

Select the only best answer (2% each, 0.5% penalty for each incorrect answer)

1. Which of the following is most related to the fact that, in the steady state, cell membranes are relatively more permeable to potassium than to sodium?
  - A. Cells possess an outside-negative transmembrane resting potential.
  - B. Cells possess an inside-negative transmembrane resting potential.
  - C. Cells change volume in the presence of somatic pressure gradients.
  - D. Normal cells show a progressive diminution in the internal potassium concentration in the steady state.
  - E. Cells do not possess active ion transport systems.
2. Which of the following best describes the process of diffusion?
  - A. A "downhill" process that is possible in nature.
  - B. An "uphill" process that is active in nature requiring a metabolic energy input.
  - C. A driven process that is purely dependent on the presence of a true driving force such as a pressure or voltage gradient.
  - D. A process by which only large molecular weight proteins may move across biologic membranes.
  - E. Requires metabolic energy
3. The enhancement of contractility of the cardiac muscle fiber brought about by digitalis is related to:
  - A. increased cyclic AMP.
  - B. stimulation of calmodulin.
  - C. inhibition of the sodium pump.
  - D.  $\beta$ -adrenergic stimulation.
  - E. increased production of adenosine.
4. Normal blood flow to the brain is:
  - A. greatly modified by vasomotor control.
  - B. increased by high  $O_2$  level.
  - C. about 150 ml/min.
  - D. about 750 ml/min.
  - E. greatly increased during exercise.
5. The decrease in magnitude of a generator potential during sustained stimulation is called
  - A. receptor perturbation.
  - B. chronaxie.
  - C. refractoxiness.
  - D. potentiation.
  - E. adaptation.
6. The vomiting center is located in the:
  - A. cerebral cortex.
  - B. thalamus.
  - C. hypothalamus.
  - D. medulla oblongata.
  - E. cervical spinal cord.

7. Respiratory alkalosis is characterized by
- A. low pH concentration.
  - B. fall in  $p\text{CO}_2$
  - C. excess pulmonary ventilation.
  - D. protein synthesis increases.
  - E. reduced  $\text{HCO}_3^-/p\text{CO}_2$  rate
8. The total quantity of air that can be expelled from the lungs following a maximal inspiration is known as the:
- A. vital capacity.
  - B. tidal volume.
  - C. expiratory reserve volume.
  - D. functional residual capacity.
  - E. total capacity.
9. In a progressive AV block one would expect:
- A. progressive prolongation of the interval between atrial and ventricular contractions.
  - B. progressive shortening of the interval between atrial and ventricular contractions.
  - C. progressive weakening of atrial contractions.
  - D. progressive weakening of ventricular contractions.
  - E. progressive strengthening of ventricular contractions.
10. A decrease in the total osmotic pressure of arterial blood pressure would lead to an increase in urine volume by
- A. stimulating the secretion of aldosterone.
  - B. increasing the permeability of the glomerular capillaries to water.
  - C. direct inhibiting the reabsorption of water by the collecting ducts.
  - D. increasing the hydrostatic pressure inside the glomerulus.
  - E. inhibiting ADH secretion.
11. If the mean electrical axis of a ventricular depolarization is  $-30^\circ$ , the resultant EKG should reveal the largest positive QRS complex in lead
- A. aVR.
  - B. aVL.
  - C. I.
  - D. II.
  - E. aVF.
12. Which of the following conditions would cause an increase in aortic systolic pressure and a decrease in aortic pulse pressure?
- A. increased stroke volume.
  - B. increased heart rate.
  - C. increased elastic modulus.
  - D. increased arterial compliance.
  - E. decreased peripheral resistance.

13. The rate of gastric emptying is controlled primarily by reflexes that occur
- A. when chyme enters the stomach.
  - B. when chyme enters the intestine.
  - C. during chewing.
  - D. during the interdigestive period.
  - E. during swallowing.
14. Which of the following conditions is most likely to cause acidosis with marked dehydration?
- A. drinking sodium lactate solution
  - B. severe, persistent vomiting
  - C. excessive sweating
  - D. severe diarrhea.
  - E. complete water deprivation for 24 hours
15. Stimuli for aldosterone secretion include all of the following except
- A. atrial natriuretic factor.
  - B. angiotensin II.
  - C. corticotropin.
  - D. hyperkalemia.
  - E. hypovolemia.
16. The following blood data are collected from a 27-year-old male patient: pH = 7.50,  $[\text{HCO}_3^-] = 38 \text{ mmole/L}$ , and  $\text{pO}_2 = 80 \text{ mmHg}$ , given these findings, what is the expected  $\text{pCO}_2$  for this patient?
- A. 30 mmHg
  - B. 40 mmHg
  - C. 50 mmHg
  - D. 60 mmHg
  - E. 70 mmHg
17. Normally, most of the  $\text{H}^+$  is excreted by the kidney in the form of
- A. phosphate ion.
  - B. bicarbonate ion.
  - C. ammonium ion.
  - D. titratable acid.
  - E.  $\beta$ -hydroxybutyrate ion.
18. The normal sequence of phases of the menstrual cycle is
- A. menses, preovulatory, ovulatory, estrogenic.
  - B. menses, follicular, ovulatory, estrogenic.
  - C. progestational, menses, follicular, preovulatory.
  - D. ovulatory, progestational, menses, luteal.
  - E. preovulatory, ovulatory, progestational, menses.

