SLE132 Biology Form and Function
Week 3 Cirulaton and Respiration

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

1) Animals such as hydras and jellies can exchange gases directly with the environment by _____. 1) _____
A) active transport B) bulk transport C) osmosis D) diffusion

2) In humans, oxygen is delivered to the cells of the body by _____. 2) _____
A) diffusion
B) a closed circulatory system
C) an open circulatory system
D) diffusion and facilitated diffusion

3) Which one of the following is a characteristic of open circulatory systems but NOT closed circulatory systems? 3) _____
A) a heart
B) a vascular system
C) open-ended blood vessels
D) blood

4) In animals with a closed circulatory system, gas exchange occurs across the thin walls of _____. 4) _____
A) venules B) arteries C) capillaries D) arterioles

5) Veins carry _____. 5) _____
A) oxygen-poor blood
B) blood toward the heart
C) blood away from the heart
D) oxygen-rich blood

6) Trace the path of a red blood cell in a circuit that takes it from the capillary bed of the right kidney to the capillary bed of the left kidney. Assume that you are doing this for an animal with a double circulation system. 6) _____
A) capillary bed of right kidney → arterioles → arteries → aorta → right atrium → right ventricle → pulmonary arteries → capillaries of lungs → pulmonary veins → left atrium → left ventricle → veins → venules → capillary bed of left kidney
B) capillary bed of right kidney → venules → veins → right atrium → right ventricle → pulmonary arteries → capillaries of lungs → pulmonary veins → left atrium → left ventricle → aorta → arteries → arterioles → capillary bed of left kidney
C) capillary bed of right kidney → venules → veins → left atrium → left ventricle → pulmonary arteries → capillaries of lungs → pulmonary veins → right atrium → right ventricle → aorta → arteries → arterioles → capillary bed of left kidney
D) capillary bed of right kidney → venules → veins → right atrium → right ventricle → pulmonary veins → capillaries of lungs → pulmonary arteries → left atrium → left ventricle → aorta → arteries → arterioles → capillary bed of left kidney

7) Which of these carry(ies) oxygen-poor blood? 7) _____
A) pulmonary arteries
B) aorta
C) pulmonary veins
D) left ventricle

8) Why is blood pressure higher during systole than during diastole? 8) _____
A) More blood flows into the heart during systole than during diastole.
B) The contraction of the heart during systole increases the blood pressure against arterial walls.
C) The contraction of the heart during diastole decreases the blood pressure against arterial walls.
D) The relaxation of the heart during systole increases the blood pressure against arterial walls.

9) The basic rhythm of the heartbeat is set by the _____. 9) _____

A) "fight–or–flight" hormone
B) sinoatrial node
C) systolic pressure
D) EKG

10) If your blood pressure were 120/70, it would mean that _____. 10) _____

A) your blood pressure during systole is 120 and your blood pressure during diastole is 70
B) your blood pressure during systole is 120 and your heart rate is 70
C) you have high blood pressure
D) you have low blood pressure

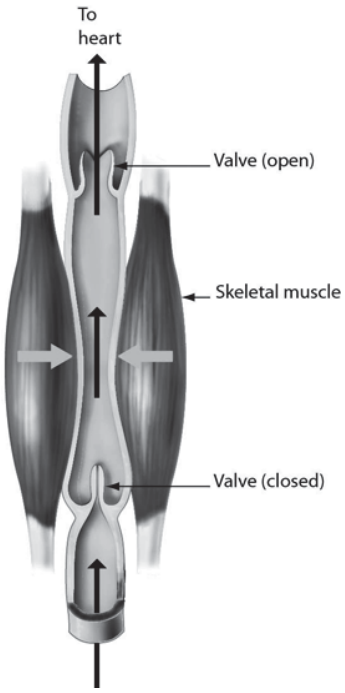
11) As a consequence of red blood cells' lack of nuclei and other organelles, they _____. 11) _____

A) contain less hemoglobin than they might otherwise be able to carry
B) have a small surface area
C) have more room to carry hemoglobin
D) can carry more calcium

12) White blood cells play a particularly important role in _____. 12) _____

A) supporting the activity of red blood cells
B) blood clotting
C) carrying carbon dioxide
D) fighting infections

