KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2015/2016

END OF COURSE EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MBChB LEVEL II)

HMP: MEDICAL PHYSIOLOGY; PAPER II; MULTIPLE CHOICE QUESTIONS

DATE: TUESDAY 19TH JULY 2016 **TIME: 2.00 P.M. - 3.30 P.M.**

INSTRUCTIONS:

This paper consists of a stem question followed by 4 alternative responses/ choices. Choose the single best response out of the choices given. Each question = 1 mark

1. Ca^{2+} transport across the cell membrane:
   A) Is mediated by Ca^{2+} - calmodulin complex.
   B) Requires energy from ATP hydrolysis.
   C) Is a symport
   D) Maintains intracellular Ca^{2+} 10,000 times higher than extracellular Ca^{2+}.

2. Cell shape and motility is maintained by:
   A) Microtubules
   B) Golgi apparatus
   C) Desmosomes
   D) Mitochondria

3. Tetrodotoxin blocks:
   A) Na^{+} channel
   B) K^{+} channel
   C) Ca^{++} channel
   D) Cl^{-} channel

4. Regarding the Na^{+}- K^{+} ATPase, following statement is true:
   A) It is an antiport carrying 3 Na^{+} into the cell and 2 K^{+} outside the cell
   B) It maintains cell volume
   C) A symport of 3 Na^{+} and $2^{+}K^{+}$ into the cell
   D) It is an electrogenic pump maintaining intracellular positivity

5. Group A nerve fibrers are most susceptible to:
   A) Pressure
   B) Hypoxia
   C) Temperature
   D) Local anaesthetics

6. Which is an amino acid neurotransmitter:
   A) Acetylcholine
   B) Epinephrine
   C) GABA
   D) Dopamine

7. Motor unit consists of :
   A) All muscle fibers in a muscle
   B) Motor nerve and muscle fibres it supplies
   C) Afferent neuron, center and efferent neuron
   D) Single muscle fiber and all neurons that innervate it

8. Acetylcholine causes, through nicotinic receptors:
   A) Decrease in heart rate
   B) Contraction of skeletal muscle
   C) Secretion of saliva
   D) Constriction of pupils

9. Excitation from SA node to AV node is conducted by:
   A) nodal fibers;
   B) internodal fibers;
   C) atrial cardiac cells;
   D) Purkinje fibers;

10. Which ionic currents are responsible for depolarization in nodal cells?
    A) K^+ outward current;
    B) Cl^- inward current;
    C) Na^+ inward current;
    D) Ca^{2+} inward current;

11. The parasympathetic effects on the heart can be explained by:
    A) increased permeability for K^+ ions in nodal cells;
    B) increased threshold potential in nodal cells;
    C) decreased permeability for K^+ ions in nodal cells;
    D) increased permeability for Na^+ ions in nodal cells;

12. Second heart sound is caused by:
    A) ventricular relaxation;
    B) closing of semilunar valves;
    C) vibration of the aortic walls at the beginning of diastole;
    D) vibration of atrial walls;

13. Heart muscle has following characteristics:
    A) every heart cell has own contraction pace;
    B) tetanic contractions are longer, with low ATP consumption;
    C) Does not undergo tetanic contractions;
    D) refractory period lasts the same as systole;

14. Collectively, the capillary epithelium, basement membrane, and podocytes form the
    A) filtration membrane.
    B) glomerulus.
    C) juxtamedullary nephron.
    D) nephron.

15. At which of these locations is the osmolality of the filtrate the highest?
    A) proximal tubule
    B) bottom of the loop of Henle
    C) distal tubule
    D) top of the collecting duct

16. Which of these substances is actively transported into the filtrate in the proximal and distal tubule?
    A) H+ ions
    B) Na+ ions
    C) Glucose
    D) amino acids

17. The micturition reflex
    A) can be stimulated or inhibited by higher centers in the brain.
    B) is stimulated by increased pressure in the bladder.
    C) can be stimulated by irritation of the bladder or urethra.
    D) all of these

18. An increase secretion of renin would be expected to have what effect on sodium excretion and potassium excretion in urine?
    A) increase in Na+ excretion and increase K+ excretion
    B) increase in Na+ excretion and decrease K+ excretion
    C) decrease in Na+ excretion and increase K+ excretion
    D) decrease in Na+ excretion but no effect on K+ excretion

19. The space ____ is referred to as a "potential space."
    A) between the parietal and visceral pleurae
    B) between the parietal pleura and intercostal muscles
    C) between the visceral pleura and lung
    D) within the alveoli

20. The ability of the lungs to stretch, is called their ____.
    A) resistance
    B) compliance
    C) capacitance
    D) elasticity

