NREMT AEMT - Quiz Questions with Answers

Airway, Respiration & Ventilation

1.

Damage to cellular tissue as a result of excessive oxygen levels in the blood is called which of the following?

Oxygen toxicity

Decompression sickness

Nitrogen narcosis

Subcutaneous emphysema

Correct answer: Oxygen toxicity

Administration of oxygen to patients is a common practice, though many patients do not benefit from it. Oxygen toxicity refers to damage to cellular tissue resulting from excessive oxygen levels in the blood.

Increased oxygen levels contribute to production of free radicals, resulting in tissue damage and cellular death in some patients. Use caution with administration of oxygen therapy, understanding that hypoxemia is much worse than oxygen toxicity, so when in doubt, if you are unable to measure oxygen saturation reliably and the patient has the potential for hypoxia, provide supplemental oxygen. Follow local protocols.

Decompression sickness is caused by ascending too fast in SCUBA diving. It is also called "the bends."

Nitrogen narcosis is a change in consciousness, neuromuscular function, and behavior brought on by breathing compressed inert gasses. It has also been called depth intoxication, “narks,” and rapture of the deep.

Subcutaneous emphysema occurs when air becomes trapped under the skin. It is often the result of a pneumothorax or trauma to the airway.

2.

Your patient presents with a chronic cough, wheezing, and cyanosis. What disease or condition do you expect your patient is suffering?

Bronchitis

Asthma

Anaphylaxis

Heart failure

Correct answer: Bronchitis

Bronchitis is characterized by a chronic productive cough with a copious amount of sputum produced due to the chronic inflammation of the bronchial tubes. Bronchitis will also present with wheezing lung sounds and cyanosis as air exchange is hindered due to restricted air movement.

Asthma is a reactive airway condition that environmental factors like pollen and pollutants can exacerbate. Patients with asthma present with wheezing and, at times, coughing. What makes this different than bronchitis is that coughing associated with asthma is not chronic.

Anaphylaxis occurs when the body has an inappropriate inflammatory response to an allergen. This response results in flushed skin, hives, edema, and wheezing. Anaphylaxis is an acute condition and not associated with a chronic cough.

Heart failure is a condition where the heart cannot adequately pump blood, resulting in edema in the extremities and the lungs (pulmonary edema). Pulmonary edema results in "crackles" being heard in the lungs, not wheezing. Coughing is not a sign or symptom that heart failure patients often report.

3.

Which of the following is an indication of adequate artificial ventilation?

Pulse rate returns to normal.

Minimal or no chest rise and fall.

Breath sounds cannot be heard during auscultation.

Skin color is cyanotic.

Correct answer: Pulse rate returns to normal range

When evaluating the effectiveness of artificial ventilations, look for visible and equal chest rise and fall, breath sounds that can be heard during auscultation, ventilations being delivered at an appropriate rate (for age), pulse rate that returns to the normal range, skin color that improves, and oxygen saturation levels that improve.

4.

You and your partner are manually ventilating an asthma patient on the verge of respiratory arrest. As you ventilate this patient, what should you consider regarding the ventilation rate?

Ventilate slower than usual to avoid auto-PEEP

Hyperventilate the patient

Ventilate at the usual rate

Manual ventilation is not recommended for this patient

Correct answer: Ventilate slower than usual to avoid auto-PEEP

Auto-PEEP occurs in patients that are being mechanically or manually ventilated. Auto-PEEP is also referred to as breath stacking and occurs when the patient receives another breath before completely exhaling the last one. Breath stacking is dangerous and can cause significant pressure in the lungs, resulting in a pneumothorax and tension pneumothorax. Auto-PEEP can also cause a considerable decrease in venous return to the heart if the intrathoracic pressure in the chest exceeds the pressure of the blood returning to the heart. These principles are fundamental in patients with reactive airway diseases like asthma and COPD (Chronic Obstructive Pulmonary Disease). Both of these diseases make exhalation difficult for the patient. It may seem counterintuitive, but ventilating these patients at a slower rate is more beneficial.

Hyperventilating the patient is incorrect. There are very few times in EMS (Emergency Medical Services) that hyperventilation benefits the patient. Patients with reactive airway disease require slower ventilations. Slower ventilations allow the patient to complete exhalation before receiving another breath. Slower ventilations reduce the chances of pneumothorax and decrease venous return to the heart.

Ventilating a patient with reactive airway disease at the normal rate is likely to cause Auto-PEEP. Auto-PEEP occurs when a breath is administered to a patient when they have not wholly exhaled their last breath. This concept is fundamental in patients with reactive airway disease who have difficulty with exhalations.

Patients with significant respiratory fatigue, bordering on respiratory failure, must receive manual or mechanical ventilation. When ventilating reactive airway disease patients, you must ventilate slower than you usually would. Doing so allows the

patient to exhale entirely before receiving another breath and will reduce the risk of Auto-PEEP.

5.

Supplemental oxygen should be administered to:

Any patient with potential hypoxia

All patients

Patients with cardiac arrest

Patients with respiratory arrest

Correct answer: Any patient with potential hypoxia

By enriching atmospheric air with supplemental oxygen, you can increase oxygen to cells and reduce pain. You should administer supplemental oxygen to any patient showing signs of potential hypoxia.

Current guidelines from the American Heart Association state that any patient with chest pain or evidence of acute coronary syndrome who is not experiencing respiratory distress and has an oxygen saturation level greater than or equal to 94% does not require supplemental oxygen. To put it simply, not every patient requires supplemental oxygen.

Evidence shows that oxygen is helpful to patients with hypoxia, so if you are in doubt about the oxygenation status, administer supplemental oxygen. Follow all protocols.

6.

You arrive on scene to discover a patient whose family reports that he seemed fine several hours ago. He responds only to painful stimuli; breathing at a rate of 8 breaths per minute, his lips and nail beds are cyanotic. SpO2 is 78%. There are no obvious causes for bradypnea or hypoxia. Which acid-base disorder do you suspect?

Respiratory acidosis

Respiratory alkalosis

Metabolic acidosis

Metabolic alkalosis

Correct answer: Respiratory acidosis

The ineffective respiration rate means that CO2 is not being exchanged at the alveolar level and will be building up in the blood, causing a drop in pH. This patient is in respiratory acidosis.

Respiratory alkalosis results from hyperventilation.

Acid-base disorders that are not immediately corrected by innate buffering (bicarbonate) systems result in compensatory mechanisms. Respiratory responses are the fastest means to rebalance acid-base disorders, but they are unsustainable over long periods of time. Renal compensation (through changes in production of bicarbonate) takes time to initiate, and generally implies a chronic condition such as diabetes, prolonged vomiting, or renal failure.

It is also possible to have both metabolic and respiratory derangement at the same time if compensatory mechanisms are impaired, but that is something less likely to be addressed in the field.

7.

Which of the following is a soft rubber device with a beveled tip used in a patient who has an intact gag reflex?

Nasopharyngeal airway

Oropharyngeal airway

Endotracheal tube

French-tip catheter

Correct answer: Nasopharyngeal airway

A nasopharyngeal airway is made from soft rubber with a beveled tip for use in patients who have an intact gag reflex and are unable to maintain an airway.

