Name:_____ Class:_____ Date:_____

Chapter 02: Ventilation

1. What instrument is used to measure Patm?

a. dynameter b. altimeter
c. barometer d. hygrometer

ANSWER: c

FEEDBACK:
a. A barometer is used to measure barometric (PB) or atmospheric (Patm) pressure.
b. A barometer is used to measure barometric (PB) or atmospheric (Patm) pressure.
c. A barometer is used to measure barometric (PB) or atmospheric (Patm) pressure.
d. A barometer is used to measure barometric (PB) or atmospheric (Patm) pressure.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: The Airways
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 1/29/2019 9:34 AM
DATE MODIFIED: 1/29/2019 9:37 AM

2. What is the term for the movement of gas from the external environment to the alveoli?

a. external respiration b. ventilation
c. internal respiration d. osmosis

ANSWER: b

FEEDBACK:
a. The movement of gas from the external environment to the alveoli is called ventilation.
b. The movement of gas from the external environment to the alveoli is called ventilation.
c. The movement of gas from the external environment to the alveoli is called ventilation.
d. The movement of gas from the external environment to the alveoli is called ventilation.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Introduction
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 1
DATE CREATED: 1/29/2019 9:38 AM
DATE MODIFIED: 1/29/2019 9:39 AM

3. At sea level under standard conditions, what would the P_B equal in mm Hg ?

a. 29.9 b. 1034
c. 14.7 d. 760

ANSWER: d

FEEDBACK:
a. At sea level under standard conditions, the normal barometric pressure is 760 mm Hg.

Chapter 02: Ventilation

b. At sea level under standard conditions, the normal barometric pressure is 760 mm Hg.
c. At sea level under standard conditions, the normal barometric pressure is 760 mm Hg.
d. At sea level under standard conditions, the normal barometric pressure is 760 mm Hg.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Mechanisms of Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 2
DATE CREATED: 1/29/2019 9:40 AM
DATE MODIFIED: 1/30/2019 1:04 AM

4. What is the general term for a pressure difference between two points in a system?

a. diffusion b. osmotic gradient
c. pressure gradient d. system pressure variation

ANSWER: c
FEEDBACK:
a. A pressure gradient is defined as the difference in pressures occuring between two points.
b. A pressure gradient is defined as the difference in pressures occuring between two points.
c. A pressure gradient is defined as the difference in pressures occuring between two points.
d. A pressure gradient is defined as the difference in pressures occuring between two points.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Pressure Gradients
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 2
DATE CREATED: 1/29/2019 9:43 AM
DATE MODIFIED: 1/29/2019 9:45 AM

5. At sea level, what would the alveolar pressure at end-expiration equal?

a. 760 mm Hg b. 0 mm Hg
c. 764 mmHg d. 756 mm Hg

ANSWER: a
FEEDBACK:
a. Because the alveolar and atmospheric pressure are identical at end-expiration, no air movement occurs.
b. Because the alveolar and atmospheric pressure are identical at end-expiration, no air movement occurs.
c. Because the alveolar and atmospheric pressure are identical at end-expiration,

no air movement occurs.

d. Because the alveolar and atmospheric pressure are identical at end-expiration, no air movement occurs.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Pressure Gradients
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 2
DATE CREATED: 1/29/2019 9:45 AM
DATE MODIFIED: 1/29/2019 9:47 AM

6. At what point in the ventilatory cycle would the intra-alveolar pressure be higher than the atmospheric pressure?

a. pre-inspiration b. inspiration
c. expiration d. end-expiration

ANSWER: c
FEEDBACK:

a. For gas to leave the lungs during exhalation, the intra-alveolar pressure must be higher than the atmospheric pressure.
b. For gas to leave the lungs during exhalation, the intra-alveolar pressure must be higher than the atmospheric pressure.
c. For gas to leave the lungs during exhalation, the intra-alveolar pressure must be higher than the atmospheric pressure.
d. For gas to leave the lungs during exhalation, the intra-alveolar pressure must be higher than the atmospheric pressure.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Pressure Gradients
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 2
DATE CREATED: 1/29/2019 9:49 AM
DATE MODIFIED: 1/29/2019 9:51 AM

7. Which gas law states that at constant temperature, a volume of gas varies inversely proportional to its pressure?

a. Henry's b. Charles
c. Boyle's d. Gay-Lussac's

ANSWER: c
FEEDBACK:

a. Boyle's law states that at a constant temperature P1 x V1=P2 x V2 .
b. Boyle's law states that at a constant temperature P1 x V1=P2 x V2 .
c. Boyle's law states that at a constant temperature P1 x V1=P2 x V2 .
d. Boyle's law states that at a constant temperature P1 x V1=P2 x V2 .

POINTS: 1
DIFFICULTY: Recall

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REFERENCES: Boyle's Law and Its Relationship to Pressure Gradients
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 2
DATE CREATED: 1/29/2019 9:51 AM
DATE MODIFIED: 1/30/2019 4:10 AM

8. Which sequence represents one respiratory cycle?

I. Inspiration, expiration
II. Inspiration, end-inspiration, expiration, and end-expiration
III. Expiration, end-expiration, inspiration, end-inspiration
IV. End-inspiration, inspiration, end-expiration, expiration

a. II only b. IV only
c. 1 and III only d. II and IV only

ANSWER: b
FEEDBACK:
a. Inspiration, end-inspiration, expiration, and end-expiration represents one respiratory cycle.
b. Inspiration, end-inspiration, expiration, and end-expiration represents one respiratory cycle.
c. Inspiration, end-inspiration, expiration, and end-expiration represents one respiratory cycle.
d. Inspiration, end-inspiration, expiration, and end-expiration represents one respiratory cycle.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Balloon Model of Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 3
DATE CREATED: 1/29/2019 10:00 AM
DATE MODIFIED: 1/30/2019 4:14 AM

9. What is the general term for the inward movement of tissue between the ribs during inspiration due to increased negative intrapleural pressure generated during respiratory distress?

a. dyspnea b. intercostal retractions
c. supraclavicular retractions d. pectus excavatum

ANSWER: b
FEEDBACK:
a. Intercostal retractions are the inward movement of tissue between ribs during inspiration due the high negative intapleural pressure generated during respiratory distress, especially in newborns and infants.
b. Intercostal retractions are the inward movement of tissue between ribs during inspiration due the high negative intapleural pressure generated during respiratory distress, especially in newborns and infants.
c. Intercostal retractions are the inward movement of tissue between ribs during inspiration due the high negative intapleural pressure generated during

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respiratory distress, especially in newborns and infants.

d. Intercostal retractions are the inward movement of tissue between ribs during inspiration due the high negative intapleural pressure generated during respiratory distress, especially in newborns and infants.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: The Primary Mechanism of Ventilation Applied to the Human Airways|Clinical Connection 2-1: Inspiratory Intercostal Retractions
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 4
DATE CREATED: 1/29/2019 10:58 PM
DATE MODIFIED: 1/29/2019 11:01 PM

10. What is the general term for the force required to move gas or fluid through a tube or vessel?

a. transthoracic pressure b. driving pressure
c. transpulmonary pressure d. transmural pressure

ANSWER: b
FEEDBACK:

a. The driving pressure is the pressure difference between two points in a tube or vessel.
b. The driving pressure is the pressure difference between two points in a tube or vessel.
c. The driving pressure is the pressure difference between two points in a tube or vessel.
d. The driving pressure is the pressure difference between two points in a tube or vessel.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Driving Pressure
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 5
DATE CREATED: 1/29/2019 11:01 PM
DATE MODIFIED: 1/29/2019 11:03 PM

11. Which pressure is represented by $P_{rs} = P_B - P_{alv}$?

a. transmural pressure b. transpulmonary pressure
c. transthoracic pressure d. transrespiratory pressure

ANSWER: d
FEEDBACK:

a. Transrespiratory pressure is the difference between the atmospheric pressure and alveolar pressure.
b. Transrespiratory pressure is the difference between the atmospheric pressure and alveolar pressure.
c. Transrespiratory pressure is the difference between the atmospheric pressure and alveolar pressure.