21. Forceful inspiration of air employs all of the following muscles, except the
    A) scalenes
    B) external intercostals
    C) internal intercostals
    D) diaphragm

22. As blood passes through systemic capillaries, what happens to the affinity of hemoglobin for oxygen and what happens to the Hb-O2 dissociation curve?
    A) Hb affinity for O2 increases and the dissociation curves shifts to the left
    B) Hb affinity for O2 increases and the dissociation curves shifts to the right
    C) Hb affinity for O2 decreases and the dissociation curves shifts to the left
    D) Hb affinity for O2 decreases and the dissociation curves shifts to the right

23. During exercise, which of these statements is true?
    A) The arterial percent oxyhemoglobin saturation is decreased.
    B) The venous percent oxyhemoglobin saturation is decreased.
    C) The arterial P CO 2 is measurably increased.
    D) The arterial pH is measurably decreased

24. If the blood lacked red blood cells but the lungs were functioning normally,
    A) the arterial P O 2 would be normal.
    B) the oxygen content of arterial blood would be normal.
    C) both a and b would apply.
    D) neither a nor b would apply.

25. The breakdown of erythrocytes in the body yields:
    A) Iron, most of which is excreted in the urine
    B) The pigment bilirubin which is water soluble
    C) The pigment bilirubin which is conjugated in the liver
    D) Bile Salts such as sodium taurocholate

26. Monocytes
    A) Originate from precursor cells in lymph nodes
    B) Migrate from the blood into the tissues
    C) DO NOT transform into tissue macrophages
    D) Manufacture immunoglobin M

27. Circulating Red Blood Cells
    A) Include about 1% which retain their nuclei
    B) May show a network pattern when appropriately stained
    C) Are distributed evenly in the blood stream
    D) Travel more slowly through venules than capillaries

28. Lymphocytes
    A) Constitute 1-2% of circulating white cells
    B) Are not motile
    C) Can transform into plasma cells
    D) Decrease markedly in number with removal of the adult thymus

29. Lymph
    A) Contains plasma proteins
    B) Vessels are important in the absorption of protein from the intestine
    C) Is cell free
    D) Flow depends critically on the contraction of adjacent skeletal muscles

30. Which of the following is the correct order of segments of the GI tract – from shortest to longest:

    A) Duodenum, oesophagus and stomach, colon, jejunum and ilem
    B) Colon, oesophagus and stomach, duodenum, jejunum and ileum
    C) Oesophagus and stomach, duodenum, colon, jejunum and ileum
    D) Oesophagus and stomach, colon, duodenum, jejunum and ileum

31. Regarding motility of the GI tract, which of the following is correct:

    A) If the autonomic input to the gut is removed peristaltic activity will cease
    B) Retrograde cholinergic neurons cause smooth muscle relaxation
    C) The basal electrical rhythm is initiated by interstitial cells of Cajal
    D) Anterograde cholinergic neurons cause smooth muscle contraction

32. Regarding swallowing, all of the following are true except:

A) It is a reflex response
B) When sitting upright gravity causes food and liquid to fall to lower oesophagus ahead of the peristaltic wave
C) Efferent nerve fibres are via the trigeminal, glossopharyngeal and vagus nerves
D) Afferent nerve fibres are integrated in the nucleus of the tractus solitaries and nucleus ambiguous

33. Regarding gastric emptying which is correct:

A) Fats and acid, but not carbohydrate, in the duodenum inhibit gastric acid secretion
B) Meals containing fat have the slowest gastric emptying time
C) Meals rich in protein empty faster than those rich in carbohydrate
D) Rate of stomach emptying is independent of osmotic pressure in material entering duodenum

34. Regarding motility of the small intestine and colon, which is incorrect:

A) The three types of smooth muscle contractions in the small intestine are peristaltic waves, segmentation contractions and tonic contractions
B) Segmentation contractions are important in increasing chyme exposure to mucosal surface
C) The colon is the only part of the GI tract where mass action contraction occurs
D) The gastroileal reflex is when the ileocecal valve constricts in response to food leaving the stomach

35. Pancreatic glucagon

A) Is produced by the beta cells of the islets of Langerhans
B) Is a cholesterol derivative
C) Output is inversely proportional to the blood glucose level
D) Has a half-life in the circulation of 3–4 hours

36. Releasing hormones produced in the hypothalamus

A) Are secreted by cells in the median eminence
B) Pass down nerve axons to reach the pituitary gland
C) Cannot control the output of more than one pituitary hormone
D) Regulate the release of oxytocin