19. Phosphatidyl polyphosphoinoside (PIP<sub>2</sub>) plays an important role in cell signal transduction. It is hydrolyzed to DAG and IP<sub>3</sub> by
- A. phospholipase A<sub>1</sub>.
  - B. phospholipase A<sub>2</sub>.
  - C. diacylglyceride lipase.
  - D. phospholipase C.
  - E. phospholipase D.
20. All of the following statements about the major causes of edema formation are correct, EXCEPT:
- A. Increased arterial pressure secondary to increased cardiac output.
  - B. Local arteriolar dilation.
  - C. Decreased interstitial fluid protein concentration.
  - D. Increased venous pressure.
  - E. Obstruction of lymphatic vessels.
21. The primary physiological effects of hydrocortisone include all the followings, EXCEPT:
- A. an increase in nitrogen excretion in the urine because of protein metabolism.
  - B. a decrease in sodium retention.
  - C. an increase in gluconeogenesis.
  - D. a decrease in peripheral glucose utilization.
  - E. an increase in liver glycogen.
22. Vascular endothelial cells produce heparin-like substances which adjoin in the cell membrane. The heparin-like substance is
- A. the inhibitor of thrombin.
  - B. the activator of plasmin.
  - C. the inhibitor of platelet aggregation.
  - D. the activator of anti-thrombin III.
  - E. the activator of prostacyclin formation in endothelial cells.
23. All of the following factors produced by vascular endothelial cells are anti-thrombotic, EXCEPT:
- A. Prostacyclin.
  - B. Endothelin.
  - C. Nitric oxide.
  - D. Tissue-type plasminogen activator.
  - E. Thrombomodulin.
24. Renin, a kidney enzyme in granules of the juxtaglomerular apparatus, induces
- A. the formation of angiotensin III from angiotensin II.
  - B. the formation of angiotensin III from angiotensin I.
  - C. the formation of angiotensin II from angiotensinogen.
  - D. the formation of angiotensin II from angiotensinogen I.
  - E. the breakdown of angiotensin II.

25. Which of the following statements about aldosterone is FALSE?
- A. It is biosynthesized in adrenal cortex.
  - B. It stimulates the reabsorption of  $\text{Na}^+$  in distal convoluted tubule.
  - C. Its secretion is inhibited by increase in fluid volume.
  - D. Its secretion is stimulated by angiotensin.
  - E. None of the above.
26. A hormone receptor which directly binds to DNA in its active form is
- A.  $\beta$ -adrenergic receptor.
  - B. muscarinic receptor.
  - C. estrogen receptor.
  - D. histamine receptor.
  - E. serotonin receptor.
27. Which of the following items probably be not involved in the vagus stimulated gastric secretion
- A. insulin.
  - B. feeding.
  - C. antralalkalization.
  - D. 2-deoxy-d-glucose.
  - E. sham feeding.
28. Intrinsic factor which is required for absorption of vit.  $\text{B}_{12}$  in the intestine is secreted by
- A. parietal cells.
  - B. argentaffin cells.
  - C. zymogenic cells.
  - D. mast cells.
  - E. mucus neck cells.
29. Gastrin may possess the following physiologic functions, EXCEPT
- A. stimulation of a gastric secretion.
  - B. trophic action.
  - C. promotion of gastric motility.
  - D. increase in gastric mucosal blood flow.
  - E. relaxation of esophageal and pyloric sphincters.
30. Which of the following items is incorrect, when gastric acid back diffusion occurs?
- A. Luminal  $\text{H}^+$  is decreased.
  - B. Luminal  $\text{CA}^{++}$  is decreased.
  - C. Luminal  $\text{Na}^+$  is increase.
  - D. Intramural pH is decreased.
  - E. Potential difference is decrease.

