

1) The upper airways and lower airways are

- \* A. Upper - mouth to trachea carina; Lower - beyond carina through to the alveoli
- B. Upper - mouth to 5th tracheal cartilage; Lower - everything beyond the 5th tracheal cartilage
- C. Upper - mouth to larynx; Lower - beyond larynx through to the alveoli
- D. Upper - mouth to primary bronchi; Lower - beyond bronchi through to the alveoli

2) The muscles involved with inspiration include

- A. External intercostals, internal intercostals, internal and external obliques
- \* B. Diaphragm, external intercostals and internal intercostals
- C. Diaphragm, internal and external obliques
- D. Diaphragm, external intercostals and rectus abdominus

3) The volume of air that enters the lungs during a single breath of normal or unforced inspiration is defined as

- A. vital capacity
- \* B. the tidal volume
- C. functional capacity
- D. functional residual capacity
- E. the minute volume

4) Expiration at rest is always passive

- \* A. False
- B. True

5) Expiration is mostly passive due to the elastic recoil of the chest and lungs. Most of the lung recoil is generated by

- A. Elastic tissue of lungs
- \* B. Alveoli
- C. Diaphragm
- D. External and internal intercostal muscles

6) The pleural cavity is the space between the parietal pleura (attached to the chest wall) and the visceral plura (attached to the lung). It is normally filled with

- A. Pleural fluid and lymph
- B. Only air
- \* C. Only pleural fluid
- D. A small amount of plural fluid and air

7) Pleural pressure is normally lower (by about 5cm of water) than atmospheric pressure. During inspiration, pleural pressure

- A. may become more negative or less negative, depending on the individual
- B. becomes less negative
- \* C. becomes more negative
- D. stays the same

8) Alveolar pressure drops during inspiration, going down by how many cm of H<sub>2</sub>O?

- A. 15
- B. 5
- \* C. 1
- D. 10

9) When lungs are affected by fibrosis, their compliance

- \* A. Decreases
- B. Increases
- C. Could increase or decrease depending on the degree of infection
- D. Remains the same

10) Pleural pressure (P<sub>pl</sub>) becomes more negative during inspiration (up to 10 cm of H<sub>2</sub>O). How negative it becomes is dependent

- A. directly on exercise; inversely on lung compliance, airway resistance
- \* B. directly on exercise and airway resistance; inversely on lung compliance
- C. directly on exercise, airway resistance and lung compliance
- D. directly on exercise and lung compliance; inversely on airway resistance

11) At rest, the effort of breathing is to overcome the recoil forces of the lungs and thorax as well as to overcome the resistance to air flow in airways. Which portion of the airway offers the greatest resistance?

- \* A. Nasal cavity, pharynx and larynx
- B. Bronchi and bronchioles
- C. Trachea
- D. Alveolar ducts and alveoli

12) Changes in diameter during inspiration and expiration occur as follows

- A. Trachea : identical during inspiration and expiration; Bronchi larger during inspiration than expiration.
- B. Trachea : larger during inspiration than expiration; Bronchi smaller during inspiration than expiration.
- \* C. Trachea : smaller during inspiration than expiration; Bronchi larger during inspiration than expiration.
- D. Trachea : larger during inspiration than expiration; Bronchi larger during inspiration than expiration.

13) The response of lungs with an obstructed airway differs from ones affected by fibrosis as follows:

- \* A. Lungs with an obstructed airway are capable of expanding to full capacity - they just take longer to do so; fibrosis reduces the capacity of lungs
- B. There is no difference; in both cases, the lungs can expand to full capacity, but slower
- C. Lungs with fibrosis are capable of expanding to full capacity - they just take longer to do so; obstructed airways reduce the capacity of lungs
- D. There is no difference; in both cases, the lungs cannot expand to full capacity

14) Dyspnea (difficulty breathing) tends to worsen as follows :

- \* A. Upper respiratory obstruction - during inspiration; lower respiratory obstruction - during expiration.
- B. Upper respiratory obstruction - during inspiration; lower respiratory obstruction - during inspiration.
- C. Upper respiratory obstruction - during expiration; lower respiratory obstruction - during inspiration.
- D. Upper respiratory obstruction - during expiration; lower respiratory obstruction - during expiration.