An oropharyngeal airway is a hard, plastic airway designed to prevent the tongue from obstructing the glottic opening.

French, or whistle-tip, catheters are used in situations in which a rigid catheter cannot be used, such as a patient with a stoma or one whose teeth are clenched or if suctioning through the nose is necessary. An endotracheal tube is not used for suctioning but for maintaining an airway, although suctioning can be performed through an endotracheal tube.

8.

Your patient has sustained multi-system trauma in a motor vehicle crash, is in shock and requires positive pressure ventilatory support. As ventilations are delivered, what would be the AEMT's primary concern?

A drop in blood pressure due to increased interthoracic pressure

A drop in pulse rate due to increased interthoracic pressure

A decrease in exhaled carbon dioxide from ventilations

An increase in exhaled carbon dioxide from ventilations

Correct answer: A drop in blood pressure due to increased interthoracic pressure

A critical concept that EMS providers must understand is that when the natural act of breathing changes from negative pressure to artificial ventilation via positive pressure, this increases interthoracic pressure and reduces blood return to the heart. This can result in decompensation of the cardiac system in shock, as well as diminished preload and cardiac output.

Ventilation does affect exhaled carbon dioxide levels, but this would not be the primary concern in this patient; these would be more important as ongoing ventilation and resuscitation continues. A patient in shock who requires ventilator support will have abnormal exhaled carbon dioxide levels, and focusing on end tidal levels may result in over ventilation, which is lethal for these patients.

9.

What is the volume of the size D oxygen cylinder?

350 L

500 L

625 L

3,000 L

Correct answer: 350 L

Oxygen cylinders are available in several sizes, sizes D and M being most often used. D tanks are portable and can be carried from your unit to the patient, and M tanks remain in your unit as a main supply tank.

Oxygen Cylinder Volumes:

- ***D:*** *350 L*
- ***Jumbo D:*** *500 L*
- ***E:*** *625 L*
- ***M (MM):*** *3,000 L*
- ***G:*** *5,300 L*
- ***H, A (M4), K:*** *6,900*

Always check that the cylinders are properly labeled and that testing dates are current.

10.

The volume of air moved through the lungs in one minute, less dead space, is called what?

Alveolar minute volume

Alveolar ventilation

Tidal volume

Minute volume

Correct answer: Alveolar minute volume

Alveolar minute volume is the volume of air moved through the lungs in one minute, less dead space; it is calculated by multiplying tidal volume (minus dead space) and respiratory rate.

Alveolar ventilation is the volume of air that reaches the alveoli; it is calculated by subtracting the amount of dead space air from the tidal volume.

Tidal volume is the amount of air that is moved in or out of the lungs during one breath.

Minute volume is the volume of air moved through the lungs in one minute; it is calculated by multiplying tidal volume and respiratory rate.

11.

An unconscious patient requires immediate airway suctioning. You do not suspect trauma. What is the best method of opening the airway before suctioning?

Tongue-jaw lift maneuver

Turn the patient's head to one side

Jaw-thrust maneuver

"Ramped" position

Correct answer: Tongue-jaw lift maneuver

The tongue-jaw lift maneuver is the best way to open an airway in preparation for suctioning. This procedure should only be done in unconscious patients, as the AEMT (Advanced Emergency Medical Technician) must insert a thumb into the patient's mouth, under the incisors or gumline, and pull straight up to open the mouth. This method of opening the airway should be used for suctioning only and cannot be used to maintain an open airway for ventilation.

The head tilt-chin lift maneuver relieves an airway obstruction in an unconscious patient. The patient's tongue is placed in a position where it cannot obstruct the airway by placing one hand on the patient's forehead and one under the chin and tilting the head backward. This method is not used for suctioning as the hand under the chin keeps the mouth shut. The technique is ideal for ventilating a patient with a bag-valve mask.

The jaw-thrust maneuver is used to open the airway of a patient who you suspect has suffered a spinal cord injury. An AEMT can open the patient's airway by pressing upward on the angles of the lower jaw and moving the mouth forward, all while keeping the cervical spine in a neutral position.

The "ramped" position is used when the AEMT suspects managing the patient's airway will be difficult. Signs of a difficult airway include obesity, limited neck mobility, a large tongue, and a larger patient head size. Ramping the patient can be done by placing pillows or towels under the patient's shoulders until the head falls into a neutral position.

Turning the patient's head to one side is helpful if they are actively vomiting, but it is not the way to open an airway in preparation for suctioning.

12.

Which of the following is the most worrisome sign in assessing the breathing of an infant?

Head bobbing

Pale skin

Excessive crying

Barking cough

Correct answer: Head bobbing

Although a barking cough is a serious concern, the recruitment of accessory muscles is a compensatory response that indicates significant work of breathing and cannot be sustained.

In children, work of breathing is a more accurate indicator of adequate respiration than rate or breath sounds on auscultation. Compensation for abnormalities in respiratory function can manifest as abnormal airway sounds (barking cough or stridor), abnormal positioning (tripoding, refusing to lie down), retractions (accessory muscle use), and nasal flaring.

Head bobbing is a form of accessory muscle use in infants.

13.

Your 32-year-old-male patient is complaining of difficulty breathing and chest pain. He says it began suddenly about 30 minutes ago while driving and reports his pain as sharp and stabbing on the right side, just above the 6th rib, midclavicular. His lung sounds are clear and neck veins are flat. He has no known medical history, and takes no medication. BP 94/70; HR 118; SpO_2 90%; RR 32. Which of the following should you suspect?

Pulmonary embolism

Acute coronary syndrome

Spontaneous pneumothorax

Tension pneumothorax

Correct answer: Pulmonary embolism

A pulmonary embolism is a blood clot in a pulmonary artery. Signs and symptoms include dyspnea, sudden onset of sharp chest pain, hypoxia, hematopsis, and signs of shock. Care includes oxygen, obtaining a 12-lead ECG, IV access, and rapid transport to an appropriate facility.

While acute coronary syndrome can be suspected, the patient's age and the characteristics of the chest pain make it unlikely.

A pneumothorax is unlikely in this patient because lung sounds are normal, and signs of a tension pneumothorax would result in absent lung sounds.

14.

Which of the following Arterial Blood Gas (ABG) values is outside of the normal range?

$PaCO_2$: 55 mmHg

pH: 7.36

PaO_2: 90

SaO_2: 95%

Correct answer: $PaCO_2$: 55 mmHg

$PaCO_2$ measures the partial pressure of carbon dioxide in the bloodstream. Any deviation from the normal range indicates the carbon dioxide is not efficiently moving from the bloodstream to the lungs. A typical range for a $PaCO_2$ test is 35–45 mm Hg.

pH measures how acidic, base, or neutral the patient's blood is. pH specifically measures the concentration of hydrogen ions in the bloodstream. Any value less than 7.35 is considered acidic, while any value of 7.45 is considered base. Any value between 7.35 and 7.45 is considered normal.

PaO_2 is the measurement of the partial pressure of oxygen in a patient's bloodstream. A PaO_2 evaluates the concentration of oxygen molecules dissolved in the blood's plasma; it does not indicate the total amount of oxygen in the body.

