muscles is facilitated by :
 - a. Lateral corticospinal tract
 - b. Ventral corticospinal tract
 - c. Rubrospinal tract
 - d. Olivospinal tract
8. The following is NOT CORRECT about transections above the spinal cord
 - a. Can lead to decerebrate rigidity
 - b. Can cause decorticate posturing
 - c. Above the lateral vestibular nucleus causes decorticate rigidity
 - d. Above the red nucleus causes decorticate posturing
9. The correct statement about Mossy fibers is
 - a. They form majority of the cerebral cortex inputs
 - b. Some fibres synapse with purkinje dendrites in a row
 - c. Does not synapse with cerebellar interneurons
 - d. Includes pontocerebellar and not spinocerebellar afferents.
10. The basal ganglia nuclei include all the following EXCEPT
 - a. Amygdala
 - b. Hipocampus
 - c. Caudate
 - d. Globus Pallidus
11. Receptors in muscles and tendons are functionally known as:
 - a. Nociceptors
 - b. Cutaneous receptors
 - c. Proprioceptors
 - d. Exteroreceptors

12. Having the ability to ignore constant phasic stimuli is called
- The law of specific nerve energies
 - Tonic adaptation
 - Sensory adaptation
 - Law of projection
13. Most sensory receptors :-
- are stimulated by different types of stimuli
 - are stimulated only by specific stimuli
 - posses a high threshold for their specific stimuli
 - Generate different types of action potential
14. Pain receptors :-
- become more sensitive with prolonged stimulation
 - adapt rapidly
 - are more numerous in viscera than other tissues
 - include different morphological types
15. Receptors for light touch are called and they are located in the
- Bulbs of Krause / dermis
 - Pacinian corpuscles epidermis
 - Meissner's corpuscles / dermis
 - Ruffini corpuscles / hypodermis.
16. The brain interprets signals from the eye as light even if the eye is actually being stimulated by something else, such as pressure. This best describes
- Sensory adaptation
 - Visual accommodation
 - The law of specific nerve energies
 - The pupillary reflex
17. Stretch reflex is the fastest in the body. What is the most acceptable reason for the above?
- It is mediated by proprioceptive receptors
 - Skeletal muscle contracts faster than smooth muscle
 - It is monosynaptic
 - α motor neurons are myelinated
18. Which of the following substances enhances the sensitivity of pain receptors but does not directly excite them?
- Bradykinin
 - Serotonin
 - Potassium ions
 - Prostaglandins

19. Meiosis occurs in human males in:
- Epididymis
 - Seminiferous tubules
 - Vas deferens
 - Seminal vesicle
20. To inhibit the initiation of labor
- Administration of an antagonist of the actions of progesterone
 - Administration of an antagonist of PGE2 effects
 - Mechanically dilating and stimulating the cervix
 - Administration of oxytocin
21. Birth control pills containing combinations of synthetic estrogen and progesterone compounds that are given for the first 21 days of the menstrual cycle are effective in preventing pregnancy. What is the explanation for their efficacy?
- Prevention of the preovulatory surge of LH secretion from the pituitary gland
 - Prevention of development of the ovarian follicles
 - Suppression of the function of the corpus luteum soon after it forms
 - Prevention of normal development of the endometrium
22. Spermatogenesis is regulated by a negative feedback control system in which FSH stimulates the steps in sperm cell formation. Which negative feedback signal associated with sperm cell production inhibits pituitary formation of FSH?
- Testosterone
 - Inhibin
 - Estrogen
 - LH
23. What accompanies sloughing of the endometrium during the endometrial cycle in a normal woman?
- An increase in progesterone
 - The LH "surge"
 - A decrease in both progesterone and estrogen
 - An increase in estradiol
24. Check the incorrect statement regarding oxytocin.
- It is essential for release of ova during ovulation
 - It increases uterine contractility
 - It facilitates ejaculation of semen
 - It facilitates sperm transport in the uterus
25. The testis-determining gene (or the SRY gene) is located normally on/in:
- chromosome 6
 - chromosome 12
 - short arm of chromosome 22
 - Y chromosome

26. With regard to development of gonads, which of the following is most likely with a 46XX zygote that contains a functional SRY gene?
 - a. Female internal and external genitalia develop
 - b. Both ovaries and testes develop
 - c. Only ovaries develop
 - d. Only testes develop
27. The hormone that is essential for intrauterine development of male external genitalia is:
 - a. testosterone
 - b. dihydrotestosterone
 - c. Mullerian regression factor
 - d. SOX factor
28. In an adult female who underwent pelvic surgery, internal genitalia were found to be male, and the karyotype was 46 XY. The most likely explanation for this is:
 - a. loss of function mutation in SRY gene
 - b. deficiency of testosterone
 - c. deficiency of Mullerian inhibiting peptide
 - d. deficiency of testosterone 5 α reductase
 - e. complete androgen insensitivity
29. The "penis-at-12" syndrome occurs due to a deficiency of:
 - a. 17 α hydroxylase
 - b. testosterone 5 α reductase
 - c. 11 β hydroxysteroid dehydrogenase
 - d. CYP 450sc
30. When do progesterone levels rise to their highest point during the female hormonal cycle?
 - a. Between ovulation and the beginning of menstruation
 - b. Immediately before ovulation
 - c. When the blood concentration of LH is at its highest point
 - d. When 12 primary follicles are developing to the antral stage

SECTION B: Short Answer Questions (5marks each)

1. Outline the sources of information that the brain uses to maintain the right posture, balance and coordination
2. List any 5 clinical features associated with abnormalities in function of the cerebellum.
3. Describe the spinal motor stretch reflex.
4. Amputees may feel pain and other sensations in a limb that is no longer there. This can be a distressing medical problem. Explain this phenomenon
5. Describe the pathways of sensory systems followed by pain, temperature and crude touch modalities into the central nervous system.
6. What is adaptation of sensory receptors and what is the mechanism of adaptation
7. Define an upper motor neuron and explain why upper motor neuron lesions are characterized by "spastic paralysis"
8. Outline 5 functions of the blood testis barrier
9. List five factors affecting the onset of puberty.
10. Explain Acrosomal Reaction

SECTION C: Long Answer Questions (10marks each)

1. Describe the efferent pathways of the cerebellum
2. Explain how each of the following aspects of sensation are coded by the nervous system.
 - a. Sensory modality
 - b. Location of stimulus
 - c. Intensity of stimulus
3. Describe the endocrine control during male sexual differentiation.
4. Describe the tissue and hormonal changes that occur in the ovaries and endometrium during each phase of the menstrual cycle.