15) Typical causes of small (or lower) airway obstruction include :

- A. Constriction of smooth muscle
- B. Obstruction of airway
- C. Thickened mucosa
- D. Dynamic collapse of airways
- E. A, B and C only
- F. A, B and D only
- \* G. All of A, B, C and D

16) Which of the following airways is least likely to suffer from dynamic narrowing?

- A. Pharynx
- B. Nares
- C. Larynx
- D. Trachea
- \* E. Nasal cavity

17) Dynamic collapse of airways is always undesirable.

- \* A. False
- B. True

18) The effect of a minor upper airway obstruction on inspiration and expiration is:

- A. Plural pressure become more negative during inspiration while becoming more positive during expiration
- \* B. Plural pressure become more negative during inspiration while remaining about the same during expiration
- C. Plural pressure become less negative during inspiration; during expiration it also becomes less negative.
- D. Plural pressure become less negative during inspiration while remaining about the same during expiration

19) The effect of exercise on pulmonary resistance is as follows:

- A. During expiration, the proportion of resistance of lower airways to total resistance reduces
- B. During inspiration, the proportion of resistance of upper airways to total resistance reduces
- C. The comparative resistance of the nose, other upper airways and lower airways stays relatively constant during inspiration and expiration.
- \* D. During inspiration, the proportion of resistance of lower airways to total resistance reduces

20) Dead space

- A. cannot be manipulated by the individual
- B. is never found within alveoli
- \* C. is any part of the respiratory system in which gas exchange does not occur
- D. is usually greater in small animals than in larger animals

21) Most 'pulmonary' sounds are due to air flow in

- \* A. Large airways
- B. Large and small airways
- C. Small airways
- D. Large airways during expiration, small airways during inspiration

22) The partial pressure of a particular gas in a sample of air reflects

- A. The weight of the gas within the sample relative to the total weight of the sample
- B. The number of molecules of the gas present within the sample relative to the total number of molecules
- C. The molecular weight of the gas within the sample
- \* D. The number of molecules of the gas present within the sample

23) Which of the following is true?

- \* A. Carbon dioxide is much more soluble in water than oxygen
- B. Carbon dioxide and oxygen have about equal solubility in water
- C. Carbon dioxide is much less soluble in water than oxygen
- D. Both carbon dioxide and oxygen do not dissolve in water

24) In a normal animal, diffusion of oxygen across the alveolar and endothelial walls is approximately the same as that of carbon dioxide (in the opposite direction). This is because

- A. The diffusion coefficients of CO<sub>2</sub> and O<sub>2</sub> are the same
- B. The diffusion coefficients and driving pressures of CO<sub>2</sub> and O<sub>2</sub> are the same
- C. The surface area available to CO<sub>2</sub> and O<sub>2</sub> is identical
- \* D. Even though the relative diffusion coefficient of CO<sub>2</sub> is 20 times that of O<sub>2</sub>, the much higher driving pressure of O<sub>2</sub> makes up for it.

25) The exchange rate (of O<sub>2</sub> and CO<sub>2</sub>) in muscle tissue goes up during exercise because

- \* A. The driving pressure gradients and the surface area available for exchange increases
- B. The driving pressure gradients and the surface area available for exchange reduces
- C. The driving pressure gradients increase but the surface area available for exchange reduces
- D. The driving pressure gradients reduce but the surface area available for exchange increases

26) Normally, the approximate partial pressures of O<sub>2</sub> and CO<sub>2</sub> in venous blood are :

- A. PvO<sub>2</sub> = 40 mm H<sub>2</sub>O, PvCO<sub>2</sub> = 46 mm H<sub>2</sub>O
- B. PvO<sub>2</sub> = 100 mm Hg, PvCO<sub>2</sub> = 40 mm Hg
- C. PvO<sub>2</sub> = 100 mm H<sub>2</sub>O, PvCO<sub>2</sub> = 40 mm H<sub>2</sub>O
- \* D. PvO<sub>2</sub> = 40 mm Hg, PvCO<sub>2</sub> = 46 mm Hg

