

Biol-131 Exam 3 A

Name \_\_\_\_\_

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) Which of the following is caused by the chemical reactions of gases of the respiratory system?  
A) Regulation of pH  
B) Regulation of blood pressure  
C) The synthesis of vasodilators  
D) Aids in defecation
  
- 2) The nose is divided into right and left halves by the \_\_\_\_\_.  
A) nasal septa  
B) nasal vestibules  
C) nasal cavities  
D) nasal fossae  
E) nasal apertures
  
- 3) Each alveolus is surrounded by a web of blood capillaries supplied by the \_\_\_\_\_.  
A) aorta  
B) inferior vena cava  
C) pulmonary vein  
D) pulmonary artery  
E) superior vena cava
  
- 4) The lungs contains a total of five \_\_\_\_\_.  
A) laryngeal cartilages  
B) choanae  
C) lobes  
D) tracheal cartilages  
E) segmental bronchi
  
- 5) Crude sounds are formed into intelligible speech by all of the following *except* the \_\_\_\_\_.  
A) oral cavity      B) lips      C) tongue      D) pharynx      E) epiglottis
  
- 6) The amount of air in excess of tidal volume that can be inhaled with maximum effort is the \_\_\_\_\_.  
A) expiratory reserve volume  
B) residual volume  
C) inspiratory capacity  
D) vital capacity  
E) inspiratory reserve volume

- 7) How is the vital capacity calculated?
- A) Inspiratory reserve volume + tidal volume
  - B) Respiratory volume + tidal volume
  - C) Expiratory reserve volume + tidal volume + inspiratory reserve volume
  - D) Inspiratory reserve volume + expiratory volume
  - E) Expiratory reserve volume + tidal volume
- 8) During exercise, which of the following directly increases respiratory rate?
- A) Reduced oxyhemoglobin
  - B) Reduced blood pH
  - C) The Bohr effect
  - D) Increased amount of CO<sub>2</sub> in the blood
  - E) Increased H<sup>+</sup> level in the blood
- 9) Which of the following would slow down gas exchange between the blood and alveolar air?
- A) A decrease in membrane thickness
  - B) A decrease in nitrogen solubility
  - C) An increase in membrane thickness
  - D) An increase in respiratory rate
  - E) An increase in alveolar surface area
- 10) In the air we breathe, which gas is found in the highest concentration?
- A) Nitrogen
  - B) Carbon dioxide
  - C) Oxygen
  - D) Water vapor
  - E) Hydrogen
- 11) Each hemoglobin molecule can transport up to \_\_\_\_\_ oxygen molecules.
- A) 3                      B) 6                      C) 4                      D) 2                      E) 5
- 12) Which of the following is the term for a deficiency of oxygen or the inability to utilize oxygen in a tissue?
- A) Apoxia                      B) Anoxia                      C) Eupnea                      D) Cyanosis                      E) Hypoxia
- 13) Which of the following is a lung disease marked by abnormally few but large alveoli?
- A) Pulmonary hemosiderosis
  - B) Cor pulmonale
  - C) Collapsed lung
  - D) Emphysema
  - E) Atelectasis

- 14) Nitrogen bubbles can form in the blood and other tissues when a scuba diver ascends too rapidly, producing a syndrome called \_\_\_\_\_.
- A) pulmonary edema
  - B) pulmonary barotrauma
  - C) decompression sickness
  - D) hyperbaric disease
  - E) cerebral embolism
- 15) The vagus and glossopharyngeal nerves carry afferent signals from peripheral chemoreceptors to a chemosensitive area in the \_\_\_\_\_.
- A) medulla oblongata
  - B) ventral respiratory group
  - C) pontine respiratory group
  - D) pons
  - E) dorsal respiratory group
- 16) Mucus plays an important role in cleansing inhaled air. It is produced by \_\_\_\_\_ of the respiratory tract.
- A) great alveolar cells
  - B) goblet cells
  - C) squamous alveolar cells
  - D) ciliated cells
  - E) the pleurae
- 17) The blood transports more CO<sub>2</sub> in the form of \_\_\_\_\_ than in any other form.
- A) bisphosphocarbonate
  - B) bicarbonate ions
  - C) dissolved CO<sub>2</sub> gas
  - D) carbaminohemoglobin
  - E) carboxyhemoglobin
- 18) Breathing is controlled solely by the medulla oblongata and pons.
- A) True
  - B) False
- 19) The rate of oxygen diffusion is affected by the pressure gradient of carbon dioxide.
- A) True
  - B) False
- 20) Gas transport is the process of carrying gases from the alveoli to the systemic tissues and vice versa.
- A) True
  - B) False