SaO_2 on an ABG indicates the patient's oxygen saturation, specifically the amount of hemoglobin bound to oxygen molecules. SaO_2 differs from PaO_2, as PaO_2 is a measurement of oxygen unbound to hemoglobin and dissolved into the bloodstream.

15.

Which of the following is not a sign or symptom of anaphylaxis?

Cough

Urticaria

Generalized edema

Laryngeal edema with dyspnea

Correct answer: Cough

The signs and symptoms of anaphylaxis include flushed skin or hives (urticaria), generalized edema, hypotension, laryngeal edema with dyspnea, and wheezing or stridor.

16.

Your patient has a tracheostomy and requires high flow oxygen administration. Your unit does not carry tracheostomy masks. What should be used to deliver oxygen for this patient?

A face mask

A nasal cannula

Oxygen tubing placed into the stoma

A bag mask device

Correct answer: A face mask

If you need to deliver oxygen to a patient with a tracheostomy and do not have a tracheostomy mask, a face mask can be used to deliver oxygen.

Nasal cannulas do not deliver high flow oxygen.

Never place oxygen tubing into a stoma.

A bag mask device would be used for ventilation, not just oxygen delivery.

17.

Which of the following is a common cause of respiratory alkalosis?

Anxiety

Opioid overdose

Alcohol overdose

Nasogastric suctioning

Correct answer: Anxiety

Respiratory alkalosis results from hyperventilation, which decreases carbon dioxide levels in the body, resulting in an increase in the pH. Common causes of respiratory alkalosis include fever, anxiety, and aspirin overdose.

Opioid overdoses result in hypoventilation and subsequent respiratory acidosis.

Alcohol overdoses can cause respiratory acidosis due to suppression of the respiratory drive and hypoventilation.

Nasogastic suctioning often causes metabolic alkalosis due to excessive loss of acids from the GI (Gastrointestinal) tract.

18.

Your patient presents with significant head trauma and respiratory pattern changes. What respiratory pattern do you expect to see in this patient?

Cheyne-Stokes respirations

Kussmaul respirations

Agonal respirations

Apnea

Correct answer: Cheyne-Stokes respirations

A patient with Cheyne-Stokes respirations is an abnormal respiratory pattern that consists of a gradual increase of respiratory depth and rate followed by a decrease of depth and rate. In between, the patient will experience periods of apnea.

Kussmaul Respirations are associated with diabetic ketoacidosis. Patients with Kussmaul respiration present with rapid, deep respirations that do not change in rate or depth, like Cheyne-Stokes respirations.

Agonal respirations are slow, shallow, and ineffective. Agonal respirations are not a form of effective breathing and signal brain anoxia.

Apnea is the ceasing of all breathing and respiratory effort.

19.

Which of the following can result in respiratory acidosis?

Select the three answer choices that are correct.

Opioid overdose

Chest trauma

Pulmonary edema

Hyperventilation from a panic attack

Respiratory acidosis is always related to hypoventilation. Decreased lung tidal volumes result in the retention of carbon dioxide and subsequent lowering of the pH. Common causes of respiratory acidosis include:

- *Airway obstruction*
- *Cardiac Arrest*
- *Opioid overdose*
- *Submersion*
- *Respiratory arrest*
- *Pulmonary edema*
- *Closed head injury*
- *Chest Trauma*

Hyperventilation is a common cause of respiratory alkalosis.

20.

Your patient is a six-year-old female who presents with difficulty breathing, expiratory wheezing with rhonchi lung sounds, and pale skin with capillary refill of three seconds. You note retractions and slightly labored respirations. Her mother reports she has had a fever for four days with a runny nose and a productive cough. Her immunizations are up to date. Vital signs are: BP 92/56; HR 112; RR 28; SpO_2 92%; Temp 99.7° F. Your treatment plan for this patient should include which of the following?

Select the three answer choices that are correct.

- **Administration of humidified oxygen**
- **Administration of a bronchodilator**
- **Position of comfort**
- IV access
- Administration of epinephrine

This patient most likely has a lower airway infection such as pneumonia, RSV (Respiratory Syncytial Virus), bronchiolitis, or SARS/COVID-19. The AEMT should manage this patient with a position of comfort, humidified oxygen, and an inhaled bronchodilator if local protocols allow. This patient does not warrant IV access at this point, which may actually upset the patient and worsen her difficulty breathing. This patient does not exhibit signs of anaphylaxis or severe asthma, so epinephrine is not indicated,

21.

Your 89-year-old male patient is having a hemorrhagic stroke that has resulted in the need for ventilatory support. Prior to ventilatory support, you would expect the patient's Arterial Blood Gases (ABG's) to reflect which of the following?

Low pH and elevated CO_2

High pH and elevated CO_2

Low pH and low CO_2

High pH and low PaO_2

Correct answer: Low pH and elevated CO_2

Patients with bleeding in the brain as a result from a stroke or trauma are most likely to require ventilatory support due to inadequate or hypoventilation. Respiratory acidosis results from hypoventilation, and is reflected by a low pH, elevated CO_2, and elevated H_2CO_3 (bicarbonate) levels in the Arterial Blood Gas (ABG).

22.

What are rhythmic respirations with gradually increasing and decreasing rates and depth followed by intermittent periods of apnea?

Cheyne-Stokes respirations

Apneustic respirations

Biot respirations

Kussmaul respirations

Correct answer: Cheyne-Stokes respirations

Cheyne-Stokes respirations are rhythmic, gradually increasing in rate and depth, followed by a gradual decrease of respiration with intermittent periods of apnea.

An irregular pattern, rate, and depth of breathing with intermittent periods of apnea is termed Biot or ataxic respirations. Apneustic respirations are prolonged, gasping inhalations followed by extremely short, ineffective exhalation. Kussmaul respirations are deep, rapid respirations. They are common in patients with diabetic ketoacidosis.

23.

What are the signs of diphtheria?

Fever and sore throat with pharyngeal exudate

Coughing spells with a "whooping" sound and fever

Sudden-onset fatigue, cough, fever, and sore throat

Fever, a barking cough, and stridor

Correct answer: Fever and sore throat with pharyngeal exudate

Fever and sore throat with pharyngeal exudate indicate diphtheria. The signs/symptoms of croup are fever, a barking cough and stridor, mostly seen in pediatric patients. Coughing spells with a "whooping" sound and fever are signs/symptoms of pertussis. Sudden-onset fatigue, cough, fever, and sore throat are indications of influenza.

24.

Signs of inadequate breathing in adults include all the following except:

Vesicular breath sounds

A series of deep breaths followed by periods of apnea

Noisy auscultation of breath sounds

Unequal chest expansion

Correct answer: Vesicular breath sounds

Vesicular breath sounds are fine, faint, normal sounds noted in the lateral wall of the chest made by air moving in and out of the smaller bronchioles and alveoli.

A patient with inadequate breathing may appear to be working hard to breathe. Labored breathing requires effort and may involve use of accessory muscles of the neck, chest, and abdomen. Deep breaths followed by periods of apnea, noisy auscultation of breath sounds, or unequal chest expansion are all examples of inadequate breathing in adults.