27) As ventilation of the lungs increase, the tendency is for

- A. PAO<sub>2</sub> to decrease and PACO<sub>2</sub> to increase
- \* B. PAO<sub>2</sub> to increase and PACO<sub>2</sub> to decrease
- C. PAO<sub>2</sub> to increase and PACO<sub>2</sub> to increase
- D. PAO<sub>2</sub> to decrease and PACO<sub>2</sub> to decrease

28) Swanks, a hound, is hot in pursuit of a squirrel. Blood in his veins has changed from its "resting state" as follows

- A. PvO<sub>2</sub> up, PvCO<sub>2</sub> up
- B. PvO<sub>2</sub> down, PvCO<sub>2</sub> down
- C. PvO<sub>2</sub> unchanged, PvCO<sub>2</sub> unchanged
- \* D. PvO<sub>2</sub> down, PvCO<sub>2</sub> up

29) Ventilation (V) relates to circulation of air; perfusion (Q) relates to blood flow. In the lungs, they should, ideally, relate to each other as follows

- A. They relate to different entities (ventilation to air, perfusion to blood); consequently, they have no connection with each other.
- B. Perfusion is inversely related to ventilation - as ventilation reduces, the body compensates by increasing perfusion so that maximal O<sub>2</sub>/CO<sub>2</sub> exchange can occur
- \* C. Perfusion should match ventilation. If ventilation increases, so should perfusion ... and vice-versa
- D. They are inversely related to each other - as perfusion rises, the increased blood pressure reduces ventilation ... and vice-versa

30) Lung overall V/Q (ventilation to perfusion) ratio is affected as follows

- \* A. Reduces when there is an airway blockage; increases when a pulmonary artery thrombosis exists
- B. Increases when there is an airway blockage or when a pulmonary artery thrombosis exists
- C. Increases when there is an airway blockage; reduces when a pulmonary artery thrombosis exists
- D. Reduces when there is an airway blockage or when a pulmonary artery thrombosis exists

31) Respiratory Quotient is

- A. The ratio of the tidal volume to the vital capacity of lungs
- B. inverse of the V/Q ratio
- \* C. The ratio of the volume of CO<sub>2</sub> released to the volume of O<sub>2</sub> consumed by a body tissue
- D. the V/Q ratio

32) A cyanotic cat is determined to have a large alveolar-arterial oxygen difference (A-a gradient). Its problem is probably related to

- A. Right-sided heart failure
- \* B. Diffusion of O<sub>2</sub> from alveoli into blood
- C. Perforation of the pleural cavity
- D. Obstruction in the upper airways

33) Oxygen in alveoli diffuses through the wall, dissolves into plasma, then diffuses across the wall of red blood cells before finally binding to hemoglobin. The percentage of oxygen transported by hemoglobin is about

- A. 80
- \* B. 97
- C. 75
- D. 50

34) The oxyhemoglobin dissociation curve reflects the changing affinity of hemoglobin for O<sub>2</sub>. Its shape is

- A. Linear, flat (All O<sub>2</sub> binding occurs at a specific threshold)
- \* B. Sigmoid, positive (curved like the letter S, the higher the O<sub>2</sub>, the higher the binding)
- C. Exponential, positive (as O<sub>2</sub> increases, ever more of it binds to hemoglobin)
- D. Linear, positive (the higher the O<sub>2</sub>, the higher the binding)

35) Pulse oximetry provides an indication of blood oxygenation. It measures

- A. Carboxyhemoglobin, then derives O<sub>2</sub> saturation
- B. Blood oxygen, then derives hemoglobin saturation
- \* C. Hemoglobin O<sub>2</sub> saturation directly
- D. Blood CO<sub>2</sub>, then derives hemoglobin saturation

36) The normal results from an arterial blood gas analysis are approximately

- A. pH : 7.15-7.25, P<sub>O2</sub> : 60-80 mmHG, P<sub>CO2</sub> : 46 mmHg, O<sub>2</sub> saturation : 85-90%
- B. pH : 6.95-7.05, P<sub>O2</sub> : 85-100 mmHG, P<sub>CO2</sub> : 46 mmHg, O<sub>2</sub> saturation : 95-100%
- C. pH : 7.35-7.45, P<sub>O2</sub> : 46 mmHG, P<sub>CO2</sub> : 46 mmHg, O<sub>2</sub> saturation : 68-77%
- \* D. pH : 7.35-7.45, P<sub>O2</sub> : 85-100 mmHG, P<sub>CO2</sub> : 40 mmHg, O<sub>2</sub> saturation : 95-100%

