



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2019/2020

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE

HMP 230: MEDICAL PHYSIOLOGY VI

DATE: Friday, 13th December 2019

TIME: 2.00 p.m. - 5.00 p.m.

INSTRUCTIONS:

ANSWER ALL QUESTIONS IN SECTION A, B & C

SECTION A: MULTIPLE CHOICE QUESTIONS

Answer ALL questions. Choose the single best response. Indicate your answer by circling your choice option.

1. Alpha – waves of the EEG:
 - a) are observed during relaxed wakeful state
 - b) are faster than delta – waves but slower than theta waves
 - c) disappear when the person becomes alert
 - d) are observed during REM sleep
2. The cells of origin of the corticospinal tract lie:
 - a) Exclusively in post-central gyrus
 - b) Predominantly in the precentral gyrus and adjacent frontal cortex
 - c) Exclusively in the precentral gyrus
 - d) Predominantly in post central gyrus and associated adjoining areas
3. The prefrontal area is concerned with all the following, **EXCEPT** :
 - a) adjusting behavior
 - b) motor guidance within the surrounding environment
 - c) planning timing of movements
 - d) recall of memories
4. 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 ileum
 - 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

5. Regarding motility of the GI tract, which of the following is correct:
- If the autonomic input to the gut is removed peristaltic activity will cease
 - Retrograde cholinergic neurons cause smooth muscle relaxation
 - The basal electrical rhythm is initiated by interstitial cells of Cajal
 - Anterograde cholinergic neurons cause smooth muscle contraction
6. Regarding swallowing, all of the following are true **EXCEPT**:
- It is a reflex response
 - When sitting upright gravity causes food and liquid to fall to lower oesophagus ahead of the peristaltic wave
 - Efferent nerve fibres are via the trigeminal, glossopharyngeal and vagus nerves
 - Afferent nerve fibres are integrated in the nucleus of the tractus solitaries and nucleus ambiguus
7. In gastric emptying:
- Fats and acid, but not carbohydrate, in the duodenum inhibit gastric acid secretion
 - Meals containing fat have the slowest gastric emptying time
 - Meals rich in protein empty faster than those rich in carbohydrate
 - Rate of stomach emptying is independent of osmotic pressure in material entering duodenum
8. Regarding motility of the small intestine and colon, which is **INCORRECT**:
- The three types of smooth muscle contractions in the small intestine are peristaltic waves, segmentation contractions and tonic contractions
 - Segmentation contractions are important in increasing chyme exposure to mucosal surface
 - The colon is the only part of the GI tract where mass action contraction occurs
 - The gastroileal reflex is when the ileocecal valve constricts in response to food leaving the stomach
9. If one suffers from myopia, they have eyeballs that are too _____ and need _____ lens to correct the problem.
- Short, concave
 - Wide, convex
 - Long, concave
 - Short, convex
10. When you fly in an airplane and your ears pop, it is because you are relieving pressure via the
- Eustachian tube
 - Tympanic membrane
 - Semicircular canals
 - Nasal nares
11. The nose and the tongue are both for _____ reception.
- Electrical
 - Vibratory
 - Chemical
 - Mechanical

12. The organ of the ear that actually transfers vibrations into impulses is the
- Vestibule
 - Organ of Corti
 - Semicircular canals
 - Tympanic membrane
13. Regarding the granular neurons of the cortex:
- The major excitatory neurotransmitter is GABA
 - They have short axons and mostly serve as interneurons
 - Contribute to most of the output from the cortex
 - Contribute to the large fibres that go to the spinal cord
14. Association areas of the cortex:
- serve to associate sensory inputs to motor response and perform mental processes that intervene between sensory inputs and motor outputs
 - facilitates conscious perception of specific sensory stimuli
 - facilitates motor coordination
 - provides the motor output to the spinal cord to effect motor action
15. The reticular activating system is inhibited by:
- epinephrine
 - serotonin
 - acetylcholine
 - norepinephrine
16. An increase in the concentration of plasma potassium causes increase in:
- release of renin
 - secretion of aldosterone
 - secretion of ADH
 - release of natriuretic hormone
17. Amino acids are almost completely reabsorbed from the glomerular filtrate via active transport in the :
- proximal tubule
 - loop of Henle
 - distal tubule
 - collecting duct
18. Glomerular filtration rate would be increased by :
- constriction of the afferent arteriole
 - decrease in afferent arteriolar pressure
 - compression of the renal capsule
 - a decrease in the concentration of plasma protein
19. The greatest amount of hydrogen ion secreted by the proximal tubule is associated with :
- excretion of potassium ion
 - excretion of hydrogen ion
 - reabsorption of calcium ion
 - reabsorption of bicarbonate ion

20. Most of the glucose that is filtered through the glomerulus undergoes reabsorption in the :
- proximal tubule
 - descending limb of the loop of Henle
 - ascending limb of the loop of Henle
 - distal tubule

SECTION B: SHORT ANSWER QUESTIONS

Answer all questions in the answer booklet provided. Each question is 5 marks

- Outline the motor aspect of speech formation
- Outline the clinical manifestation associated with bilateral ablation of the amygdala
- Explain the process of olfactory signal transduction
- Describe the tympanic reflex
- List any 5 secretory cells in the stomach, indicating their products
- Describe the defecation reflex
- List any five factors affecting glomerular filtration rate.
- Describe the effects of aldosterone on the renal nephrons and explain how its secretion is regulated.

SECTION C: LONG ANSWER QUESTIONS

Answer all four (4) questions in the answer booklet provided. Each question is 10 Marks

- Describe the neuro-hormonal systems that control the activating-driving systems of the cerebrum
- Destruction sensory transduction of the visual system
- Compare the divisions of the Autonomic Nervous System
- Explain the concept of transport maximum (4 Marks)
 - Explain the mechanisms of glycosuria under normal and abnormal physiological states (6 marks)