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MAIN EXAMINATION

AUGUST – DECEMBER 2017 TRIMESTER

FACULTY OF SCIENCES

DEPARTMENT OF NURSING

REGULAR PROGRAMME

NUR / UNUR 101: MEDICAL PHYSIOLOGY I

Date: DECEMBER 2017	**Duration: 3 Hours**
INSTRUCTIONS: Answer ALL Questions	

PART I: MULTIPLE CHOICE QUESTIONS (MCQ) (20 MARKS)

Q1. Transcription refers to

a) The process where an mRNA is used as a template forprotein production.
b) The process where a DNA sequence is copied into RNA forthe purpose of gene expression.
c) The process where DNA wraps around histones to form anucleosome.
d) The process of replication of DNA prior to cell division.

Q2. The primary structure of a protein refers to

a) The twist, folds, or twist and folds of the amino acidsequence into stabilized structures within the protein (ie,α-helices and β-sheets).
b) The arrangement of subunits to form a functional structure.
c) The amino acid sequence of the protein.
d) The arrangement of twisted chains and folds within aprotein into a stable structure.

Q3. The electrogenic Na, K ATPase plays a critical role in cellularbphysiology by

a) Using the energy in ATP to extrude 3 Na+ out of the cell inexchange for taking two K + into the cell.

b) Using the energy in ATP to extrude 3 K+ out of the cell inexchange for taking two Na + into the cell.
c) Using the energy in moving Na+ into the cell or K + outsidethe cell to make ATP.
d) Using the energy in moving Na+ outside of the cell or K+inside the cell to make ATP.

Q4. Second messengers

a) Are substances that interact with fi rst messengers outside cells.
b) Are substances that bind to fi rst messengers in the cellmembrane.
c) Are hormones secreted by cells in response to stimulation by another hormone.
d) Mediate the intracellular responses to many differenthormones and neurotransmitted.

Q5. A 32-year-old female received an injection of a local anestheticfor a tooth extraction. Within 2 hours, she noted palpitations,diaphoresis, and dizziness. Which of the following ionicchanges is correctly matched with a component of the actionpotential?

a) Opening of voltage-gated K+ channels: Afterhyperpolarization
b) A decrease in extracellular Ca 2+ : Repolarization
c) Opening of voltage-gated Na+ channels: Depolarization
d) Rapid closure of voltage-gated Na+ channels: Restingmembrane potential

Q6. Which of the following is correctly paired?

a) Sinoatrial node: Nicotinic cholinergic receptors
b) Autonomic ganglia: Muscarinic cholinergic receptors
c) Pilomotor smooth muscle: β 2 -adrenergic receptors
d) Vasculature of some skeletal muscles: Muscarinic cholinergic receptors

Q7. Which of the followingstatements about the parasympathetic nervous system is correct?

a) Postganglionic parasympathetic nerves release acetylcholineto activate muscarinic receptors on sweat glands.
b) Parasympathetic nerve activity aff ects only smooth musclesand glands.
c) Parasympathetic nerve activity causes contraction of smoothmuscles of the gastrointestinal wall and relaxation of thegastrointestinal sphincter.
d) Parasympathetic nerve activity causes contraction of the radialmuscle of the eye to allow accommodation for near vision.

Q8. Concerning thesympathetic nervous system

a) All postganglionic sympathetic nerves releasenorepinephrine from their terminals.
b) Cell bodies of preganglionic sympathetic neurons arelocated in the intermediolateral column of the thoracic andsacral spinal cord.
c) Th e sympathetic nervous system is required for survival.
d) Acetylcholine is released from all sympathetic preganglionicnerve terminals.

Q9. In the control of sympathetic nerve activity

a) Preganglionic sympathetic nerves receive inhibitory inputfrom the rostral ventrolateral medulla.
b) The major source of excitatory input to preganglionicsympathetic nerves is the paraventricular nucleus of thehypothalamus.
c) The activity of sympathetic preganglionic neurons can be affected by the activity of neurons in the amygdala.
d) Unlike the activity in δ-motor neurons, sympatheticpreganglionic neurons are not under any significant reflex control.