37) The volume of oxygen held in 100 ml of blood is primarily dependent on

- A. Hematocrit
- \* B. Percent oxygen saturation of hemoglobin and the percent hematocrit
- C. Volume of Oxygen dissolved in plasma
- D. Percent oxygen saturation of hemoglobin

38) The oxyhemoglobin dissociation curve depicts the percentage saturation of hemoglobin as a function of P<sub>O2</sub>. When pH lowers or temperature rises, it shifts to the right. This will result in

- \* A. Easier dissociation of oxygen from hemoglobin
- B. Easier binding of oxygen to hemoglobin
- C. Changes in pH do not affect the oxyhemoglobin dissociation curve
- D. The dissociation curve is only affected when pH rises

39) Carbon monoxide (CO) poisoning occurs because

- A. It binds to the same sites that oxygen uses
- B. It depletes oxygen in air by spontaneously reacting with oxygen to form CO<sub>2</sub>
- C. It has a much higher affinity for hemoglobin than oxygen
- \* D. It has a much higher affinity for hemoglobin than oxygen and because it binds to the same sites that oxygen uses

40) Methemoglobinemia occurs when

- A. Hematocrit is low
- B. Methane is inhaled
- \* C. there are large amounts of methemoglobin (an altered hemoglobin which does not carry oxygen) in the blood
- D. Oxygen partial pressure is reduced, as at Mt. Everest

41) The primary mode of CO<sub>2</sub> transport in blood is

- A. bound to hemoglobin
- \* B. as HCO<sub>3</sub><sup>-</sup> (bicarbonate)
- C. as carbamino compounds
- D. in solution (dissolved in plasma)
- E. dissolved within RBCs, but not bound to hemoglobin

42) Within the brain, the respiratory centers are contained within the

- \* A. Medulla and Pons
- B. Cerebrum
- C. Cerebellum
- D. Hippocampus

43) Peripheral chemoreceptors are those outside the CNS. They are found in the carotid bodies at the bifurcation of the common carotid and in the aortic bodies in the aortic arch. They are most sensitive to changes in

- A. HCO<sub>3</sub><sup>-</sup>
- \* B. P<sub>O2</sub>
- C. Both P<sub>O2</sub> and P<sub>CO2</sub>
- D. P<sub>CO2</sub>

44) Central chemoreceptors exist in the medulla oblongata. They are directly stimulated by

- A. O<sub>2</sub>
- B. HCO<sub>3</sub><sup>-</sup>
- \* C. H<sup>+</sup>
- D. CO<sub>2</sub>

45) Normal systolic pressure in the pulmonary artery is about

- A. 120 mmHg
- B. 80mm Hg
- \* C. 25 mmHg
- D. 10mm Hg

46) Under hypoxic conditions, pulmonary arterioles

- A. may constrict or dilate depending on pH
- B. dilate
- C. remain unaffected
- \* D. constrict

47) Pulmonary vascular pressure is <u>actively</u> affected by :

- \* A. Neural and hormonal factors
- B. PCO<sub>2</sub> levels
- \* C. PO<sub>2</sub> levels
- D. Pulmonary inflation
- E. Cardiac pressure

48) In most species pulmonary arterial pressure during exercise is about 35 mmHg. In the horse, during severe exercise, it can be

- \* A. 90 mmHg
- B. 45 mmHg
- C. 35 mmHg
- D. 20 mmHg

49) Pulmonary edema can result from

- A. Increased pulmonary capillary pressure
- B. Decreased plasma oncotic pressure
- C. Damaged pulmonary capillaries
- \* D. All of the above

50) During exercise, cardiac output can increase five-fold, but pulmonary arterial pressure may not even double. This occurs because

- A. pulmonary vascular resistance decreases during exercise
- B. unperfused capillaries are recruited during exercise
- C. previously perfused vessels are distended during exercise
- D. factors that dilate the pulmonary arteries are released by the endothelium during exercise
- \* E. all of the above

51) Which of the following will cause the greatest increase in pulmonary arterial pressure?