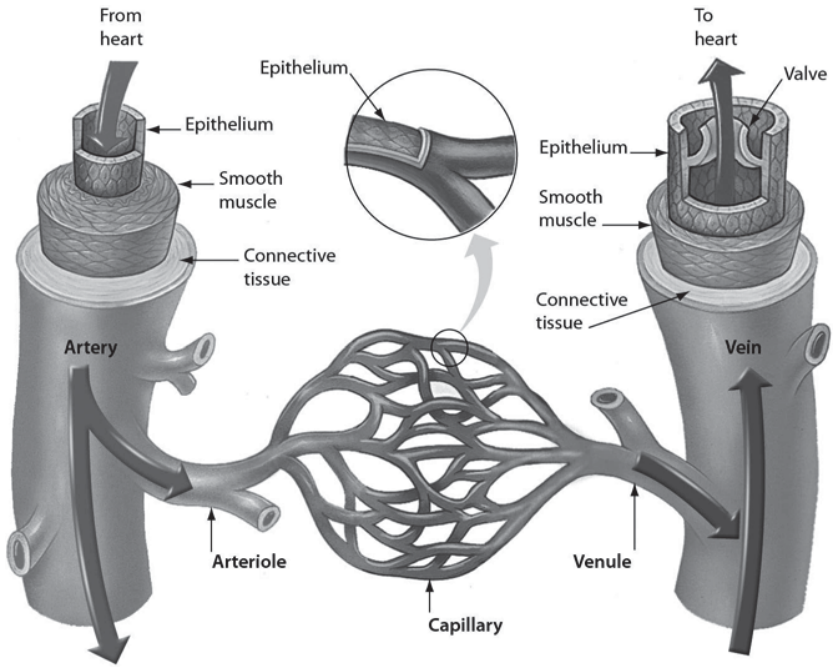
Please refer to the following art to answer the following questions.



13) The one–way flow of blood in veins is maintained by _____. 13) _____

A) valves
B) their thick walls
C) blood pressure
D) muscles pressing against the veins

14) Examine the structure of blood vessels in the following figure. Which one of the following has the structure best suited to chemical exchange between the blood and tissues? 14) _____



A) capillary B) venule C) arteriole D) artery

15) Damage to the sinoatrial node in humans _____. 15) _____
A) would have a direct effect on blood pressure monitors in the aorta
B) would block conductance between the bundle branches and the Purkinje fibres
C) would have a negative effect on peripheral resistance
D) would disrupt the rate and timing of cardiac muscle contractions

16) Gas exchange requires a surface that is both _____. 16) _____
A) protected within the body and connected to the circulatory system
B) permeable to oxygen and impermeable to carbon dioxide
C) durable and stiff
D) thin and moist

17) Countercurrent exchange is evident in the flow of _____. 17) _____
A) blood in the dorsal vessel of an insect and that of air within its tracheae
B) air within the primary bronchi of a human and the blood within the pulmonary veins
C) water across the skin of a frog and the blood flow within the ventricle of its heart
D) water across the gills of a fish and the blood within those gills

18) Earthworms use _____ as their respiratory surface. 18) _____
A) lungs B) tracheae C) gills D) their skin

19) Insects breathe using _____. 19) _____
A) book lungs B) their entire outer skin
C) lungs D) tracheae

20) What path does a molecule of O_2 take from the nose to the respiratory surface? 20) _____

A) pharynx → larynx → bronchus → bronchiole → alveolus → trachea
B) pharynx → larynx → trachea → bronchiole → bronchus → alveolus
C) larynx → pharynx → trachea → bronchus → bronchiole → alveolus
D) pharynx → larynx → trachea → bronchus → bronchiole → alveolus

21) In the human respiratory system, gas exchange occurs across the cells of the _____. 21) _____

A) trachea B) alveoli C) bronchi D) diaphragm

22) Breathing is regulated by _____. 22) _____

A) the circulatory system
B) control centers in the brain stem
C) the spinal cord
D) the diaphragm and chest muscles