37. Which of the following decreases the conversion of 25-hydroxycholecalciferol to 1,25-dihydroxycholecalciferol?

A) A diet low in Ca^{2+}

B) Hypocalcemia

C) Hyperparathyroidism

D) Chronic renal failure

38. Grave's disease is characterised by low levels of

A) Triiodothyronine (T_3)

B) Thyroxine (T_4)

C) Diiodotyrosine (DIT)

D) Thyroid-stimulating hormone (TSH)

39. The reticular activating system is stimulated by all the following, EXCEPT

A) epinephrine
B) serotonin
C) acetylcholine
D) norepinephrine

40. The hypothalamic nucleus that act as a biological clock of the body is

A) supraoptic nucleus
B) preoptic nucleus
C) arcuate nucleus
D) suprachiasmatic nucleus

41. β – waves of the EEG

A) are observed during relaxed wakeful state
B) are faster than α – waves but slower than theta waves
C) disappear when the person becomes alert
D) are observed during REM sleep

42. Damage of the general interpretative area causes all the following effects, EXCEPT

A) failure of articulate speech
B) failure to understand written words
C) failure to understand spoken words
D) sensory aphasia

43. Retrogarde amnesia indicates

A) inability to consolidate memories
B) Inability to recall memories
C) Failure of working memory
D) Presence of lesions in the hippocampus

44. The discharges of corticospinal neuron

A) can be influenced by sensory input from the part of the body moved

B) reflect joint position rather the force of movement

C) excite motor neurons to distal muscles strictly through disynaptic connections

D) have no relation to the direction of movement

45. In control of posture by the brain stem:

A) Medullary reticular nuclei inhibit antigravity muscles

B) Pontine reticular nuclei inhibit antigravity muscles

C) Vestibular nuclei system inhibit antigravity muscles

D) The red nucleus controls axial and proximal muscles

46. Abnormal function of the putamen circuit is associated with:

A) Intention tremor
B) Chorea
C) Response to treatment with dopamine
D) Myoclonic

47. Mid-cycle shift of basal body temperature is due to:
    A) LH surge
    B) FSH
    C) Progesterone
    D) Estradiol

48. Corpus luteum is maintained by:
    A) LH
    B) Progesterone
    C) Estrogen
    D) Inhibin

49. hCG is produced maximally in:
    A) first trimester
    B) second trimester
    C) third trimester
    D) implantation

50. Site of action of estrogen is:
    A) mitochondria
    B) cell membrane
    C) nucleus
    D) cytoplasm

51. Increased secretion of following hormone occurs in post menopausal women:
    A) estrogen
    B) progesterone
    C) FSH
    D) cortisone

52. Vision is most acute when light rays are brought to focus on the:

    A) fovea centralis
    B) the outermost layer of the retina
    C) optic disc
    D) cells in the occipital lobes of the brain

53. The _____ are the actual areas that respond to chemical stimulations for the sense of smell.

    A) olfactory lobes
    B) olfactory mucous membrane cells
    C) cilia on olfactory cells
    D) olfactory organs

54. Which sense is most likely to adapt rapidly?

A) taste
B) smell
C) hearing
D) vision

55. The cells that convert vibrations into neurological impulses are the _____ cells.

A) hair
B) otolith
C) basilar membrane
D) crista acoustica

56. Loss of the sensation of taste is referred to as _____.

A) dysosmia
B) ageusia
C) hypogeusia
D) asnosmia

57. A postganglionic neuron

A) Has myelinated axons
B) Releases neurotransmitter at the effector cell
C) Is the first part of an autonomic motor pathway
D) Has its cell body in the brain or spinal cord

58. Which of the following is not considered a part of the prevertebral ganglia?

A) Celiac ganglion
B) Terminal ganglion
C) Superior mesenteric ganglion
D) Inferior mesenteric ganglion

59. Which of the following sequences best describes the path taken by the sympathetic fibers of the autonomic system?

A) Lateral horns → ventral root → white rami communicantes → paravertebral chain ganglion → gray rami communicantes → target
B) White rami communicantes → paravertebral chain ganglion → lateral horns → ventral root →gray rami communicantes → target
C) Lateral horns → paravertebral chain ganglion → ventral root → white rami communicantes → gray rami communicantes → target
D) Lateral horns → ventral root → gray rami communicantes → paravertebral chain ganglion → white rami communicantes → target

60. Which of the following would NOT take place during exercise or vigorous physical activity?
    A) Increased digestive activity to allow more glucose absorption for energy
    B) Constriction of visceral blood vessels to supply more blood to the heart and skeletal muscle
    C) Increased glucose release from the liver to provide increased energy to cells
    D) Bronchial dilation to increase ventilation

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