Other signs of inadequate breathing in adults include reduced flow of expired air at the nose and mouth; respiratory rate of less than 12 or more than 20 breaths per minute; shallow depth of breathing; pale, cyanotic, cool, mottled, or moist skin; retractions; and staccato speech patterns.

25.

You are dispatched to the home of a three-year-old child with shortness of breath. While obtaining medical history, the mother informs you that they don't believe in vaccinations. Upon physical exam, you see that the child has a severe sore throat, difficulty swallowing, and a high fever. Additionally, you notice that she is drooling, with worsening dyspnea. Which of the following actions would be incorrect?

Place an oral airway

Keep the child calm

Alert the receiving hospital about airway stability concerns

Administer humidified oxygen if available

Correct answer: Place an oral airway

Placing an oral airway is contraindicated because this patient is conscious, and will have a gag reflex. This would only make the condition worse. Vaccination against the most common cause of epiglottitis, Haemophilus influenzae type B, has significantly reduced the incidence. However, in recent years, many parents have refused basic vaccinations. Therefore, it is possible that an increase in cases may be seen. Important clues to observe include stridor and sore throat with a normal-appearing pharynx. However, examination of the pharynx or larynx in these children may precipitate complete airway obstruction. Children typically should have their airway secured by tracheal intubation; adults can often be observed for signs of airway compromise.

26.

What is the volume of the size M oxygen cylinder?

3,000 L

625 L

5,300 L

500 L

Correct answer: 3,000 L

Oxygen cylinders are available in several sizes, sizes D and M being most often used. D tanks are portable and can be carried from your unit to the patient, and M tanks remain in your unit as a main supply tank.

Oxygen Cylinder Volumes:

- ***D:*** *350 L*
- ***Jumbo D:*** *500 L*
- ***E:*** *625 L*
- ***M (MM):*** *3,000 L*
- ***G:*** *5,300 L*
- ***H, A (M4), K:*** *6,900*

Always check that the cylinders are properly labeled and that testing dates are current.

27.

Which of the following is an extrinsic factor affecting pulmonary ventilation?

Trauma

Infection

Allergic reaction

Airway occlusion by the tongue

Correct answer: Trauma

There are many factors that affect pulmonary ventilation. Extrinsic factors include trauma and foreign body airway obstruction.

The most common cause of obstruction in an unresponsive patient is the tongue obstructing the airway, which is an intrinsic factor. Allergic reaction or infection are examples of intrinsic factors that affect pulmonary ventilation.

28.

Which of the following is an extrinsic factor affecting pulmonary ventilation?

Foreign body airway obstruction

Airway occlusion by the tongue

Infection

Allergic reaction

Correct answer: Foreign body airway obstruction

There are many factors that affect pulmonary ventilation. Extrinsic factors include trauma and foreign body airway obstruction.

The most common cause of obstruction in an unresponsive patient is the tongue obstructing the airway, which is an intrinsic factor. Other intrinsic factors include infection, allergic reaction, and pulmonary edema.

29.

The portion of tidal volume that does not reach alveoli and does not participate in gas exchange is called:

dead space

tidal volume

residual volume

vital capacity

Correct answer: dead space

Dead space is the amount of tidal volume that does not reach the alveoli, and therefore does not participate in gas exchange. Tidal volume is the amount of air which is moved through the airway during inhalation or exhalation in one breath. Residual volume is the amount that remains after maximal expiration. Vital capacity is the maximum volume of air expelled after maximal inspiration.

30.

Your patient is a known asthmatic who reports difficulty breathing despite using their rescue inhaler. You auscultate inspiratory and expiratory wheezing in all fields. What component of the asthma triad is your finding of wheezing consistent with?

Bronchospasms

Airway edema

Increased mucus production

Hypotension

Correct answer: Bronchospasm

Bronchospasms result from the narrowing of the airway passages in the lungs and trachea. Bronchospasms are reversible, and in the case of asthma, bronchospasms are the result of a stimulus. The narrowing bronchospasms create turbulent airflow in the distal airways, resulting in wheezing on auscultation. If bronchospasms are severe, lung sounds may be absent or faint, resulting from the accumulation of trapped air. Bronchospasms should be treated with a nebulized bronchodilator.

Airway edema is another portion of the asthma triad. Edema, or swelling, occurs in the upper and lower airways during an asthma exacerbation. The airway's swelling contributes to the airways' narrowing and may result in stridor being observed. Airway edema is best treated with IV or IM corticosteroids.

An increase in mucus production is the last portion of the asthma triad. Mucus production rises to excessive proportions during an asthma attack. Increased mucus is the body's attempt at trapping foreign particles that trigger the asthma attack in the airways before they make it to the alveoli. This response is often excessive, creating more turbulent airflow through the already narrowed airways. Asthma patients will cough as they try to expel the excess mucus from their airways. These patients will most often benefit from the administration of expectorants.

Hypotension is not a part of the asthma triad but is common in patients with severe asthma exacerbation. As intrathoracic pressure builds in the chest due to air trapping, venous return to the heart decreases, resulting in hypotension.

31.

Which of the following actions can prevent gastric distention while providing artificial ventilations with a bag mask device?

Select the three answer choices that are correct.

Only squeeze the bag long enough to see visible chest rise

Reposition the airway as needed

Limit ventilation times to 1 second or less

Place an oral airway

Place the patient on their left side

Any form of artificial ventilation that does not blow air directly into the trachea may result in gastric distention, which can cause aspiration and interfere with lung expansion. Actions that can limit the risk of gastric distention include:

- *Limit ventilation times to one second or less*
- *Ventilating only until visible chest rise is seen*
- *Reposition the airway as needed*
- *Placement of an advanced airway that will isolate the trachea*

An oral airway helps keep the airway open, but does not prevent gastric distention. You would not place a patient on their side while performing ventilations. If prolonged ventilations are anticipated placement of an advanced airway should be performed as soon as possible.

32.

You are called to a single-family residence for a pediatric patient with shortness of breath. According to the patient's guardians, the patient has a high fever, a barking cough, and stridor. What condition do you expect?

Croup

Epiglottitis

Pertussis

Pneumonia

Correct answer: Croup

Croup is a condition that is seen in pediatric patients. Croup can be a bacterial or viral condition. Patients with croup will present with a fever, barking cough, and stridor. The most significant finding in a patient with croup is a barking cough. Often, this cough is said to sound like the barking sound that a seal makes. Stridor is another significant finding indicating that the upper airway is narrowing.

Epiglottitis is a condition that is most often seen in pediatric patients. Epiglottitis is the infection and subsequent swelling of the epiglottis. Patients with epiglottitis present with a high fever, drooling, and stridor. Patients with epiglottitis do not make any coughing attempts. Extreme caution must be taken to not upset or scare the patient as it may cause the airway to become occluded.

Pertussis, or the "whooping cough," is characterized by intense coughing that produces a "whooping" sound and a high fever. The "whooping" sound created by pertussis differs from that harsh, barking cough associated with croup.