d. Transrespiratory pressure is the difference between the atmospheric pressure and alveolar pressure.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Transrespiratory Pressure
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 5
DATE CREATED: 1/29/2019 11:04 PM
DATE MODIFIED: 1/30/2019 4:16 AM

12. What is the term for the pressure difference that occurs across the airway wall ?

a. Transmural pressure b. Transrespiratory pressure
c. Transpulmonary pressure d. Transthoracic pressure

ANSWER: a
FEEDBACK:

a. The transmural pressure is derived by subtracting the pressure on the inside of the airway from the pressure on the ouside of the airway.
b. The transmural pressure is derived by subtracting the pressure on the inside of the airway from the pressure on the ouside of the airway.
c. The transmural pressure is derived by subtracting the pressure on the inside of the airway from the pressure on the ouside of the airway.
d. The transmural pressure is derived by subtracting the pressure on the inside of the airway from the pressure on the ouside of the airway.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Transmural Pressure
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 5
DATE CREATED: 1/29/2019 11:09 PM
DATE MODIFIED: 1/29/2019 11:12 PM

13. What is the term for the difference between the alveolar pressure and the pleural pressure?

a. transmural pressure b. transthoracic pressure
c. transrespiratory pressure d. transpulmonary pressure

ANSWER: d
FEEDBACK:

a. The transpulmonary pressure is the difference between the alveolar pressure and the pleural pressure.
b. The transpulmonary pressure is the difference between the alveolar pressure and the pleural pressure.
c. The transpulmonary pressure is the difference between the alveolar pressure and the pleural pressure.
d. The transpulmonary pressure is the difference between the alveolar pressure and the pleural pressure.

POINTS: 1

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DIFFICULTY: Recall
REFERENCES: Transpulmonary Pressure
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 5
DATE CREATED: 1/29/2019 11:12 PM
DATE MODIFIED: 1/29/2019 11:17 PM

14. What is the movement of air from one lung to another?
    a. seesaw effect b. pendulluft
    c. flail chest d. diaphragm paralysis

ANSWER: b
FEEDBACK:
a. Pendelluft is the movement of air from one lung to another.
b. Pendelluft is the movement of air from one lung to another.
c. Pendelluft is the movement of air from one lung to another.
d. Pendelluft is the movement of air from one lung to another.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Transthoracic Pressure
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 5
DATE CREATED: 1/29/2019 11:17 PM
DATE MODIFIED: 1/29/2019 11:19 PM

15. Which abnormal breathing pattern is a result of diaphragm fatigue or paralysis?
    a. partial inspiration b. abdominal paradox
    c. respiratory distress d. abdominal protrusion

ANSWER: b
FEEDBACK:
a. Abdominal paradox is an abnormal breathing pattern that results from diaphragm fatigue, as the normal mechanics of breathing are altered to maintain ventilation.
b. Abdominal paradox is an abnormal breathing pattern that results from diaphragm fatigue, as the normal mechanics of breathing are altered to maintain ventilation.
c. Abdominal paradox is an abnormal breathing pattern that results from diaphragm fatigue, as the normal mechanics of breathing are altered to maintain ventilation.
d. Abdominal paradox is an abnormal breathing pattern that results from diaphragm fatigue, as the normal mechanics of breathing are altered to maintain ventilation.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Abdominal Paradox

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QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 6
DATE CREATED: 1/29/2019 11:19 PM
DATE MODIFIED: 1/29/2019 11:22 PM

16. Which clinical measurement is used to evaluate the elastic forces of the lungs?

a. elastance b. lung compliance
c. surface tension d. airway resistance

ANSWER: b
FEEDBACK:

a. The elastic forces of the lungs can be evaluated by measuring lung compliance.
b. The elastic forces of the lungs can be evaluated by measuring lung compliance.
c. The elastic forces of the lungs can be evaluated by measuring lung compliance.
d. The elastic forces of the lungs can be evaluated by measuring lung compliance.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Elastic Properties of the Lung and Chest Wall
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 7
DATE CREATED: 1/29/2019 11:29 PM
DATE MODIFIED: 1/29/2019 11:30 PM

17. What of the following is used to calculate lung compliance?

a. $P=(2ST) / r$ b. $\Delta V/ \Delta P$
c. $P1V1=P2V2$ d. $\Delta P/ \Delta V$

ANSWER: b
FEEDBACK:

a. Lung compliance is defined as the change in lung volume per unit of pressure change.
b. Lung compliance is defined as the change in lung volume per unit of pressure change.
c. Lung compliance is defined as the change in lung volume per unit of pressure change.
d. Lung compliance is defined as the change in lung volume per unit of pressure change.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Lung Compliance
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 8

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DATE CREATED: 1/29/2019 11:31 PM
DATE MODIFIED: 1/29/2019 11:44 PM

18. What would the lung compliance equal if a pressure change of 4 cm H20 resulted in a volume change of 600 mL?

a. 0.15L/cm H20 b. 1.5 L/cm H20
c. 0.24 L/cm H20 d. 0.066 L/cm H20

ANSWER: a
FEEDBACK:
a. A volume change of 0.6 L from pressure change of 4 cm H20 would result in a lung compliance of 0.15 L/cm H20 (0.6L/4 cm H20).
b. A volume change of 0.6 L from pressure change of 4 cm H20 would result in a lung compliance of 0.15 L/cm H20 (0.6L/4 cm H20).
c. A volume change of 0.6 L from pressure change of 4 cm H20 would result in a lung compliance of 0.15 L/cm H20 (0.6L/4 cm H20).
d. A volume change of 0.6 L from pressure change of 4 cm H20 would result in a lung compliance of 0.15 L/cm H20 (0.6L/4 cm H20).
POINTS: 1
DIFFICULTY: Application
REFERENCES: Lung Compliance
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 9
DATE CREATED: 1/29/2019 11:45 PM
DATE MODIFIED: 1/29/2019 11:47 PM

19. Reversible bronchospasm, airways inflammation, mucous plugging, and hyperinflation of the alveoli are characteristics of what pulmonary disorder?

a. cystic fibrosis b. emphysema
c. flail chest d. asthma

ANSWER: d
FEEDBACK:
a. Asthma is characterized by reversible bronchospasm, airways inflammation, mucous plugging, and hyperinflation of the alveoli.
b. Asthma is characterized by reversible bronchospasm, airways inflammation, mucous plugging, and hyperinflation of the alveoli.
c. Asthma is characterized by reversible bronchospasm, airways inflammation, mucous plugging, and hyperinflation of the alveoli.
d. Asthma is characterized by reversible bronchospasm, airways inflammation, mucous plugging, and hyperinflation of the alveoli.
POINTS: 1
DIFFICULTY: Recall
REFERENCES: Lung Compliance|Clinical Connection 2-4: Pulmonary Disorders that Force the Patient to Breathe at the Top Flat Portion of the Volume Pressure Curve
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 10
DATE CREATED: 1/29/2019 11:47 PM

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DATE MODIFIED: 1/29/2019 11:49 PM

20. How do obstructive lung diseases that cause air trapping affect lung compliance?

a. Lung compliance remains normal. b. Lung compliance is reduced.

c. Lung compliance is increased. d. Lung compliance is unaffected by air trapping.