31. Insulin secretion may be stimulated by the following agents, EXCEPT
- A. somatostatin.
  - B. glucagon.
  - C. secretin.
  - D.  $\beta$ -adrenergics.
  - E. potassium.
32. All of the following endogenous substances can stimulate intestinal absorption of salts and water, EXCEPT
- A. dopamine.
  - B. somatostatin.
  - C. enkephalins.
  - D. angiotensin.
  - E. secretin.
33. The following endogenous hormones may influence the migrating myoelectric complex (MMC) in the gastrointestinal tract, EXCEPT
- A. substance P.
  - B. corticosteroid.
  - C. motilin.
  - D. neurotensin.
  - E. somatostatin.
34. The following substances are proteases secreted by the pancreas, EXCEPT
- A. trypsin.
  - B. pepsin.
  - C. chymotrypsin.
  - D. carboxypeptidases A.
  - E. elastase.
35. Cyclic AMP mediates the response of target cells to:
- A. all human hormones.
  - B. peptide hormones.
  - C. steroid hormones.
  - D. all of the above.
  - E. none of the above.
36. Which of the following stimuli can increase a gland's hormonal secretion?
- A. changes in the extracellular concentrations of nutrients and ions.
  - B. hormonal stimulation.
  - C. nerve stimulation.
  - D. all of the above.
  - E. none of the above.

37. The anterior-pituitary hormones:
- A. a short-loop feedback.
  - B. somatotropin.
  - C. gonadotropin.
  - D. regulation of vitamin.
  - E. none of the above.
38. The following statements about insulin are correct, EXCEPT
- A. It is a polypeptide composed of two chains.
  - B. Before its function, it must first bind with a large receptors.
  - C. Its physiological functions are similar to glucagon.
  - D. Diabetes mellitus is the most important disease involving the insulin.
  - E. All the above are correct.
39. Select the incorrect association
- A. A ( $\alpha$ ) cell of pancreas: glucagon.
  - B. B ( $\beta$ ) cell of pancreas: insulin.
  - C. C ( $\delta$ ) cell of pancreas: somatostatin.
  - D. ACTH: Grave's disease.
  - E. PTH: bone mineral hoemostasis.
40. Each is true of peptide hormones EXCEPT they
- A. are made on the ribosomes of endocrine cells.
  - B. can be three amino acids long.
  - C. are produced from smaller hormones called preprohormones.
  - D. serve as neurotransmitters as well in many cases.
  - E. all of the above are false.
41. Which of the following hormones that is not an amine hormone?
- A. aldosterone
  - B. epinephrine
  - C. norepinephrine
  - D. thyroxine
  - E. none of these
42. Select the INCORRECT association
- A. aldosterone - sodium control
  - B. cortisol - glucocorticoid
  - C. oxytocin - liver
  - D. ADH - vasopressin
  - E. FSH - GnRH

43. The patients whose eye ball is too short and the image is focussed behind the retina can be classified as:
- A. myopia.
  - B. hyperopia.
  - C. subperopia.
  - D. presbyopia.
  - E. none of the above.
44. The sounds heard most keenly by human ears are those from sources vibrating at frequencies between:
- A. 200 and 2000 Hz.
  - B. 1000 and 2000 Hz.
  - C. 1000 and 4000 Hz.
  - D. 2000 and 4000 Hz.
  - E. 2000 and 20000 Hz.
45. Somatic sensation for heat, cold, touch, pressure, joint position and pain is mediated by
- A. wave length.
  - B. specific receptor.
  - C. frequencies.
  - D. sensational impulse.
  - E. none of the above.
46. Muscle length and changes in length are monitored by:
- A. postural reflex.
  - B. stretch receptor.
  - C. alpha motor neuron.
  - D. pyramidal tracts.
  - E. all of the above.
47. The direct control of erythrocyte production is:
- A. erythropoietin.
  - B. erythrothin.
  - C. erythromytotin.
  - D. hemoglobin.
  - E. none of the above.
48. In the state of hypoxia, high altitude for acclimatization is:
- A. The peripheral chemoreceptors stimulate ventilation.
  - B. Increase of erythrocyte synthesis to elevate the erythrocyte and hemoglobin contents in blood.
  - C. Facilitation of oxygen unloading in tissues.
  - D. Increase the transfer of oxygen by the raising of capillary density, mitochondria, and muscle myoglobin.
  - E. all of the above.



49. Decrease of arterial blood pressure either by drugs or by others makes the cardiac rate to be:
- A. increased.
  - B. decreased.
  - C. decreased at initial stage and increased thereafter.
  - D. increased immediately and decreased later.
  - E. none of the above.
50. The substance can be activated and/or released in response to stress in human body is:
- A. ACTH.
  - B. CRH.
  - C. Cortisol.
  - D. endorphine.
  - E. all of the above.