Pneumonia is an infection in the lung tissue resulting from a virus, bacterium, or foreign object aspiration. Patients who have pneumonia present with fever, chills, and coughing. The coughing will produce green, red, or rust-colored sputum. Sputum production is not characteristic of croup, a dry, barking cough.

33.

Your patient has a history of asthma, and they are prescribed several medications. Which medication does the patient use to decrease the amount of secretions that are produced in the lungs?

Fluticasone

Proventil

Cromolyn

Advair Diskus

Correct answer: Fluticasone

Fluticasone is the generic name for Advair Diskus. Advair is a medication that is used in the chronic treatment of asthma. Advair is unique among chronic asthma medications because it decreases the production of secretions in the lower airways of asthmatic patients.

Proventil is the trade name for albuterol. Albuterol is a medication used to acutely treat reactive airway diseases such as asthma, COPD (Chronic Obstructive Pulmonary Disease), and bronchitis. Albuterol dilates the smaller distal airways that become constricted during an acute exacerbation; it does not decrease the amount of secretions that are created in the lungs.

Cromolyn is the generic drug name for Intal, a medication used in the chronic treatment of asthma. Intal works by decreasing the amount of histamine released by the body. Excessive histamine can cause swelling in the distal airways and it can contribute to asthma exacerbation.

The Flovent Diskus is the trade name for the drug Fluticasone. Fluticasone is approved for the chronic treatment of asthma. Fluticasone is an anti-inflammatory medication that reduces the swelling in the lower airways associated with chronic asthmatics.

34.

What is the fraction of inspired oxygen in the air?

- **21%**
- 17%
- 24%
- 100%

Correct answer: 21%

The fraction of inspired oxygen is the fraction of oxygen in the volume being measured. The most common gases in the atmosphere are nitrogen (78%), oxygen (about 21%), and argon (almost 1%). Other molecules are present in the atmosphere as well but in very small quantities. Medical patients experiencing difficulty breathing are provided with oxygen-enriched air, which means a higher-than-atmospheric FiO2.

35.

Which of the following is not an indication for CPAP?

Apnea

Cardiogenic pulmonary edema

Severe asthma attack

COPD exacerbation

Correct answer: Apnea

Continuous Positive Airway Pressure (CPAP) is indicated for patients with cardiogenic pulmonary edema, severe asthma, and COPD. Apnea is a contra-indication of CPAP.

36.

Which of the following is a contraindication for a nasopharyngeal airway?

Head injury with epistaxis

Altered mental status with an intact gag reflex

Patient unable to tolerate an OPA

Cervical neck injury

Correct answer: Head injury with epistaxis

Contraindications for the nasopharyngeal airway include severe head injury with blood draining from the nose, potential for basilar skull fracture, history of fractured nasal bone, or resistance during insertion.

A nasopharyngeal airway is usually better tolerated by patients with an intact gag reflex. It is not as likely as an OPA to cause vomiting, as the distal tip rests in the hypopharynx behind the tongue.

37.

Your patient is a five-year-old male who is post-ictal after a generalized seizure. You note the need for suctioning his oropharnyx. Which of the following should the AEMT be concerned about while suctioning this patient?

Decreasing heart rate

Increasing heart rate

Obstructing the airway

Stimulating another seizure

Correct answer: Decreasing heart rate

Pediatric patients are very susceptible to vagal stimuli and their heart rate will decrease if suctioning, or stimulating the back of the throat, occurs too long. There would be no concern of increasing heart rate. The purpose of suctioning is to clear the airway, so there would be no concern about obstructing the airway. There is no reason to be concerned that suctioning the oropharynx would stimulate another seizure.

38.

What are the signs of tuberculosis?

Cough, fever, fatigue, productive/bloody sputum

Dyspnea, high fever, stridor, drooling, difficulty swallowing, severe sore throat

Dyspnea, chills/fever, cough, sputum (green, red or rust-colored), localized wheezing/crackles

Cough, fever, sore throat, fatigue

Correct answer: Cough, fever, fatigue, productive/bloody sputum

Classic clinical features associated with active pulmonary tuberculosis are cough, fever, night sweats, hemoptysis, chest pain, fatigue, and weight loss/anorexia.

Epiglottitis is an acute inflammation in the supraglottic region of the oropharynx with inflammation of the epiglottis, vallecula, arytenoids, and aryepiglottic folds, commonly presenting with stridor, drooling, and difficulty swallowing. In pediatric patients, it is most often caused by bacterial infection. Pediatric epiglottitis is a medical emergency, with mortality rates as high as 10% in children whose airways are not protected by endotracheal intubation.

Community-acquired pneumonia is one of the most common infectious diseases and is an important cause of mortality and morbidity worldwide. Signs/symptoms include dyspnea, chills/fever, cough, sputum (green, red or rust-colored), and localized wheezing/crackles.

Influenza is a viral respiratory infection causing fever, coryza, cough, headache, and malaise.

39.

Which of the following are potential conditions that can result from a prolonged asthma attack?

Select the three correct answer choices.

- **Hypercapnia**
- **Dehydration**
- **Auto-PEEP**
- Hypocapnia

Asthma is a reactive airway disease that includes the triad of airway edema, increased mucus production, and bronchospasm. Prolonged asthma attacks result in retention of carbon dioxide (hypercapnia), hypoxia, and dehydration. Due to constricted airways, exhalation is impeded and results in air being trapped in the lungs. This is known as auto-PEEP (positive end-expiratory pressure). It's dangerous because of reduced cardiac output, impairing the movement of air in and out of the lungs.

Hypocapnia is a state of low carbon dioxide and results from excessive ventilation from conditions such as hyperventilation. Asthma attacks interfere with the removal of carbon dioxide and are associated with high levels of carbon dioxide, not low.

40.

What classification of respiratory disruption is an asthma exacerbation?

Lower airway obstruction

Upper airway obstruction

Chest wall impairment

Neurologic control

Correct answer: Lower airway obstruction

Lower airway obstructions can occur for several reasons, such as trauma, edema, mucus production and accumulation, and obstructive respiratory diseases like asthma. In obstructive respiratory diseases, the lower portion of the airways becomes constricted, trapping gas inside and creating a barrier, blocking inhaled gases from reaching the alveoli.

Various conditions can cause upper airway obstruction. These conditions include a physical object obstructing the airway and infections such as tonsillitis or epiglottitis. In both of these diseases, anatomical structures in the airway swell, blocking respiration.

The chest wall is essential in the mechanical process of breathing. Any impairment to the chest wall will subsequently impair breathing. An injury may cause chest wall impairments, but they can also be caused by neuromuscular diseases such as multiple sclerosis or muscular dystrophy.

Neurologic impairments can also cause respiratory distress. Neurologic impairments can vary from depressant drugs, strokes, or trauma that results in the loss of the phrenic nerve and paralysis of the muscles necessary for breathing.

41.