- \* A. Exposure of a cow to the hypoxia of high altitude
- B. A twofold increase in pulmonary blood flow
- C. Stimulation of the vagus nerve (PNS) in a sheep
- D. Inhalation of a tidal volume in a horse
- E. None of the above

52) Bronchial circulation

- \* A. drains into the pulmonary circulation and azygous vein
- B. has a bronchial arterial pressure of the same magnitude as pulmonary arterial pressure
- C. supplies nutrient blood flow only to bronchi and no other structures
- D. vasoconstricts in response to hypoxia
- E. receives the total output of the right ventricle

53) In quadrupeds, pulmonary blood flow

- A. is distributed uniformly among the alveoli
- \* B. is distributed so that the dorsal regions of the lung receive the most blood flow
- C. is distributed within the lung as would be predicted by the action of gravity
- D. is distributed uniformly when the animal is anesthetized
- E. is distributed primarily to the ventral part of the lung during exercise

54) The lungs trap particles in air that's breathed. One of the mechanisms involved is sedimentation. This occurs mainly in

- \* A. Lower airways
- B. Upper airways
- C. Nasal epithelium
- D. Alveoli

55) The mucociliary system of the lungs

- A. is restricted to the nasal cavity and trachea
- B. consists of a gel layer in which cilia beat, overlain by a sol layer that entraps particles
- \* C. has a more rapid transport rate in the trachea than in the bronchioles
- D. lacks ciliated cells in the bronchioles, so mucus must be pulled into the larger airways by viscous drag

56) Fetal tissue functions in a hypoxic condition relative to adult tissue. It uses the following mechanisms to cater to this :

- \* A. Higher cardiac output
- \* B. Its erythrocytes have a higher affinity for oxygen
- C. Lower cardiac output
- \* D. Its erythrocytes have a higher hemoglobin concentration
- E. Its erythrocytes have a lower affinity for oxygen
- F. Vasoconstriction of coronary arteries
- \* G. Rerouting of blood to high-importance tissue (e.g. brain, heart)

57) The lung is an outgrowth of the foregut. It develops in three stages

- A. First, blood circulation; then, the minor airways and alveoli; finally, the major airways which connect with the trachea
- B. First, the minor airways and alveoli; then the major airways which connect with the trachea; finally, blood circulation
- \* C. First, the major airways; then pulmonary blood vessels; finally, alveoli
- D. First, the major airways; then minor airways and alveoli; finally, blood circulation

58) Immediately after birth, there is a strong stimulus to inhale because

- \* A. fetal PaO<sub>2</sub> drops
- B. air fills the mouth of the fetus
- \* C. fetal PaCO<sub>2</sub> rises
- D. of the trauma of travelling through the birth canal

59) The first breaths of a neonate result in the following :

- A. Decrease in the pressure of the left atrium and ventricle
- \* B. Pulmonary vasodilation
- \* C. Reduction in the pressure of the right atrium and ventricle
- \* D. Complete closure of the foramen ovale
- E. Complete closure of the ductus arteriosus

60) Mouth breathing decreases upper airway resistance. By how much does mouth breathing reduce resistance in horses?

- A. 10%
- B. 15%
- C. 30%
- D. 45%
- \* E. Horses don't mouth breathe

61) The partial pressure of water vapour in exhaled air is approximately

- A. 3.7 mmHg
- B. 13.7 mmHg
- \* C. 47.0 mmHg
- D. 159 mmHg
- E. 760 mmHg

62) Airway smooth muscle is contracted by which of the following.