Q10. Initiation of an action potential in skeletal muscle

a) Requires spatial facilitation.
b) Requires temporal facilitation.
c) Requires the release of acetylcholine.
d) Requires the release of norepinephrine.

Q11. A 35-year-old woman sees her physician to report muscle weakness in the extraocular eye muscles and muscles of theextremities. She states that she feels fine when she gets up inthe morning, but the weakness begins soon after she becomesactive. The weakness is improved by rest. Sensation appears normal. The physician treats her with an anticholinesteraseinhibitor, and she notes immediate return of muscle strength.Her physician diagnoses her with

a) Lambert–Eaton syndrome.
b) Myasthenia gravis.
c) Multiple sclerosis.
d) Parkinson disease.

Q12. Which of the following electrophysiological events is correctlypaired with the change in ionic currents causing the event?

a) Fast inhibitory postsynaptic potentials (IPSPs) and closingof Cl^- channels.

b) Fast excitatory postsynaptic potentials (EPSPs) and anincrease in Ca 2+ conductance.
c) End plate potential and an increase in Na+ conductance.
d) Presynaptic inhibition and closure of voltage-gated K +channels.

Q13. During the upstroke of the nerve actionpotential

a) There is net outward current and the cellinterior becomes more negative
b) There is net outward current and the cellinterior becomes less negative
c) There is net inward current and the cellinterior becomes more negative
d) There is net inward current and the cellinterior becomes less negative

Q14. Which characteristic or component is shared by skeletal muscle and smooth muscle?

a) Thick and thin filaments arranged insarcomeres
b) Troponin
c) Elevation of intracellular [Ca2+] forexcitation–contraction coupling
d) Spontaneous depolarization of themembrane potential

Q15. At the muscle end plate, acetylcholine(ACh) causes the opening of

a) Na+ channels and depolarization towardthe Na+ equilibrium potential
b) K+ channels and depolarization towardthe K+ equilibrium potential
c) Ca2+ channels and depolarizationtoward the Ca2+ equilibrium potential
d) Na+ and K+ channels and depolarizationto a value halfway between the Na+ andK+ equilibrium potentials

Q16. Cutting which structure on the right side causes blindness in the temporal fieldof the left eye and the nasal field of theright eye?

a) Optic nerve
b) Optic chiasm
c) Optic tract
d) Geniculocalcarine tract

Q17. Which of the following statements best describes the basilar membrane of the organ of Corti?

a) The apex responds better to low frequencies than the base does
b) The base is wider than the apex

c) The base is more compliant than the apex
d) High frequencies produce maximaldisplacement of the basilar membranenear the helicotrema

Q18. Which of the following is an inhibitory neurotransmitter in the central nervous system(CNS)?

a) Norepinephrine
b) Glutamate
c) Aminobutyric acid (GABA)
d) Serotonin

Q19. Cutting which structure causes blindness in the temporal fields of the left and right eyes?

a) Optic nerve
b) Optic chiasm
c) Optic tract
d) Geniculocalcarine tract

Q20. When compared with the cones of the retina, the rods

a) are more sensitive to low-intensity light
b) adapt to darkness before the cones
c) are most highly concentrated on the fovea
d) are primarily involved in color vision

PART II SHORT ANSWER QUESTION (SAQ) (4O MARKS)

Q1. Contrast negative and positive feedback mechanisms **(3 marks)**

Q2. Discus water shifts in different body fluid compartments **(5 Marks)**

Q3. List proteins components of the cell membranes and state two functions of each **(5 marks)**

Q4. Describe transport across the cell membrane **(10 marks)**

Q5. Describe the nucleic acids with regard to their building blocks **(5 marks)**

Q6. State any two forms of DNA giving characteristics of each **(2 marks)**

Q7. Describe the steps of photoreception in the rods **(5 marks)**

Q8. State 5 cell organelles and state their functions **(5 marks)**

PART III LONG ANSWER QUESTION (LAQ) (4O MARKS)

Q1. a) Concerning the basal ganglia, discuss the direct and indirect pathways **(10 marks)**

b) Discuss the neuromuscular junction **(10 marks)**

Q2. With the aid of a diagram explain different phases in a nerve action potential graph **(20 marks)**

END