The upper airway consists of:

Nasopharynx, pharynx, oropharynx, mouth, epiglottis, and larynx

Nasopharynx, oropharynx, pharynx, larynx, epiglottis, and trachea

Nasopharynx, oropharynx, pharynx, epiglottis, trachea, and main bronchi

Mouth, oropharynx, pharynx, esophagus, and stomach

Correct answer: Nasopharynx, pharynx, oropharynx, mouth, epiglottis, and larynx

The upper airway consists of the mouth, nasopharynx, oopharynx, pharynx, epiglottis, and larynx. At the base of the larynx (hypopharynx or laryngopharynx), a bifurcation occurs, forming the trachea and esophagus. The lower airway consists of the trachea, carina, bronchi, bronchioles, and alveoli. The terms "airway" and "respiratory" are interchangeable, e.g., the upper respiratory tract is synonymous with the upper airway tract.

42.

Which of the following is the volume of air moved through the lungs in one minute, less dead space?

Alveolar minute volume

Alveolar ventilation

Tidal volume

Minute volume

Correct answer: Alveolar minute volume

Alveolar minute volume is the volume of air moved through the lungs in one minute, less dead space; it is calculated by multiplying tidal volume (minus dead space) with respiratory rate.

Alveolar ventilation is the volume of air that reaches the alveoli during inspiration; it is calculated by subtracting the amount of dead space air from the tidal volume.

Tidal volume is the amount of air that is moved in or out of the lungs during one breath.

Minute volume is the volume of air moved through the lungs in one minute; it is calculated by multiplying tidal volume and respiratory rate.

43.

As you ascend in altitude, oxygen molecules:

spread farther apart.

move closer together.

move faster.

become smaller.

Correct answer: spread farther apart.

As you ascend in altitude, the barometric pressure decreases, which causes oxygen molecules to spread apart, reducing the oxygen content of each breath incrementally as one goes up in altitude. Oxygen molecules do not change in size with ascent or descent in altitude.

44.

Multiplying tidal volume and respiratory rate provides which of the following?

Minute volume

Alveolar minute volume

Alveolar ventilation

Tidal volume

Correct answer: Minute volume

Minute volume is the volume of air moved through the lungs in one minute; it is calculated by multiplying tidal volume and respiratory rate.

Alveolar ventilation is the volume of air that reaches the alveoli during inspiration; it is calculated by subtracting the amount of dead space air from the tidal volume.

Tidal volume is the amount of air that is moved in or out of the lungs during one breath.

Alveolar minute volume is the volume of air moved through the lungs in one minute, less dead space; it is calculated by multiplying tidal volume (minus dead space) and respiratory rate.

45.

You arrive at the dispatched residence to find an elderly patient in respiratory distress. You note that a pink, frothy sputum appears from the patient's mouth with each breath. What disease or condition do you expect this patient is suffering?

Congestive heart failure

Right-sided heart failure

Orthopnea

Angina pectoris

Correct answer: Congestive Heart Failure

Left-sided heart failure, also known as congestive heart failure, occurs when the left portion of the heart can no longer pump effectively. The heart attempts to adapt to these ineffective contractions by increasing the rate of contractions and enlarging the left ventricle. If these adaptions fail, the heart cannot effectively pump all the blood from the lungs out to the body, resulting in lung congestion. The backup of blood in the lungs forces fluids from the vasculature into the alveoli. Over time, this fluid accumulates until the patient is in significant respiratory distress with blood-tinged sputum.

Right-sided heart failure occurs when the right portion of the heart cannot effectively pump blood to the lungs. Right-sided failure results in fluid backing up into the patient's vasculature. It is often seen as edema in the feet and ankles of ambulatory patients or the sacral area of bedbound patients.

Orthopnea is a symptom, not a disease. A patient is orthopedic if they find breathing easier when seated instead of lying supine.

Angina pectoris occurs when cardiac tissue is not adequately perfused. The lack of blood and oxygen to cardiac tissue causes chest pain, often described as "squeezing" or "crushing." This pain is usually felt sub-sternally and may frequently radiate to the patient's left arm.

46.

A drug that poses a risk to the normal development or health of an unborn fetus is called which of the following?

Teratogenic

Tumorigenic

Ketogenic

Carcinogenic

Correct answer: Teratogenic

A teratogenic drug is one that poses a risk to the normal development or health of an unborn fetus.

Carcinogenesis, oncogenesis, and tumorigenesis are the formation of a cancer. Ketogenesis is the biochemical process by which organisms produce a group of substances collectively known as ketone bodies from the breakdown of fatty acids and ketogenic amino acids.

47.

The amount of air moved in/out of the lungs during one breath is called:

tidal volume

residual volume

alveolar ventilation

minute volume

Correct answer: tidal volume

Tidal volume is the amount of air which is moved through the airway during inhalation or exhalation in one breath. Residual volume is the amount that remains after maximal expiration, alveolar ventilation is the amount that actually reaches the alveoli for gas exchange, and minute volume is the amount of air moved over the course of one minute, that is, tidal volume times respiratory rate.

48.

Your patient reports a sudden sharp chest pain followed by shortness of breath while exercising. They are alert and oriented throughout your entire examination. Upon auscultation, you notice no lung sounds on the left side and subcutaneous emphysema. What condition do you expect?

Spontaneous pneumothorax

Tension pneumothorax

Pulmonary embolism

Asthma

Correct answer: Spontaneous pneumothorax

A pneumothorax occurs when a portion of the lung ruptures, allowing gas to escape into the pleural cavity. Often, pneumothoraces are associated with trauma, but they can occur spontaneously. A pneumothorax initially presents with sharp chest pain and shortness of breath, but if it is not appropriately managed, it can develop into a tension pneumothorax.

A pneumothorax left untreated can develop into a tension pneumothorax, characterized by significant shortness of breath, JVD (Jugular Vein Distention), hypotension, and shock. The speed at which a pneumothorax develops into a tension pneumothorax depends on the size of the rupture. If a tension pneumothorax is not treated, it will cause death.

A Pulmonary Embolism (PE) is a condition that develops suddenly. A PE occurs when the pulmonary vasculature becomes obstructed by a volume of gas, plaque, amniotic fluid, or a blood clot. This obstruction causes intense sharp chest pain and a sudden onset of shortness of breath and tachycardia. Patients suffering from PE will initially have clear lung sounds, whereas patients with a pneumothorax will present with absent lung sounds on one side.

Asthma is a reactive airway condition that environmental factors like pollen and pollutants can exacerbate. Patients with asthma present with wheezing in all lung fields.

49.

You are ventilating a patient with a bag-valve mask. Which statement is true regarding providing positive pressure ventilations to a patient?

Cardiac output will decrease

Air is drawn into the lungs through negative pressure

Overventilation is not typical

Adequate tidal volume is less than normal respirations

Correct answer: Cardiac output will decrease

Normal ventilation is quite different than Positive Pressure Ventilation (PPV). When administering, the air is forced into the lungs rather than being drawn in through negative pressure. PPV increases intrathoracic pressure inside the body, decreasing venous return to the heart.

In normal ventilation, air is drawn into the lungs by the chest wall's expansion and the diaphragm's contraction. These mechanisms do not work when patients require Positive Pressure Ventilation (PPV). With PPV, air is forced into the lungs, displacing the diaphragm and expanding the rib cage.

While providing positive pressure ventilations, it can be easy to over-ventilate the patient. Overventilation can cause significant problems for your patient, including pulmonary damage and gastric distention.