- \* A. stimulation of muscarinic receptors
- B. stimulation of alpha adrenergic receptors
- \* C. histamine
- D. stimulation of beta-adrenergic receptors
- E. vasoactive intestinal peptide (VIP)

63) Peripheral chemoreceptors detect which of the following:

- \* A. carbon dioxide
- \* B. hydrogen ions
- C. carbon monoxide
- \* D. oxygen
- E. nitrogen

64) Fetal hemoglobin

- \* A. is able to unload oxygen in fetal tissues due to their very low P<sub>O2</sub>
- \* B. has an oxyhemoglobin dissociation curve that is shifted to the left relative to the adult
- C. has an oxyhemoglobin dissociation curve that is shifted to the right relative to the adult
- D. has a lesser affinity for oxygen than adult hemoglobin
- \* E. has a greater affinity for oxygen than adult hemoglobin

65) Fetal adaptations to low oxygen partial pressures include:

- \* A. hemoglobin with higher affinity for oxygen
- \* B. higher cardiac output
- \* C. higher hemoglobin concentration
- \* D. more oxygenated blood shunted to the head and brain
- E. hemoglobin with lower affinity for oxygen
- F. lower cardiac output

66) Marked ventilation/perfusion mismatches (inequalities) can be due to which of the following factors?

- A. blocked pulmonary veins leading to the heart
- \* B. blocked pulmonary arteries leading to ventilated lung
- \* C. collapsed (=atelectatic) alveoli that are still perfused
- \* D. blocked airways leading to still perfused lung
- E. blocked airways leading to un-perfused lung

67) In healthy animals, the partial pressures in pulmonary blood returning to the heart

- A. are lower for oxygen compared to the alveolar partial pressure for O<sub>2</sub>
- B. are higher for CO<sub>2</sub> compared to the alveolar partial pressure for CO<sub>2</sub>
- C. are lower for CO<sub>2</sub> compared to the alveolar partial pressure for CO<sub>2</sub>
- \* D. reflect the alveolar partial pressures

68) Even in healthy animals, minute ventilation does not match minute perfusion perfectly, leading to a V/Q ratio close to 0.8. Which of the following factors contribute to this ratio?

- \* A. direct emptying of some coronary veins into the left ventricle
- B. patent ductus arteriosus in neonates
- C. shunting of oxygenated blood from pulmonary vessels into bronchial veins
- \* D. shunting of some deoxygenated blood from bronchial vessels into pulmonary veins

69) Pulmonary vessels constrict in response to which of the following stimuli?

- \* A. hypoxia
- B. prostaglandins D and E
- C. nitric oxide
- \* D. activation of alpha-adrenergic receptors

70) Cattle are the domestic species most often affected by altitude sickness, which can occur when animals are moved from a low to a high altitude environment. This is due to which of the following factors?

- \* A. more muscular pulmonary arteries than most other domestic species
- B. lower oncotic pressure in the blood
- C. lower hemoglobin concentrations
- \* D. pulmonary vasoconstriction in response to hypoxia
- E. ruminal distension at high altitude

71) Which of the following statement(s) correctly describe the pulmonary circulatory system?

- A. mean arterial pressures of the pulmonary and systemic circulations are similar
- B. flow is only pulsatile in larger pulmonary arteries
- C. it receives half the output of the right side of the heart
- \* D. flow is pulsatile in all pulmonary vessels
- \* E. pulmonary vessels constrict in response to hypoxia

72) Which of the following statements is correct?

- \* A. surface tension is due to the physical properties of water lining the alveoli
- \* B. two thirds of the elastic recoil of the lungs is due to the surface tension in alveoli
- \* C. one third of the elastic recoil of the lungs is due to the elastic tissues of the pulmonary parenchyma
- \* D. without surfactant coating the fluid layer, surface tension would be much greater
- \* E. at the end of normal expiration, the elastic recoil of the lungs is equal and opposite to the forces exerted by the thoracic wall.

73) Which of the following forces return the lungs and chest wall to their resting dimensions at the end of expiration?

- A. contraction of the diaphragm
- B. atmospheric pressure
- \* C. elastic recoil of the lungs
- D. relaxation of abdominal muscles (diaphragm is not an abdominal muscle)
- \* E. surface tension within the alveoli
- \* F. elastic recoil of the thorax

74) The compliance of the thorax is

- A. greater in large herbivores than in carnivores
- \* B. greater in carnivores than in large herbivores
- C. greater in adults than in neonates
- \* D. greater in neonates than in adults
- \* E. a reflection of the physical properties of the musculoskeletal components of the thorax

75) How do horses decrease the resistance to airflow during exercise?