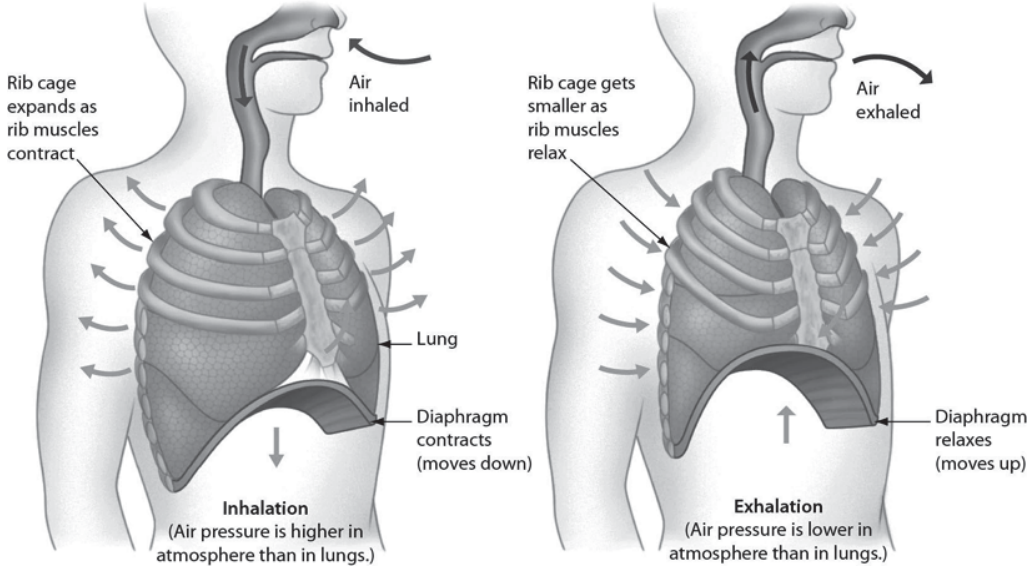
23) When you hold your breath, which of the following blood gas changes leads initially to the urge to breathe again? 23) _____

A) rising carbon dioxide level
B) rising carbon monoxide level
C) falling carbon monoxide level
D) rising carbon dioxide level and falling carbon monoxide level

24) Oxygen is transported through the body mostly _____. 24) _____

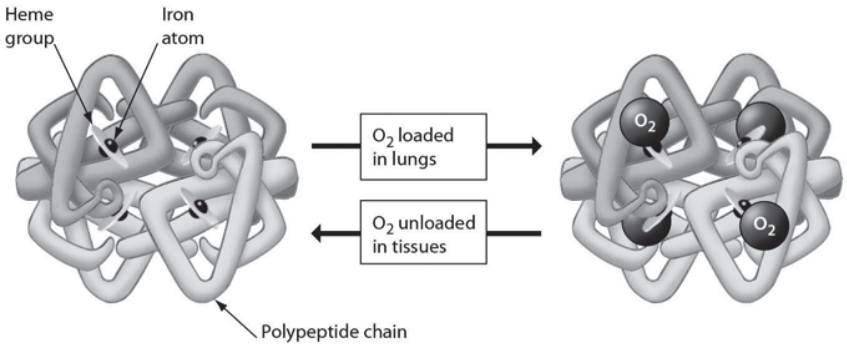
A) bound to hemoglobin
B) bound to dissolved iron
C) dissolved in the blood
D) dissolved in red blood cells

25) Examine the figure shown. During negative pressure breathing, _____. 25) _____



A) the nasal cavities expand and the diaphragm relaxes
B) the diaphragm moves downward and the rib muscles contract, increasing the size of the chest cavity and decreasing the air pressure within the chest cavity
C) the diaphragm and rib muscles contract, decreasing the size of the chest cavity and increasing the pressure within the chest cavity
D) the diaphragm moves downward and the rib muscles relax, increasing the size of the chest cavity and decreasing the air pressure within the chest cavity

26) The figure below shows that _____. 26) _____



A) a hemoglobin molecule can bind up to four molecules of oxygen
B) hemoglobin can bind to either oxygen or carbon dioxide
C) a red blood cell contains four hemoglobin molecules
D) each iron atom can bind four oxygen molecules