Tidal volume is the volume of gas drawn in with each breath. Tidal volumes change throughout the day as a patient exerts. When providing positive pressure ventilations, a larger volume of gas is required than usual to displace the ribs and diaphragm to expand the lungs.

50.

Over ventilation of a patient with a bag-mask device can lead to which of the following?

Select the four answer choices that are correct.

Barotrauma

Respiratory alkalosis

Gastric distention

Auto PEEP

Respiratory acidosis

When providing bag-mask ventilations, the AEMT must avoid excessive or forceful ventilations. Over ventilation can result in:

- *Barotrauma to airway due to excessive pressure*
- *Respiratory alkalosis due to excess loss of carbon dioxide*
- *Gastric distention*
- *Air trapping in the lungs due to inadequate expiratory time, known as auto-PEEP (Positive End-Expiratory Pressure)*

Respiratory acidosis results from inadequate or under ventilation.

51.

The volume of air moved through the lungs in one minute is called which of the following?

Minute volume

Alveolar minute volume

Alveolar ventilation

Tidal volume

Correct answer: Minute volume

Minute volume is the volume of air moved through the lungs in one minute; it is calculated by multiplying tidal volume and respiratory rate.

Alveolar ventilation is the volume of air that reaches the alveoli during inspiration; it is calculated by subtracting the amount of dead space air from the tidal volume.

Tidal volume is the amount of air that is moved in or out of the lungs during one breath.

Alveolar minute volume is the volume of air moved through the lungs in one minute, less dead space; it is calculated by multiplying tidal volume (minus dead space) and respiratory rate.

52.

The volume of air that reaches the alveoli during inspiration is called what?

Alveolar ventilation

Tidal volume

Minute volume

Alveolar minute volume

Correct answer: Alveolar ventilation

Alveolar ventilation is the volume of air that reaches the alveoli during inspiration; it is calculated by subtracting the amount of dead space air from the tidal volume.

Tidal volume is the amount of air that is moved in or out of the lungs during one breath.

Minute volume is the volume of air moved through the lungs in one minute; it is calculated by multiplying tidal volume and respiratory rate.

Alveolar minute volume is the volume of air moved through the lungs in one minute, less dead space; it is calculated by multiplying tidal volume (minus dead space) and respiratory rate.

53.

You are performing a secondary assessment on a patient complaining of shortness of breath. You note that the patient has frothy, sometimes pink-tinged sputum. What condition is related to these findings?

Heart failure

Dehydration

Infection

Tuberculosis

Correct answer: Heart failure

Heart failure is a condition where the heart cannot adequately pump blood, resulting in edema in the extremities and the lungs (pulmonary edema). During acute heart failure exacerbations, the pulmonary edema may become so significant that the patient begins to cough up frothy, blood-tinged sputum.

Dehydration can cause a patient to produce thick sputum that is not easy to clear. When the body senses dehydration, any excess water in the body is reabsorbed. This reabsorption of water creates thick sputum.

Sputum that is yellow, green, or brown indicates an infectious process. The different colored sputum is associated with varying levels of decomposition.

Blood-streaked sputum is associated with tumors, tuberculosis, or trauma. It is important to note that blood-streaked sputum is different from pink-tinged sputum. Pink-tinged sputum is all pink, while blood streaked only has areas of identifiable blood.

54.

The air that remains in the lungs after maximal expiration is called which of the following?

Residual volume

Minute volume

Vital capacity

Dead space

Correct answer: Residual volume

Residual volume is the amount that remains after maximal expiration. Minute volume is the amount of air moved over the course of one minute (i.e., tidal volume times respiratory rate). Vital capacity is the maximum volume of air expelled after maximal inspiration. Dead space is the amount of tidal volume that does not reach the alveoli and therefore, does not participate in gas exchange.

55.

Respiratory effort is driven by what?

Carbon dioxide levels

Oxygen levels

Nitrogen levels

Bicarbonate levels

Correct answer: Carbon dioxide levels

In healthy people, when oxygen levels increase, the respiratory center suspends respiration until carbon dioxide levels rise and stimulate the respiratory center to begin another breath. The drive to breathe is based on pH changes related to the carbon dioxide levels in the blood and spinal fluid.

56.

A patient with sepsis is most likely to develop what acid base balance disorder?

Metabolic acidosis

Respiratory acidosis

Metabolic alkalosis

Respiratory alkalosis

Correct answer: Metabolic acidosis

Sepsis is a severe systemwide reaction to an infection, and results in metabolic acidosis. Any condition which will result in shock, such as sepsis, will most likely lead to the development of metabolic acidosis due to the lactic acid buildup by products and resulting from anaerobic metabolism.

57.

Your patient presents with sudden onset flushed skin, urticaria, and wheezing. Which of the following conditions should the AEMT suspect is likely?

Anaphylaxis

Bronchiolitis

Heart failure

Croup

Correct answer: Anaphylaxis

Anaphylaxis, or anaphylactic shock, is a condition that significantly impacts the airway and respiratory system. It will often have a sudden onset after exposure to an allergen. Anaphylaxis will cause airway swelling, known as laryngeal edema, which can occlude the upper airway. The lower airways are also affected as the lower airways constrict, which causes wheezing breath sounds.

Bronchitis is a chronic condition that results in inflammation of the bronchial tubes in the airways. Bronchitis is characterized by a productive cough, wheezing, chronic hypoxia, and tachypnea.

Heart failure occurs when the heart cannot pump effectively and can occur acutely or be a chronic condition. Heart failure is characterized by dependent edema, crackles when listening to lung sounds, and the inability to lie supine without becoming short of breath (orthopnea).

Croup is an infection that affects the upper airways in children; the constricting upper airway results in a “barking” cough and stridor. The child will also be febrile as a result of the infection.

58.

Which of the following is a contraindication for insertion of a King LT airway?

An unresponsive five-year-old male who has ingested lye

An unresponsive 22-year-old male with no gag reflex

An unresponsive 54-year-old male with peptic ulcer disease

An unresponsive 42-year-old female with *H pylori* infection

Correct answer: An unresponsive five-year-old male who has ingested lye

Contraindications for insertion of a King LT airway include responsive patients with an intact gag reflex, patients with known esophageal disease, and patients who have ingested caustic substances.

59.

What is the term for prolonged, gasping inhalations followed by extremely short, ineffective exhalations?

Apneustic respirations

Cheyne-Stokes respirations

Kussmaul respirations

Biot respirations

Correct answer: Apneustic respirations

Apneustic respirations are prolonged, gasping inhalations followed by extremely short, ineffective exhalations.

Cheyne-Stokes respirations are rhythmic, gradually increasing in rate and depth, followed by a gradual decrease of respiration with intermittent periods of apnea. Kussmaul respirations are deep, rapid respirations. They are common in patients with diabetic ketoacidosis. An irregular pattern, rate, and depth of breathing with intermittent periods of apnea is termed Biot or ataxic respirations.

60.

Which of the following parameters would be considered abnormal?