ANSWER: b

FEEDBACK:

a. Lung compliance is decreased in the presence of obstructive lung diseases that cause air trapping and hyperinflation.

b. Lung compliance is decreased in the presence of obstructive lung diseases that cause air trapping and hyperinflation.

c. Lung compliance is decreased in the presence of obstructive lung diseases that cause air trapping and hyperinflation.

d. Lung compliance is decreased in the presence of obstructive lung diseases that cause air trapping and hyperinflation.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: Lung Compliance|Clinical Connection 2-3: Pulmonary Disorders that Force the Patient to Breathe at the Top Flat Portion of the Volume Pressure Curve

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 10

DATE CREATED: 1/29/2019 11:50 PM

DATE MODIFIED: 1/29/2019 11:51 PM

21. What effect do restrictive lung diseases have on lung compliance?

a. Restrictive lung diseases do not affect lung compliance. b. Lung compliance decreases

c. Lung compliance remains normal d. Lung compliance increases

ANSWER: b

FEEDBACK:

a. Restrictive lung diseases shift the volume-pressure curve to the right so lung compliance is reduced.

b. Restrictive lung diseases shift the volume-pressure curve to the right so lung compliance is reduced.

c. Restrictive lung diseases shift the volume-pressure curve to the right so lung compliance is reduced.

d. Restrictive lung diseases shift the volume-pressure curve to the right so lung compliance is reduced.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: Lung Compliance|Clinical Connection 2-4: Pulmonary Disorders that Shift the Pressure Volume Curve to the Right

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 11

DATE CREATED: 1/29/2019 11:52 PM

DATE MODIFIED: 1/29/2019 11:54 PM

22. Which of the following would shift the volume-pressure curve to the right?

I. Acute asthma episode
II. Pneumothorax
III. Pleural effusion
IV. Pulmonary edema

a. II, II, and IV only
b. I. III and IV only
c. I, II, and IV only
d. Ii and IV only

ANSWER: a

FEEDBACK:

a. Restrictive lung conditions, including pneumothorax, pleural effusion, and pulmonary edema shift the volume pressure curve to the right.
b. Restrictive lung conditions, including pneumothorax, pleural effusion, and pulmonary edema shift the volume pressure curve to the right.
c. Restrictive lung conditions, including pneumothorax, pleural effusion, and pulmonary edema shift the volume pressure curve to the right.
d. Restrictive lung conditions, including pneumothorax, pleural effusion, and pulmonary edema shift the volume pressure curve to the right.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Lung Compliance|Clinical Connection 2-4: Pulmonary Disorders that Shift the Pressure Volume Curve to the Right
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 11
DATE CREATED: 1/29/2019 11:54 PM
DATE MODIFIED: 1/29/2019 11:59 PM

23. What is the reciprocal of compliance?

a. elastance b. viscosity
c. resistance d. surface tension

ANSWER: a

FEEDBACK:

a. The reciprocal of compliance is elastance.
b. The reciprocal of compliance is elastance.
c. The reciprocal of compliance is elastance.
d. The reciprocal of compliance is elastance.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Hooke's Law
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 12

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DATE CREATED: 1/30/2019 12:00 AM
DATE MODIFIED: 1/30/2019 12:01 AM

24. Which physical law explains elastance?

a. Gay-Lussac's law b. Charles' law
c. Boyle's law d. Hooke's law

ANSWER: d
FEEDBACK:
a. Hooke's law explains elastance.
b. Hooke's law explains elastance.
c. Hooke's law explains elastance.
d. Hooke's law explains elastance.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Hooke's Law
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 12
DATE CREATED: 1/30/2019 12:02 AM
DATE MODIFIED: 1/30/2019 12:04 AM

25. When a positive pressure breath is delivered from a mechanical ventilator, how would intra-alveolar and intrapleural pressures be affected during inspiration?

a. The intra-alveolar pressure would rise while the intrapleural pressure remains subatmospheric
b. Both would remain constant at their resting levels
c. Both would decrease
d. Both would increase

ANSWER: d
FEEDBACK:
a. The intra-alveolar and intrapleural pressures would increase during a positive pressure breath from a mechanical ventilator.
b. The intra-alveolar and intrapleural pressures would increase during a positive pressure breath from a mechanical ventilator.
c. The intra-alveolar and intrapleural pressures would increase during a positive pressure breath from a mechanical ventilator.
d. The intra-alveolar and intrapleural pressures would increase during a positive pressure breath from a mechanical ventilator.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Hooke's Law|Clinical Connection 2-5: Positive Pressure Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 13
DATE CREATED: 1/30/2019 12:04 AM
DATE MODIFIED: 1/30/2019 12:07 AM

26. When a tension pneumothorax occurs during positive pressure ventilation, how will the cardiac output and blood

pressure affected?

a. The BP will increase but the BP will decrease
b. Both will increase
c. The cardiac output will increase but the BP will decrease
d. Both will decrease

ANSWER: d

FEEDBACK:

a. When a tesnion pneumothorax occurs, the cardiac output and blood pressure decrease due to compression of major vessels from accumulated gas in the pleural cavity.
b. When a tesnion pneumothorax occurs, the cardiac output and blood pressure decrease due to compression of major vessels from accumulated gas in the pleural cavity.
c. When a tesnion pneumothorax occurs, the cardiac output and blood pressure decrease due to compression of major vessels from accumulated gas in the pleural cavity.
d. When a tesnion pneumothorax occurs, the cardiac output and blood pressure decrease due to compression of major vessels from accumulated gas in the pleural cavity.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Hooke's Law|Clinical Connection 2-6: Hazards of Positive Pressure Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 14
DATE CREATED: 1/30/2019 12:08 AM
DATE MODIFIED: 1/30/2019 12:09 AM

27. Which law best explains the basic operation of the negative pressure ventilator?

a. Charles'
b. Boyle's
c. Hooke's
d. Dalton's

ANSWER: b

FEEDBACK:

a. The basic pressure and volume relationships described by Boyle's law are implemented by negative pressure ventilators.
b. The basic pressure and volume relationships described by Boyle's law are implemented by negative pressure ventilators.
c. The basic pressure and volume relationships described by Boyle's law are implemented by negative pressure ventilators.
d. The basic pressure and volume relationships described by Boyle's law are implemented by negative pressure ventilators.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Hooke's Law|Clinical Connection 2-7: Negative Pressure Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 15
DATE CREATED: 1/30/2019 12:10 AM
DATE MODIFIED: 1/30/2019 12:12 AM

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28. Which of the following are periods of no gas flow during negative-pressure ventilation?
I. Inspiration
II. End-inspiration
III. Expiration
IV. End-expiration
a. II only b. I and III only
c. IV only d. II and IV only

ANSWER: d

FEEDBACK:
a. During negative-pressure ventilation, no gas flow occurs at end-expiration and end-inspiration.
b. During negative-pressure ventilation, no gas flow occurs at end-expiration and end-inspiration.
c. During negative-pressure ventilation, no gas flow occurs at end-expiration and end-inspiration.
d. During negative-pressure ventilation, no gas flow occurs at end-expiration and end-inspiration.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Hooke's Law|Clinical Connection 2-7: Negative Pressure Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 15
DATE CREATED: 1/30/2019 12:14 AM
DATE MODIFIED: 1/30/2019 12:20 AM

29. What is the term for the molecular cohesive force at a liquid-gas interface?
a. compliance b. elastance
c. resistance d. surface tension

ANSWER: d

FEEDBACK:
a. Surface tension is the molecular, cohesive force that occurs at a liquid-gas interface.
b. Surface tension is the molecular, cohesive force that occurs at a liquid-gas interface.
c. Surface tension is the molecular, cohesive force that occurs at a liquid-gas interface.
d. Surface tension is the molecular, cohesive force that occurs at a liquid-gas interface.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Surface Tension and its Effect on Lung Expansion
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 16
DATE CREATED: 1/30/2019 12:20 AM
DATE MODIFIED: 1/30/2019 12:22 AM

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30. Who is credited with the following equation: P = (2ST)/r ?

a. Hooke b. LaPlace
c. Dalton d. Boyle

ANSWER: b

FEEDBACK:

a. The equation for LaPlace's law with one liquid-gas interface is written as P=(2ST)/r.
b. The equation for LaPlace's law with one liquid-gas interface is written as P=(2ST)/r.
c. The equation for LaPlace's law with one liquid-gas interface is written as P=(2ST)/r.
d. The equation for LaPlace's law with one liquid-gas interface is written as P=(2ST)/r.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Laplace's Law
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 17
DATE CREATED: 1/30/2019 12:23 AM
DATE MODIFIED: 1/30/2019 12:24 AM