- 21) If one inspires through their nose, which of the following answers has the correct order of structures the air would move through?
- A) Nares → Vestibule → Nasal Cavity → Nasopharynx → Oropharynx → Laryngopharynx → Larynx → Trachea → Bronchiole → Respiratory Bronchiole → Terminal Bronchiole → Primary Bronchus → Secondary Bronchus → Tertiary Bronchus → Alveolar Duct → Alveolar Sac → Alveolus
- B) Nares → Nasal Cavity → Vestibule → Nasopharynx → Oropharynx → Laryngopharynx → Larynx → Trachea → Primary Bronchus → Secondary Bronchus → Tertiary Bronchus → Bronchiole → Respiratory Bronchiole → Terminal Bronchiole → Alveolar Duct → Alveolar Sac → Alveolus
- C) Nares → Vestibule → Nasal Cavity → Nasopharynx → Oropharynx → Laryngopharynx → Larynx → Trachea → Primary Bronchus → Secondary Bronchus → Tertiary Bronchus → Bronchiole → Terminal Bronchiole → Respiratory Bronchiole → Alveolar Duct → Alveolar Sac → Alveolus
- D) Nares → Nasal Cavity → Vestibule → Nasopharynx → Oropharynx → Laryngopharynx → Larynx → Trachea → Primary Bronchus → Secondary Bronchus → Tertiary Bronchus → Bronchiole → Terminal Bronchiole → Respiratory Bronchiole → Alveolar Duct → Alveolar Sac → Alveolus
- 22) Upon inspiration, what is the name of the air in the conducting zone that is not available for gas exchange?
- A) Tracheal dead space  
B) Alveolar dead space  
C) Conducting dead space  
D) Anatomical dead space
- 23) How is alveolar air different than inspired air?
- A) Alveolar air has a higher  $PO_2$  than inspired air.  
B) Alveolar air has a higher  $PH_2O$  than inspired air.  
C) Alveolar air has a lower  $PCO_2$  than inspired air.  
D) Alveolar air has a higher  $PN_2$  than inspired air.
- 24) Hypocapnia will lead to which of the following conditions?
- A) Hyperventilation due to alkalosis  
B) Hypoventilation due to alkalosis  
C) Hyperventilation due to acidosis  
D) Hypoventilation due to acidosis
- 25) The expansion of the lungs during inspiration generates a pressure gradient causing air to flow into the lungs. This is an example of Boyle's law.
- A) True  
B) False
- 26) A byproduct of protein catabolism, \_\_\_\_\_ constitutes approximately one-half of all nitrogenous waste.
- A) azotemia  
B) ammonia  
C) uric acid  
D) urea  
E) creatinine

- 27) Which organ system excretes nitrogenous wastes?
- A) The respiratory system
  - B) The urinary system
  - C) The cardiovascular system
  - D) The digestive system
  - E) The integumentary system
- 28) The \_\_\_\_\_ is *not* an organ of the urinary system.
- A) ureter
  - B) urinary bladder
  - C) kidney
  - D) liver
  - E) urethra
- 29) The medial concavity of the kidney is called the \_\_\_\_\_, which admits the renal nerves, blood vessels, lymphatic vessels, and ureter.
- A) cortex
  - B) corpuscle
  - C) medulla
  - D) capsule
  - E) hilum
- 30) The \_\_\_\_\_ innervation of the kidneys reduces urine production, while the function of its \_\_\_\_\_ innervation is unknown.
- A) parasympathetic; sympathetic
  - B) enteric; somatic
  - C) central; peripheral
  - D) peripheral; central
  - E) sympathetic; parasympathetic
- 31) A single lobe of a kidney is comprised of \_\_\_\_\_.
- A) one collecting duct and all nephrons that drain into it
  - B) one pyramid and the overlying cortex
  - C) a renal medulla and two renal columns
  - D) two calyces and a renal pelvis
  - E) one major calyx and all of its minor calyces
- 32) A renal pyramid voids urine into the \_\_\_\_\_.
- A) renal medulla
  - B) ureter
  - C) major calyx
  - D) renal papilla
  - E) minor calyx

- 33) Which of the following correctly traces blood flow from the renal artery into the renal cortex?
- A) Segmental a. → interlobar a. → arcuate a. → interlobular a.
  - B) Segmental a. → arcuate a. → interlobar a. → interlobular a.
  - C) Interlobar a. → interlobular a. → segmental a. → arcuate a.
  - D) Arcuate a. → interlobar a. → afferent arteriole → interlobular a.
  - E) Afferent arteriole → interlobular a. → arcuate a. → interlobar a.
- 34) The transition from an afferent arteriole to an efferent arteriole occurs in the \_\_\_\_\_.
- A) glomerulus
  - B) peritubular capillaries
  - C) medulla
  - D) cortical radiate veins
  - E) vasa recta
- 35) Blood plasma is filtered in the \_\_\_\_\_.
- A) renal column
  - B) renal tubule
  - C) renal corpuscle
  - D) renal capsule
  - E) renal calyx
- 36) Which of the following form the inner layer of the glomerular capsule and wrap around the capillaries of the glomerulus?
- A) Mesangial cells
  - B) Nephrocytes
  - C) Macula densa cells
  - D) Podocytes
  - E) Monocytes
- 37) Glucose and amino acids are reabsorbed from the glomerular filtrate by the \_\_\_\_\_.
- A) collecting duct
  - B) glomerular capillaries
  - C) distal convoluted tubule
  - D) proximal convoluted tubule
  - E) renal corpuscle
- 38) Which of the following would reduce the glomerular filtration rate?
- A) A drop in oncotic pressure
  - B) Vasoconstriction of the afferent arteriole
  - C) Vasodilation of the afferent arteriole
  - D) Vasoconstriction of the efferent arteriole
  - E) An increase in osmotic pressure in the glomerular capsule