- \* A. constrict bloodvessels in upper airways
- \* B. distend (flare) nostrils
- \* C. dilate the pharynx and larynx
- D. mouth breathe

76) Alveolar air

- \* A. contains proportionally less O<sub>2</sub> than inspired air
- \* B. contains proportionally less N<sub>2</sub> than inspired air
- C. contains proportionally less CO<sub>2</sub> than inspired air
- \* D. has the same barometric pressure as inspired air
- E. contains proportionally more O<sub>2</sub> than inspired air
- \* F. generally contains more water vapour than inspired air
- \* G. contains proportionally more CO<sub>2</sub> than inspired air

77) The affinity of hemoglobin for oxygen is increased by which of the following factors

- A. acidosis
- B. hyperthermia
- \* C. carbon monoxide poisoning
- \* D. hypothermia
- \* E. the presence of fetal hemoglobin in some species
- \* F. alkalosis

78) Angiotensin-converting enzyme

- A. is present on the luminal surface of alveolar cells
- \* B. inactivates bradykinin
- C. is present on the luminal surface of renal glomerular arteries
- \* D. is present on the luminal surface of pulmonary endothelial cells
- \* E. converts angiotensin I to angiotensin II
- F. is inactivated in the lung

79) When cardiac output increases, one or more of the following happens :

- A. acetylcholine causes vasodilation of pulmonary vessels
- \* B. the first effect is an increase in pulmonary arterial pressures
- \* C. distension of pulmonary vessels leads to release of nitric oxide, which causes pulmonary vasodilation
- \* D. increases in pulmonary arterial pressures passively distend the pulmonary vessels
- \* E. previously unused capillaries in the lungs are recruited
- F. reflex constriction of pulmonary arteries

80) Where would you take an arterial blood sample in dogs?

- \* A. brachial
- B. saphenous
- \* C. lingual
- \* D. femoral
- E. jugular

81) The normal difference between O<sub>2</sub> partial pressure of Alveoli and arteries is between

- A. 10 and 20 mmHg
- B. -5 to +5 mmHg
- C. 10 and 20 cm H<sub>2</sub>O
- \* D. 0 and 10 mmHg
- E. 0 and 10 cm H<sub>2</sub>O

82) Where could you take an arterial blood sample in an adult horse?

- \* A. Facial, greater metatarsal, carotid
- B. Saphenous, Carotid
- C. Brachial, femoral, lingual
- D. Facial, femoral, brachial

83) Partial pressure of inhaled gases almost always reduces by the time it reaches small airways because

- \* A. It gets humidified
- B. Pressure within smaller airways increases
- C. Some exchange occurs
- D. Nitrogen tends to build up
- E. Pressure within smaller airways reduces

84) 2,3-diphosphoglycerate, or 2,3-DPG, is an organophosphate, which is created in erythrocytes during glycolysis. Which way does it shift the Hemoglobin-Oxygen dissociation curve?

- A. Left, allowing oxygen to dissociate more easily
- B. Right, allowing oxygen to dissociate less easily
- \* C. Right, allowing oxygen to dissociate more easily
- D. Left, allowing oxygen to dissociate less easily

85) Pulmonary vascular pressure is <u>actively</u> affected by :

- A. Cardiac pressure
- B. Pulmonary inflation
- \* C. PAO<sub>2</sub> levels
- \* D. Neural and hormonal factors

86) Some of the metabolic functions of lungs include :

- \* A. Norepinephrine removed partially
- B. Lactate breathed out
- C. Epinephrine removed partially
- \* D. Serotonin degraded
- \* E. Angiotensin I converted to Angiotensin II

87) With respect to where hemoglobin is created :

- A. Embryo - Yolk sac; Adult - Liver, spleen; Fetus - bone marrow
- B. Embryo - Allantois; Fetus - Liver, spleen; Adult - bone marrow
- \* C. Embryo - Yolk sac; Fetus - Liver, spleen; Adult - bone marrow
- D. Embryo - Allantois; Adult - Liver, spleen; Fetus - bone marrow

88) Small airway constriction is characterized by :

- \* A. Bronchoconstriction
- \* B. Reaction to tachykinins like Substance P
- \* C. Dynamic collapse of airways
- D. Constriction due to SNS stimulation
- E. Reaction to inflammatory mediators like prostaglandins