31. Which substance in the alveoli is responsible for lowering the surface tension?

a. saline b. pulmonary surfactant
c. plasma d. mucus

ANSWER: b

FEEDBACK:

a. Surfactant helps to reduce alveolar surface tension and helps prevent alveoli from collapsing.
b. Surfactant helps to reduce alveolar surface tension and helps prevent alveoli from collapsing.
c. Surfactant helps to reduce alveolar surface tension and helps prevent alveoli from collapsing.
d. Surfactant helps to reduce alveolar surface tension and helps prevent alveoli from collapsing.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: LaPlace's Law Applied to the Alveolar Fluid Lining
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 18
DATE CREATED: 1/30/2019 12:25 AM
DATE MODIFIED: 1/30/2019 12:27 AM

32. What percentage of pulmonary surfactant is composed of phospholipids?

a. 75 b. 90
c. 50 d. 20

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ANSWER: b

FEEDBACK:

a. Pulmonary surfactant is composed of 90 percent phospholipids and 10 percent protein.

b. Pulmonary surfactant is composed of 90 percent phospholipids and 10 percent protein.

c. Pulmonary surfactant is composed of 90 percent phospholipids and 10 percent protein.

d. Pulmonary surfactant is composed of 90 percent phospholipids and 10 percent protein.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: How Pulmonary Surfactant Regulates Alveolar Surface Tension
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 19
DATE CREATED: 1/30/2019 12:28 AM
DATE MODIFIED: 1/30/2019 12:30 AM

33. When the average alveolus is fully distended, what is the approximate surface tension?

a. 5-15 dynes/cm b. 50 dynes/cm
c. 5-15 cm H20 d. 50 cm H20

ANSWER: b

FEEDBACK:

a. When the average alveolus is inflated, the surface tension is approximately 50 dynes/cm.

b. When the average alveolus is inflated, the surface tension is approximately 50 dynes/cm.

c. When the average alveolus is inflated, the surface tension is approximately 50 dynes/cm.

d. When the average alveolus is inflated, the surface tension is approximately 50 dynes/cm.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: How Pulmonary Surfactant Regulates Alveolar Surface Tension
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 19
DATE CREATED: 1/30/2019 12:30 AM
DATE MODIFIED: 1/30/2019 12:33 AM

34. Which of the following can cause pulmonary surfactant deficiency?

I. Pulmonary embolism
II. Pulmonary edema
III. Atelectasis
IV. ARDS

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a. I, II, III, and IV b. II and III only
c. I , II, and III only d. II and IV only

ANSWER: a

FEEDBACK:
a. All of the factors listed can cause pulmonary surfactant deficiency.
b. All of the factors listed can cause pulmonary surfactant deficiency.
c. All of the factors listed can cause pulmonary surfactant deficiency.
d. All of the factors listed can cause pulmonary surfactant deficiency.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Summary of the Lung's Elastic Properties
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 20
DATE CREATED: 1/30/2019 12:34 AM
DATE MODIFIED: 1/30/2019 12:37 AM

35. What is the treatment of choice for the early stages of RDS in premature infants?

a. oxygen therapy b. CPAP
c. long acting bronchodilators d. steroids

ANSWER: b

FEEDBACK:
a. CPAP is the treatment for the early stages of RDS.
b. CPAP is the treatment for the early stages of RDS.
c. CPAP is the treatment for the early stages of RDS.
d. CPAP is the treatment for the early stages of RDS.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Summary|Clinical Connection 2-8: Pulmonary Surfactant Deficiency
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 21
DATE CREATED: 1/30/2019 12:38 AM
DATE MODIFIED: 1/30/2019 12:39 AM

36. What term is used in respiratory care to describe the movement of gas in and out of the lung and the pressure changes required to move the gas?

a. passive b. respiration
c. static d. dynamic

ANSWER: d

FEEDBACK:
a. Dynamic refers to movement of gas in and out of the lungs and the accompanying pressure changes.
b. Dynamic refers to movement of gas in and out of the lungs and the accompanying pressure changes.
c. Dynamic refers to movement of gas in and out of the lungs and the

accompanying pressure changes.

d. Dynamic refers to movement of gas in and out of the lungs and the accompanying pressure changes.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Dynamic Characteristics of the Lungs
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 22
DATE CREATED: 1/30/2019 12:40 AM
DATE MODIFIED: 1/30/2019 12:42 AM

37. When Poiseuille's law is rearranged for flow with pressure remaining constant, what impact would reducing the radius of a tube by 50% have on the gas flow?

a. It would be reduced to 1/16 of the original flow
b. It would increase to 16 times more than the original flow
c. It would be reduced to 1/4 the original flow
d. It would increase to 16 times more than the original flow

ANSWER: a
FEEDBACK:

a. When the radius of a tube is halved, the flow will decrease to 1/16 of the original output.
b. When the radius of a tube is halved, the flow will decrease to 1/16 of the original output.
c. When the radius of a tube is halved, the flow will decrease to 1/16 of the original output.
d. When the radius of a tube is halved, the flow will decrease to 1/16 of the original output.

POINTS: 1
DIFFICULTY: Application
REFERENCES: Poiseuille's Law Arranged for Flow
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 23
DATE CREATED: 1/30/2019 12:42 AM
DATE MODIFIED: 1/30/2019 12:44 AM

38. When Poiseuille's law is rearranged for pressure, what adjustment must be made in driving pressure to maintain the same flowrate when the radius of the tube is reduced by 50 percent?

a. The pressure must be increased to 4 times the original pressure
b. The pressure must be increased to 16 times the original
c. The pressure must be doubled
d. The pressure must be reduced by 50 percent

ANSWER: b
FEEDBACK:

a. Pressure is a function of the radius to the fourth power so 16 times the original pressure would be required to restore the flowrate when the radius of the tube is halved.

b. Pressure is a function of the radius to the fourth power so 16 times the original pressure would be required to restore the flowrate when the radius of the tube is halved.

c. Pressure is a function of the radius to the fourth power so 16 times the original pressure would be required to restore the flowrate when the radius of the tube is halved.

d. Pressure is a function of the radius to the fourth power so 16 times the original pressure would be required to restore the flowrate when the radius of the tube is halved.

POINTS: 1
DIFFICULTY: Application
REFERENCES: Poiseuille's Law Arranged for Pressure
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 25
DATE CREATED: 1/30/2019 12:45 AM
DATE MODIFIED: 1/30/2019 12:47 AM

39. When the radius of the bronchial airways decreases during exhalation, what change must occur to maintain a constant gas flow?

a. The transthoracic pressure must remain constant

b. The transthoracic pressure must vary inversely with the second power of the radius

c. The transthoracic pressure must vary directly with the fourth power of the radius

d. The transthoracic pressure must vary inversely with the fourth power of the radius

ANSWER: d
FEEDBACK:

a. As the radius of the bronchial airways decrease during exhalation, the transthoracic pressure must vary inversely with the fourth power of the radius.

b. As the radius of the bronchial airways decrease during exhalation, the transthoracic pressure must vary inversely with the fourth power of the radius.

c. As the radius of the bronchial airways decrease during exhalation, the transthoracic pressure must vary inversely with the fourth power of the radius.

d. As the radius of the bronchial airways decrease during exhalation, the transthoracic pressure must vary inversely with the fourth power of the radius.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Poiseuille's Law Rearranged to Simple Proportionalities
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 25
DATE CREATED: 1/30/2019 12:47 AM
DATE MODIFIED: 1/30/2019 12:49 AM

40. What is derived when the pressure difference between the mouth and alveoli is divided by the flowrate?

a. airway resistance b. lung compliance

c. chest wall compliance d. surface tension

ANSWER: a

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FEEDBACK:
a. Airway resistance is defined as the change in transrespiratory pressure divided by flow rate.
b. Airway resistance is defined as the change in transrespiratory pressure divided by flow rate.
c. Airway resistance is defined as the change in transrespiratory pressure divided by flow rate.
d. Airway resistance is defined as the change in transrespiratory pressure divided by flow rate.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Airway Resistance
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 27
DATE CREATED: 1/30/2019 12:49 AM
DATE MODIFIED: 1/30/2019 12:51 AM

41. If an individual generates a flow rate of 4 L/sec by generating a transrespiratory pressure of 6 cm H20, what would Raw equal?

a. 1.5 L/sec/cm H20 b. 2.4 L/sec/ cm H20
c. 1.5 cm H20/L/sec d. 0.67 cm H20/L/sec

ANSWER: c
FEEDBACK:
a. Airway resistance would be derived as 6 cm H20/4 L/sec to equal 1.5 cm H2O/L/sec.
b. Airway resistance would be derived as 6 cm H20/4 L/sec to equal 1.5 cm H2O/L/sec.
c. Airway resistance would be derived as 6 cm H20/4 L/sec to equal 1.5 cm H2O/L/sec.
d. Airway resistance would be derived as 6 cm H20/4 L/sec to equal 1.5 cm H2O/L/sec.