- 39) In response to a drop in overall blood pressure, \_\_\_\_\_ stimulates constriction of the glomerular inlet and even greater constriction of the outlet.
- A) angiotensin II
  - B) aldosterone
  - C) parathyroid hormone
  - D) azotemia
  - E) sodium chloride
- 40) Renin hydrolyzes angiotensinogen, which is released from the \_\_\_\_\_, to form angiotensin I.
- A) liver
  - B) spleen
  - C) kidneys
  - D) lungs
  - E) heart
- 41) Which of the following is *not* reabsorbed by the proximal convoluted tubule?
- A) Sodium chloride
  - B) Urea
  - C) Hydrogen ions
  - D) Water
  - E) Potassium
- 42) Which of the following is a direct result of antidiuretic hormone?
- A) Decreased urine volume
  - B) Increased urine volume
  - C) Decreased urine molarity
  - D) Increased urine acidity
  - E) Increased urine salinity
- 43) Aldosterone acts on the \_\_\_\_\_.
- A) descending limb of the nephron loop
  - B) proximal convoluted tubule
  - C) medullary portion of the collecting duct
  - D) distal convoluted tubule
  - E) glomerulus
- 44) In the thick segment of the ascending limb of the nephron loop,  $K^+$  reenters the cell from the interstitial fluid via the \_\_\_\_\_.  $K^+$  is then secreted into the tubular fluid.
- A) countercurrent exchange
  - B) countercurrent multiplier
  - C) vasa recta
  - D) juxtaglomerular apparatus
  - E)  $Na^+-K^+$  pump

- 45) Hypocalcemia stimulates \_\_\_\_\_.
- A) secretion of renin
  - B) a decrease in aldosterone production
  - C) vasoconstriction of the afferent arterioles
  - D) secretion of parathyroid hormone
  - E) an increase in blood urea nitrogen
- 46) In a state of fluid balance, average daily fluid gains and losses are equal.
- A) True
  - B) False
- 47) Hypovolemia refers to a reduction in total body water while maintaining normal osmolarity.
- A) True
  - B) False
- 48) Hyponatremia is usually a result of hypotonic hydration.
- A) True
  - B) False
- 49) Where is the greatest volume of water in the body found?
- A) Transcellular fluid
  - B) Extracellular fluid (ECF)
  - C) Tissue (interstitial) fluid
  - D) Intracellular fluid (ICF)
  - E) Blood plasma and lymph
- 50) In which compartment would fluid accumulate in edema?
- A) Transcellular fluid
  - B) Blood plasma
  - C) Intracellular fluid
  - D) Lymph
  - E) Tissue (interstitial) fluid
- 51) What is the function of antidiuretic hormone?
- A) It stimulates angiotensin II secretion.
  - B) It inhibits salivation and thirst.
  - C) It promotes water conservation.
  - D) It stimulates hypothalamic osmoreceptors.
  - E) It targets the cerebral cortex.
- 52) What is the principal cation of the ECF?
- A)  $K^+$
  - B)  $Na^+$
  - C)  $P_i$
  - D)  $Ca^{2+}$
  - E)  $Cl^-$



53) What is the function of aldosterone?

- A) It increases both  $\text{Na}^+$  and  $\text{K}^+$  secretion.
- B) It increases both  $\text{Na}^+$  and  $\text{K}^+$  reabsorption.
- C) It causes the urine to be more diluted.
- D) It reduces  $\text{Na}^+$  reabsorption and  $\text{K}^+$  secretion.
- E) It increases  $\text{Na}^+$  reabsorption and  $\text{K}^+$  secretion.

54) Hypernatremia is a plasma \_\_\_\_\_ concentration above normal.

- A)  $\text{Cl}^-$
- B)  $\text{P}_i$
- C)  $\text{Ca}^{2+}$
- D)  $\text{K}^+$
- E)  $\text{Na}^+$

55) How is calcium concentration in the body regulated?

- A) By hormones
- B) By the parasympathetic nervous system
- C) By chloride and phosphate concentrations in the plasma
- D) By sodium and calcium concentrations in the plasma
- E) By the sympathetic nervous system