POINTS: 1
DIFFICULTY: Application
REFERENCES: Airway Resistance
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 28
DATE CREATED: 1/30/2019 12:54 AM
DATE MODIFIED: 1/30/2019 12:56 AM

42. If a patient who generates an intrapleural pressure of -4 mmHg to inhale 450 mL experiences inflammation and bronchospasm that reduce the radius of the bronchial airways to one-half of their original size, what pressure must the patient generate to inhale the same tidal volume?

a. 16 mm Hg b. 64 mm Hg
c. 20 mm Hg d. 48 mm Hg

ANSWER: b

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FEEDBACK:

a. To maintain the same tidal volume when the radius of the bronchial airways is reduced by one half, the intrapleural pressure must increase by a factor of 16 so the required pressure would be 4 x 16 or 64 mm Hg.
b. To maintain the same tidal volume when the radius of the bronchial airways is reduced by one half, the intrapleural pressure must increase by a factor of 16 so the required pressure would be 4 x 16 or 64 mm Hg.
c. To maintain the same tidal volume when the radius of the bronchial airways is reduced by one half, the intrapleural pressure must increase by a factor of 16 so the required pressure would be 4 x 16 or 64 mm Hg.
d. To maintain the same tidal volume when the radius of the bronchial airways is reduced by one half, the intrapleural pressure must increase by a factor of 16 so the required pressure would be 4 x 16 or 64 mm Hg.

POINTS: 1
DIFFICULTY: Application
REFERENCES: Poiseuille's Law Arranged for Simple Proportionalities|Clinical Connection 2-9: Respiratory Disorders that Decrease the Radius of the Airways
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 26
DATE CREATED: 1/30/2019 1:05 AM
DATE MODIFIED: 1/30/2019 1:08 AM

43. Which flow pattern occurs in airways at low flow rates and low pressure-gradients?

a. turbulent flow b. laminar flow
c. tracheobronchial flow d. transitional flow

ANSWER: b

FEEDBACK:

a. Laminar flow occurs in airways where flow rate and pressure gradients are both low.
b. Laminar flow occurs in airways where flow rate and pressure gradients are both low.
c. Laminar flow occurs in airways where flow rate and pressure gradients are both low.
d. Laminar flow occurs in airways where flow rate and pressure gradients are both low.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Laminar Flow
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 27
DATE CREATED: 1/30/2019 1:09 AM
DATE MODIFIED: 1/30/2019 1:10 AM

44. Which flow pattern occurs in airways at high flow rates and high pressure gradients?

a. laminar flow b. turbulent flow
c. transitional flow d. tracheobronchial flow

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ANSWER: b

FEEDBACK:
a. Turbulent flow occurs in airways at high flow rates and high pressure gradients.
b. Turbulent flow occurs in airways at high flow rates and high pressure gradients.
c. Turbulent flow occurs in airways at high flow rates and high pressure gradients.
d. Turbulent flow occurs in airways at high flow rates and high pressure gradients.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Turbulent Flow
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 27
DATE CREATED: 1/30/2019 1:11 AM
DATE MODIFIED: 1/30/2019 1:13 AM

45. What is defined as "the time required to inflate a lung region to 60% of its filling capacity"?

a. inspiratory time b. maximum inspiratory time
c. dynamic compliance d. time constant

ANSWER: d

FEEDBACK:
a. A time constant is the amount of time required to inflate a lung region to 60% its potential filling capacity.
b. A time constant is the amount of time required to inflate a lung region to 60% its potential filling capacity.
c. A time constant is the amount of time required to inflate a lung region to 60% its potential filling capacity.
d. A time constant is the amount of time required to inflate a lung region to 60% its potential filling capacity.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Time Constants
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 29
DATE CREATED: 1/30/2019 1:14 AM
DATE MODIFIED: 1/30/2019 1:15 AM

46. When lung compliance is reduced by half, how will time constants be affected?

a. The time constants will double
b. The time constant will be reduced by half
c. The time constant will increase to four times the original
d. The time constant will be reduced to one-fourth of the original

ANSWER: b

FEEDBACK:
a. When lung compliance is halved, the time constant will also be halved.
b. When lung compliance is halved, the time constant will also be halved.
c. When lung compliance is halved, the time constant will also be halved.

d. When lung compliance is halved, the time constant will also be halved.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Time Constants
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 29
DATE CREATED: 1/30/2019 1:16 AM
DATE MODIFIED: 1/30/2019 1:18 AM

47. What effect will increased R_{aw} and increased C_L have on the time constants in the affected lung regions?

a. Time constants are unaffected by C_L. but will require more time to inflate in the affected region due to the increased R_{aw}
b. Both factors require less time for the affected lung region to inflate
c. Time constants are unaffected by R_{aw} but will require less time to inflate due to the increased C_L.
d. Both factors require more time for the affected region to inflate.

ANSWER: d
FEEDBACK:

a. Lung regions with increased airway resistance and increased lung compliance require more time to inflate.
b. Lung regions with increased airway resistance and increased lung compliance require more time to inflate.
c. Lung regions with increased airway resistance and increased lung compliance require more time to inflate.
d. Lung regions with increased airway resistance and increased lung compliance require more time to inflate.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Time Constants
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 29
DATE CREATED: 1/30/2019 1:19 AM
DATE MODIFIED: 1/30/2019 1:37 AM

48. What term is defined as “the change in volume of the lungs divided by the change in transpulmonary pressure during the time required for one breath’?

a. static compliance b. time constant
c. airway resistance d. dynamic compliance

ANSWER: d
FEEDBACK:

a. Dynamic compliance is the change in volume of the lungs divided by the change in transpulmonary pressure during the time required for one breath.
b. Dynamic compliance is the change in volume of the lungs divided by the change in transpulmonary pressure during the time required for one breath.

c. Dynamic compliance is the change in volume of the lungs divided by the change in transpulmonary pressure during the time required for one breath.
d. Dynamic compliance is the change in volume of the lungs divided by the change in transpulmonary pressure during the time required for one breath.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Dynamic Compliance
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 30
DATE CREATED: 1/30/2019 1:37 AM
DATE MODIFIED: 1/30/2019 1:39 AM

49. In the presence of restrictive lung disorders, how do patients typically offset the decreased time constants?

a. They adopt a decreased respiratory rate and add a breath hold
b. They adopt a decreased respiratory rate
c. They adopt a decreased respiratory rate with an increased tidal volume
d. They adopt an increased respiratory rate

ANSWER: d
FEEDBACK:
a. With restrictive lung disorders, patients typically adopt an increased respiratory rate.
b. With restrictive lung disorders, patients typically adopt an increased respiratory rate.
c. With restrictive lung disorders, patients typically adopt an increased respiratory rate.
d. With restrictive lung disorders, patients typically adopt an increased respiratory rate.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Dynamic Compliance|Clinical Connection: Restrictive Lung Disorders, Time Constants, and Breathing Pattern Relationships
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 31
DATE CREATED: 1/30/2019 1:40 AM
DATE MODIFIED: 1/30/2019 1:42 AM

50. What changes in breathing patterns do patients with obstructive pulmonary disorders with increased R_{aw} and increased time constants typically adopt?

a. They increase their respiratory rate and tidal volume
b. They increase their respiratory rate and decrease their tidal volume
c. They decrease their respiratory rate and increase their tidal volume
d. The decrease their respiratory rate and tidal volume

ANSWER: c
FEEDBACK:
a. Patients with obstructive pulmonary disorders with increased Raw and

increased time constants typically decrease their respiratory rates and increase their tidal volumes.

b. Patients with obstructive pulmonary disorders with increased Raw and increased time constants typically decrease their respiratory rates and increase their tidal volumes.

c. Patients with obstructive pulmonary disorders with increased Raw and increased time constants typically decrease their respiratory rates and increase their tidal volumes.

d. Patients with obstructive pulmonary disorders with increased Raw and increased time constants typically decrease their respiratory rates and increase their tidal volumes.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Dynamic Compliance|Clinical Connection 2-11: Obstructive Lung Disorders. Time Constants and Breathing Pattern Relationships
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 32
DATE CREATED: 1/30/2019 1:42 AM
DATE MODIFIED: 1/30/2019 1:48 AM

51. When rapid ventilatory rates occur, what is the term for the condition in which positive pressure remains in the alveoli during exhalation due to the insufficient expiratory time?

a. auto-PEEP b. WOB
c. frequency dependence d. pendulluft

ANSWER: a
FEEDBACK:

a. Auto-PEEP is the condition in which positive pressure remains in the alveoli during exhalation due to insufficient expiratory time.

b. Auto-PEEP is the condition in which positive pressure remains in the alveoli during exhalation due to insufficient expiratory time.

c. Auto-PEEP is the condition in which positive pressure remains in the alveoli during exhalation due to insufficient expiratory time.

d. Auto-PEEP is the condition in which positive pressure remains in the alveoli during exhalation due to insufficient expiratory time.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Dynamic Compliance|Clinical Connection 2-12: Auto-PEEP and its Relationship to Raw During Rapid Ventilatory Rates
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 33
DATE CREATED: 1/30/2019 1:49 AM
DATE MODIFIED: 1/30/2019 1:50 AM

52. What is the term for the volume of gas that is typically measured during exhalation of one quiet breath?

a. expiratory reserve volume b. minute volume

c. tidal volume d. expiration

ANSWER: c

FEEDBACK:

a. The amount of gas exhaled from one quiet breath is the tidal volume.
b. The amount of gas exhaled from one quiet breath is the tidal volume.
c. The amount of gas exhaled from one quiet breath is the tidal volume.
d. The amount of gas exhaled from one quiet breath is the tidal volume.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: The Normal Ventilatory Patterns
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 34
DATE CREATED: 1/30/2019 1:51 AM
DATE MODIFIED: 1/30/2019 1:53 AM

53. What is the average respiratory rate for a newborn infant?

a. 19-26 breaths/min b. 25-40 breaths/min
c. 30-60 breaths/min d. 50-80 breaths/min

ANSWER: b

FEEDBACK:

a. The average respiratory rate for a newborn infant is 30-60 breaths/min.
b. The average respiratory rate for a newborn infant is 30-60 breaths/min.
c. The average respiratory rate for a newborn infant is 30-60 breaths/min.
d. The average respiratory rate for a newborn infant is 30-60 breaths/min.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: The Normal Ventilatory Patterns
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 34
DATE CREATED: 1/30/2019 1:53 AM
DATE MODIFIED: 1/30/2019 1:55 AM

54. With the end expiratory pause is factored in, what is the normal I:E ratio for an adult at rest?

a. 1 : 3 b. 1 : 2.5
c. 1 : 1 d. 1 : 2

ANSWER: d

FEEDBACK:

a. When the end expiratory pause is included, the normal I:E ratio for an adult at rest is 1:2.
b. When the end expiratory pause is included, the normal I:E ratio for an adult at rest is 1:2.
c. When the end expiratory pause is included, the normal I:E ratio for an adult at rest is 1:2.
d. When the end expiratory pause is included, the normal I:E ratio for an adult at

rest is 1:2.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: The Normal Ventilatory Patterns
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 34
DATE CREATED: 1/30/2019 1:56 AM
DATE MODIFIED: 1/30/2019 1:57 AM

55. What is the average respiratory rate for a healthy toddler at rest?

a. 15-24 breaths/min b. 25-40 breaths/min
c. 12-20 breaths/min d. 30-60 breaths/min

ANSWER: b
FEEDBACK:
a. The average respiratory rate for a healthy toddler at rest is 25-40 breaths/min.
b. The average respiratory rate for a healthy toddler at rest is 25-40 breaths/min.
c. The average respiratory rate for a healthy toddler at rest is 25-40 breaths/min.
d. The average respiratory rate for a healthy toddler at rest is 25-40 breaths/min.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: The Normal Ventilatory Patterns|Clinical Connection 2-13: Normal Respiratory Rates for Different Age Groups
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 35
DATE CREATED: 1/30/2019 1:58 AM
DATE MODIFIED: 1/30/2019 2:00 AM

56. A 5 ft tall female who weighs 300 lb requires mechanical ventilation. If the prescribed tidal volume for this patient's condition is 6 mL/kg IBW, where should the set tidal volume be set?

a. approximately 520 mL b. approximately 380 mL
c. approximately 820 mL d. approximately 290 mL

ANSWER: d
FEEDBACK:
a. A 5 ft tall female's IBW would be approximately 100-105 pounds or 47 kg, so 47 x 6mL/kg would equal approximately 290 mL.
b. A 5 ft tall female's IBW would be approximately 100-105 pounds or 47 kg, so 47 x 6mL/kg would equal approximately 290 mL.
c. A 5 ft tall female's IBW would be approximately 100-105 pounds or 47 kg, so 47 x 6mL/kg would equal approximately 290 mL.
d. A 5 ft tall female's IBW would be approximately 100-105 pounds or 47 kg, so 47 x 6mL/kg would equal approximately 290 mL.

POINTS: 1
DIFFICULTY: Application
REFERENCES: The Normal Ventilatory Patterns|Clinical Connection 2-14: Tidal Volume and

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Breathing Rate Strategies for Mechanical Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 36
DATE CREATED: 1/30/2019 2:00 AM
DATE MODIFIED: 1/30/2019 2:02 AM

57. What are the boundaries of anatomic dead space?

a. nose and mouth to the alveolar sacs
b. nose and mouth through the terminal bronchioles
c. nose and mouth to the segmental bronchi
d. nose and mouth to the bronchioles

ANSWER: b
FEEDBACK:
a. Anatomic dead space extends from the nose and mouth through the terminal bronchioles.
b. Anatomic dead space extends from the nose and mouth through the terminal bronchioles.
c. Anatomic dead space extends from the nose and mouth through the terminal bronchioles.
d. Anatomic dead space extends from the nose and mouth through the terminal bronchioles.
POINTS: 1
DIFFICULTY: Recall
REFERENCES: Anatomic Dead Space
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 37
DATE CREATED: 1/30/2019 2:03 AM
DATE MODIFIED: 1/30/2019 2:05 AM

58. What is the approximate volume of anatomic dead space?

a. 2.2 mL/lb of ideal body weight
b. 2.2 mL/kg actual body weight
c. 1 mL/lb of ideal body weight
d. 1 mL/kg of ideal body weight

ANSWER: c
FEEDBACK:
a. The volume of anatomic dead space is approximately 1mL/lb of ideal body weight.
b. The volume of anatomic dead space is approximately 1mL/lb of ideal body weight.
c. The volume of anatomic dead space is approximately 1mL/lb of ideal body weight.
d. The volume of anatomic dead space is approximately 1mL/lb of ideal body weight.
POINTS: 1
DIFFICULTY: Recall
REFERENCES: Anatomic Dead Space
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False

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LEARNING OBJECTIVES: 37
DATE CREATED: 1/30/2019 2:05 AM
DATE MODIFIED: 1/30/2019 2:07 AM

59. What does frequency multiplied by (V_T-V_D) equal?

a. alveolar dead space
b. physiologic dead space ventilation
c. minute alveolar ventilation
d. minute ventilation

ANSWER: c

FEEDBACK:

a. The minute alveolar ventilation equals the frequency multiplied by (tidal volume minus anatomic dead space).
b. The minute alveolar ventilation equals the frequency multiplied by (tidal volume minus anatomic dead space).
c. The minute alveolar ventilation equals the frequency multiplied by (tidal volume minus anatomic dead space).
d. The minute alveolar ventilation equals the frequency multiplied by (tidal volume minus anatomic dead space).

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Anatomic Dead Space
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 37
DATE CREATED: 1/30/2019 2:07 AM
DATE MODIFIED: 1/30/2019 2:10 AM

60. What is the term for alveolar ventilation without pulmonary capillary perfusion?

a. alveolar dead space
b. physiologic dead space
c. minute alveolar ventilation
d. anatomic dead space

ANSWER: a

FEEDBACK:

a. Alveolar dead space is alveolar ventilation without pulmonary capillary perfusion
b. Alveolar dead space is alveolar ventilation without pulmonary capillary perfusion
c. Alveolar dead space is alveolar ventilation without pulmonary capillary perfusion
d. Alveolar dead space is alveolar ventilation without pulmonary capillary perfusion

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Anatomic Dead Space
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 37
DATE CREATED: 1/30/2019 2:12 AM

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DATE MODIFIED: 1/30/2019 2:14 AM

61. What does the sum of anatomic dead space and alveolar dead space equal?

a. minute ventilation
b. alveolar ventilation
c. physiologic dead space
d. total gas exchange

ANSWER: c

FEEDBACK:

a. Anatomic dead space plus alveolar dead space equals physiologic dead space.
b. Anatomic dead space plus alveolar dead space equals physiologic dead space.
c. Anatomic dead space plus alveolar dead space equals physiologic dead space.
d. Anatomic dead space plus alveolar dead space equals physiologic dead space.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Physiologic Dead Space
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 37
DATE CREATED: 1/30/2019 2:14 AM
DATE MODIFIED: 1/30/2019 2:16 AM

62. How would the addition of a length of tubing between a ventilator and the endotracheal tube affect on dead space?

a. It would have no effect on dead space
b. It would have no effect on dead space but would increase the tidal volume
c. It would decrease the dead space
d. It would increase the dead space

ANSWER: d

FEEDBACK:

a. When a length of tubing is added between the ventilator and endotracheal tube, the dead space increases.
b. When a length of tubing is added between the ventilator and endotracheal tube, the dead space increases.
c. When a length of tubing is added between the ventilator and endotracheal tube, the dead space increases.
d. When a length of tubing is added between the ventilator and endotracheal tube, the dead space increases.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Physiologic Dead Space|Clinical Connection 2-15: A Giraffe's Neck: Alveolar Ventilation vs Dead Space Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 40
DATE CREATED: 1/30/2019 2:17 AM
DATE MODIFIED: 1/30/2019 2:19 AM

63. Which of the following can cause pulmonary emboli?

I. Prolonged inactivity

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II. Pregnancy and childbirth
III. Obesity
IV. Hypercoagulation disorders

a. I, II, III, and IV b. I, III, and IV only
c. I and IV only d. I, II, and III only

ANSWER: a

FEEDBACK:
a. Pulmonary emboli can result from prolonged inactivity, pregnancy and childbirth, obesity, and hypercoagulation disorders.
b. Pulmonary emboli can result from prolonged inactivity, pregnancy and childbirth, obesity, and hypercoagulation disorders.
c. Pulmonary emboli can result from prolonged inactivity, pregnancy and childbirth, obesity, and hypercoagulation disorders.
d. Pulmonary emboli can result from prolonged inactivity, pregnancy and childbirth, obesity, and hypercoagulation disorders.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Physiologic Dead Space|Clinical Connection 2-16: Pulmonary Embolus and Dead Space Ventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 41
DATE CREATED: 1/30/2019 2:24 AM
DATE MODIFIED: 1/30/2019 2:26 AM

64. What would the minute alveolar ventilation equal if a 6 ft tall, 170 lb male has a VT of 550 mL and a respiratory rate of 11 breaths/min?

a. 550 - (170/2.2) x 11= 4.65 L b. 550 - (170/2.2) x 11= 4.65 L
c. (550 + 170) x 11 = 7.9 L d. 550 + (170 x 11) = 1.87 L

ANSWER: b

FEEDBACK:
a. The alveolar ventilation would be (550 mL tidal volume-170 anatomic dead space volume) x 11 breaths/min = 4.18 L /min.
b. The alveolar ventilation would be (550 mL tidal volume-170 anatomic dead space volume) x 11 breaths/min = 4.18 L /min.
c. The alveolar ventilation would be (550 mL tidal volume-170 anatomic dead space volume) x 11 breaths/min = 4.18 L /min.
d. The alveolar ventilation would be (550 mL tidal volume-170 anatomic dead space volume) x 11 breaths/min = 4.18 L /min.

POINTS: 1
DIFFICULTY: Application
REFERENCES: Anatomic Deadspace
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 39
DATE CREATED: 1/30/2019 3:23 AM
DATE MODIFIED: 1/30/2019 3:26 AM

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65. In the upright position, which portion of the lungs has the most negative pleural pressure?

a. hilum b. base

c. apex d. intrapleural pressure is uniform throughout all lung areas

ANSWER: c

FEEDBACK:

a. In the upright position the apex of the lung has a more negative pleural pressure than at the bases.

b. In the upright position the apex of the lung has a more negative pleural pressure than at the bases.

c. In the upright position the apex of the lung has a more negative pleural pressure than at the bases.

d. In the upright position the apex of the lung has a more negative pleural pressure than at the bases.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: How Normal Pleural Pressure Differences Cause Regional Differences in Normal Lung Ventilation

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 42

DATE CREATED: 1/30/2019 3:27 AM

DATE MODIFIED: 1/30/2019 3:29 AM

66. In the upright lung, how does compliance vary across the lung?

a. The compliance in the apices is lower than in the bases

b. The compliance is higher at the hilum than in the apices or bases.

c. The compliance in the bases is lower than in the apices

d. The compliance is uniform in all regions of the lung

ANSWER: a

FEEDBACK:

a. The compliance in the apices of the lungs is lower than the compliance in the bases.

b. The compliance in the apices of the lungs is lower than the compliance in the bases.

c. The compliance in the apices of the lungs is lower than the compliance in the bases.

d. The compliance in the apices of the lungs is lower than the compliance in the bases.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: How Normal Pleural Pressure Differences Cause Regional Differences in Normal Lung Ventilation

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 42

DATE CREATED: 1/30/2019 3:30 AM

DATE MODIFIED: 1/30/2019 3:33 AM

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67. In a healthy adult at rest, what portion of the total energy output is required for the work of breathing?

a. 5% b. 15 %

c. 25% d. 35%

ANSWER: a

FEEDBACK:

a. In a healthy adult at rest, the work of breathing consumes 5% of the total energy output.

b. In a healthy adult at rest, the work of breathing consumes 5% of the total energy output.

c. In a healthy adult at rest, the work of breathing consumes 5% of the total energy output.

d. In a healthy adult at rest, the work of breathing consumes 5% of the total energy output.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: The Effect of Airway Resistance and Lung Compliance on Ventilatory Pressure

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 43

DATE CREATED: 1/30/2019 3:33 AM

DATE MODIFIED: 1/30/2019 3:36 AM

68. What is the term for alteration of the ventilatory pattern to minimize dead space ventilation?

a. metabolic efficiency b. hyperventilation

c. ventilatory efficiency d. Hyperefficiency

ANSWER: c

FEEDBACK:

a. Alteration of the ventilatory pattern to minimize dead space ventilation is called ventilatory efficiency.

b. Alteration of the ventilatory pattern to minimize dead space ventilation is called ventilatory efficiency.

c. Alteration of the ventilatory pattern to minimize dead space ventilation is called ventilatory efficiency.

d. Alteration of the ventilatory pattern to minimize dead space ventilation is called ventilatory efficiency.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: The Effect of Airway Resistance and Lung Compliance on Ventilatory Pressure

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 43

DATE CREATED: 1/30/2019 3:36 AM

DATE MODIFIED: 1/30/2019 3:38 AM

69. How does the normal adult's respiratory pattern change when lung compliance decreases?

a. respiratory rate and tidal volume increase b. respiratory rate and tidal volume decrease.

c. respiratory rate increases and tidal volume d. respiratory rate decreases and tidal volume

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decreases increase

ANSWER: c

FEEDBACK:

a. When lung compliance decrease, the respiratory rate increases and tidal volume decreases.

b. When lung compliance decrease, the respiratory rate increases and tidal volume decreases.

c. When lung compliance decrease, the respiratory rate increases and tidal volume decreases.

d. When lung compliance decrease, the respiratory rate increases and tidal volume decreases.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: The Effect of Airway Resistance and Lung Compliance on Ventilatory Patterns|Clinical Connection 2-17: How the Adopted Breathing Pattern Changes in COPD when Compromised by a Restrictive Disorder

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 44

DATE CREATED: 1/30/2019 3:39 AM

DATE MODIFIED: 1/30/2019 3:41 AM

70. How does the breathing pattern change when a patient with COPD develops a secondary restrictive lung condition such as pneumonia?

a. respiratory rate increases b. no breathing pattern changes would occur.

c. respiratory rate and tidal volume decrease. d. respiratory rate decreases and tidal volume increase

ANSWER: a

FEEDBACK:

a. When a patient with COPD develops pneumonia, one would expect hyperventilation to occur.

b. When a patient with COPD develops pneumonia, one would expect hyperventilation to occur.

c. When a patient with COPD develops pneumonia, one would expect hyperventilation to occur.

d. When a patient with COPD develops pneumonia, one would expect hyperventilation to occur.

POINTS: 1

DIFFICULTY: Recall

REFERENCES: The Effect of Airway Resistance and Lung Compliance on Ventilatory Patterns|Clinical Connection 2-17: How the Adopted Breathing Pattern Changes in COPD when Compromised by a Restrictive Disorder

QUESTION TYPE: Multiple Choice

HAS VARIABLES: False

LEARNING OBJECTIVES: 44

DATE CREATED: 1/30/2019 3:42 AM

DATE MODIFIED: 1/30/2019 3:44 AM

71. Which ventilatory pattern is defined as the complete absence of spontaneous breathing?

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a. apnea b. dyspnea
c. apneusis d. eupnea

ANSWER: a

FEEDBACK:
a. The absence of spontaneous breathing is called apnea.
b. The absence of spontaneous breathing is called apnea.
c. The absence of spontaneous breathing is called apnea.
d. The absence of spontaneous breathing is called apnea.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Overview of Specific Breathing Conditions
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 45
DATE CREATED: 1/30/2019 3:45 AM
DATE MODIFIED: 1/30/2019 3:47 AM

72. What is the term for the breathing condition in which short episodes of rapid, uniform deep breaths are followed by 10-30 seconds of apnea?

a. Levy's b. Cheyne-Stokes
c. Biot's d. Kussmaul's

ANSWER: c

FEEDBACK:
a. Biot's breathing is characterized by short episodes of uniform, rapid deep breaths followed by 10-30 seconds of apnea.
b. Biot's breathing is characterized by short episodes of uniform, rapid deep breaths followed by 10-30 seconds of apnea.
c. Biot's breathing is characterized by short episodes of uniform, rapid deep breaths followed by 10-30 seconds of apnea.
d. Biot's breathing is characterized by short episodes of uniform, rapid deep breaths followed by 10-30 seconds of apnea.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Overview of Specific Breathing Conditions
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 45
DATE CREATED: 1/30/2019 3:47 AM
DATE MODIFIED: 1/30/2019 3:49 AM

73. What is the term for a rapid respiratory rate?

a. hyperpnea b. hyperventilation
c. eupnea d. tachypnea

ANSWER: d

FEEDBACK:
a. A rapid respiratory rate is called tachpnea.

b. A rapid respiratory rate is called tachpnea.
c. A rapid respiratory rate is called tachpnea.
d. A rapid respiratory rate is called tachpnea.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Overview of Specific Breathing Conditions
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 45
DATE CREATED: 1/30/2019 3:50 AM
DATE MODIFIED: 1/30/2019 3:52 AM

74. What is the term for the breathing pattern in which the depth of breathing increases?
a. hyperpnea b. Kussmaul's
c. hyperventilation d. tachypnea

ANSWER: a
FEEDBACK:
a. Hyperpnea is an increase in the depth of breathing.
b. Hyperpnea is an increase in the depth of breathing.
c. Hyperpnea is an increase in the depth of breathing.
d. Hyperpnea is an increase in the depth of breathing.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Overview of Specific Breathing Conditions
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 45
DATE CREATED: 1/30/2019 3:53 AM
DATE MODIFIED: 1/30/2019 3:55 AM

75. In which breathing pattern is an individual only able to breathe comfortably in the upright position?
a. tachypnea b. orthopnea
c. eupnea d. hyperpnea

ANSWER: b
FEEDBACK:
a. When one can only breathe comfortably while in the upright position, it is called orthopnea.
b. When one can only breathe comfortably while in the upright position, it is called orthopnea.
c. When one can only breathe comfortably while in the upright position, it is called orthopnea.
d. When one can only breathe comfortably while in the upright position, it is called orthopnea.

POINTS: 1
DIFFICULTY: Recall

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REFERENCES: Overview of Specific Breathing Conditions
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 45
DATE CREATED: 1/30/2019 3:56 AM
DATE MODIFIED: 1/30/2019 3:58 AM

76. Which abnormal breathing pattern is most commonly associated with ketoacidosis?
a. Cheyne Stokes b. Hypopnea
c. Biot's d. Kussmaul's

ANSWER: d
FEEDBACK:
a. Kussmaul's breathing is most often associated with ketoacidosis.
b. Kussmaul's breathing is most often associated with ketoacidosis.
c. Kussmaul's breathing is most often associated with ketoacidosis.
d. Kussmaul's breathing is most often associated with ketoacidosis.

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Overview of Specific Breathing Conditions
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
LEARNING OBJECTIVES: 45
DATE CREATED: 1/30/2019 3:58 AM
DATE MODIFIED: 1/30/2019 4:01 AM

77. What is the only absolute way of confirming hyperventilation?
a. assess the tidal volume
b. ask the patient
c. monitor the $PaCO_2$
d. assess the respiratory rate

ANSWER: c
FEEDBACK:
a. The absolute confirmation of hyperventilation is made by assessing the PaCO2
b. The absolute confirmation of hyperventilation is made by assessing the PaCO2
c. The absolute confirmation of hyperventilation is made by assessing the PaCO2
d. The absolute confirmation of hyperventilation is made by assessing the PaCO2

POINTS: 1
DIFFICULTY: Recall
REFERENCES: Overview of Specific Breathing Conditions|Clinical Connection 2-18: The Arterial Carbon Dioxide Level and its Relationship to the Clinical Verification of Hyperventilation and Hypoventilation
QUESTION TYPE: Multiple Choice
HAS VARIABLES: False
DATE CREATED: 1/30/2019 4:04 AM

Name: _____ Class: _____ Date: _____

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DATE MODIFIED: 1/30/2019 4:07 AM