$ETCO_2$ of 56 mmHg in a patient with an asthma exacerbation

$ETCO_2$ of 10 mmHg in a patient who is in cardiac arrest and receiving CPR

SpO_2 of 94% in a COPD patient with a fever

SpO2 of 100% in an infant

Correct answer: $ETCO_2$ of 56 mmHg in a patient with an asthma exacerbation

Quantitative waveform capnography is the most effective method of monitoring ventilation and perfusion. Normal $ETCO_2$ levels are 35–45 mmHg in a patient with a pulse and adequate perfusion. In a cardiac arrest, an $ETCO_2$ of 10 mmHg indicates adequate chest compressions. An $ETCO_2$ level of 56 mmHg is considered high, or abnormal. Normal pulse oximetry (SpO_2) is between 95–100% in all non-smoker patients. Some COPD patients may have chronic low SpO_2 , and 94% is the targeted minimum in these patients.

61.

Respiratory alkalosis results from:

- **Hyperventilation**
- Hypoventilation
- Hyperemesis
- Opiate overdose

Correct answer: Hyperventilation

Anything that inhibits respiratory function, such as bradypnea (labored or shallow breathing) can cause a retention of CO2, a decrease in pH, and acidosis. If the respiratory rate becomes too high, alkalosis will result from excess CO2 loss.

The four main acid-base disorders have either respiratory or metabolic causes, resulting in either acidosis or alkalosis. More complicated acid-base disorders exist, but this information is less useful when treating patients in the field.

62.

Depth and rate of breathing are primarily regulated through:

Central chemoreceptors found in the medulla and peripheral chemoreceptors found in the carotid bodies

Respiratory centers in the pons and thalamus

Respiratory centers in the pons and cerebellum

Peripheral chemoreceptors found in the pons and central chemoreceptors found in the aortic bodies

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Correct answer: Central chemoreceptors found in the medulla and peripheral chemoreceptors found in the carotid bodies

While medullary and pontine respiratory centers have a considerable role in breathing regulation, chemoreceptors found centrally in the medulla and peripherally in the carotid and aortic bodies allow for a more rapid response to changes in blood gasses, such as CO2, O2, and hydrogen ion (acid) levels.

63.

Alveolar minute volume is which of the following?

The volume of air moved through the lungs in one minute, less dead space

The volume of air that reaches the alveoli during inspiration

The amount of air that is moved in or out of the lungs during one breath

The volume of air moved through the lungs in one minute

Correct answer: The volume of air moved through the lungs in one minute, less dead space

Alveolar minute volume is the volume of air moved through the lungs in one minute, less dead space; it is calculated by multiplying tidal volume (minus dead space) and respiratory rate.

Alveolar ventilation is the volume of air that reaches the alveoli during inspiration; it is calculated by subtracting the amount of dead space air from the tidal volume.

Tidal volume is the amount of air that is moved in or out of the lungs during one breath.

Minute volume is the volume of air moved through the lungs in one minute; it is calculated by multiplying tidal volume and respiratory rate.

64.

Which of the following patients should not receive CPAP?

Select the four answer choices that are correct

Patient had GI surgery ten days ago

Patient has a closed head injury

Patient is in moderate cardiogenic shock

Patient cannot follow verbal commands

Patient is in respiratory distress

Patient presents with severe pulmonary edema

The following are general contraindications for CPAP (Continuous Positive Airway Pressure) use:

- *Patient unresponsive or otherwise unable to follow verbal commands*
- *Respiratory arrest or agonal respiration*
- *Patient unable to protect their own airway*
- *Hypoventilation*
- *Hypotension*
- *Signs of pneumothorax or chest trauma*
- *Closed head injury*
- *Facial trauma*
- *Cardiogenic shock*
- *Active/ known GI (Gastrointestinal) bleeding*
- *Recent GI surgery*
- *Patient unable to sit up or tolerate the mask*
- *Facial hair or physical characteristics prohibit the proper sealing of mask*

Respiratory distress and severe pulmonary edema are indications for CPAP.

65.

What is the oxygen flow rate for a bag-mask device with a reservoir?

15 L per minute

1 to 6 L per minute

6 to 10 L per minute

10 to 15 L per minute

Correct answer: 15 L per minute

Bag-mask devices with a reservoir can operate at a rate of 15 L per minute and deliver nearly 100% oxygen.

Nasal cannulas are capable of delivering 24% to 44% inspired oxygen at a rate of 1 to 6 L per minute. Rates above 6 L per minute are not recommended. Nonrebreather masks are useful at flow rates of 10 to 15 L per minute and can deliver up to 90% oxygen, and mouth-to-mask devices at 15 L per minute can deliver nearly 55% oxygen.

66.

You have placed an airway in an unresponsive adult patient. Which of the following would be considered the most definitive confirmation of adequate ventilation and correct airway placement?

Continuous waveform capnography

Continuous waveform pulse oximetry

Chest rise with each delivered breath

Lung sounds

Correct answer: Continuous waveform capnography

Continuous waveform capnography is considered the most definitive method of proper airway placement and continued patency. Pulse oximetry is not a reliable way to verify airway placement. Chest rise and lung sounds can be useful in verifying airway placement, but are not as definitive as capnography.

67.

Which of the following is a Schedule I drug?

Marijuana

Fentanyl

Cocaine

Hydrocodone

Correct answer: Marijuana

The rate of potential drug abuse is a determinant factor in the DEA drug scheduling scheme. Schedule I drugs have a high potential for abuse and the potential to create severe psychological and/or physical dependence. As the drug schedule number goes up, the abuse potential goes down—Schedule V drugs represent the least potential for abuse. Some examples are listed below:

- ***Schedule I:*** *Heroin, LSD, marijuana (cannabis), peyote, and MDMA (Ecstasy)*
- ***Schedule II:*** *Hydromorphone, methadone, meperidine, oxycodone, fentanyl, methylphenidate, codeine, and hydrocodone*
- ***Schedule III:*** *Codeine-mixed ingredient products with <90mg per dose unit (e.g., acetaminophen with codeine), dronabinol, buprenorphine, ketamine, anabolic steroids*
- ***Schedule IV:*** *Zolpidem, Librium, fenfluramine, Darvon, benzodiazepines (e.g., alprazolam, clonazepam)*
- ***Schedule V:*** *Pregabalin, cough preparations containing less than 200 milligrams of codeine per 100 milliliters or per 100 grams, and ezogabine*

68.

You are ventilating a patient who has overdosed on an unknown substance and is in respiratory arrest. You should target ventilations to achieve end tidal CO_2 of what level?

35–45 mmHg

30–35 mmHg

25–35 mmHg

45–80 mmHg

Correct answer: 35 to 45 mmHG

The target end tidal CO_2 levels are 35–45 mmHg. The AEMT should assure ventilation is adequate enough to maintain an adequate end tidal CO_2.

69.

What is the flow rate for a nasal cannula?

1 to 6 L per minute

10 to 15 L per minute

6 to 10 L per minute

15 L per minute

Correct answer: 1 to 6 L per minute

Nasal cannulas are capable of delivering 24% to 44% inspired oxygen at a rate of 1 to 6 L per minute. Rates above 6 L per minute are not recommended.

Nonrebreather masks are useful at flow rates of 10 to 15 L per minute and can deliver up to 90% oxygen; bag mask devices with a reservoir can operate at a rate of 15 L per minute and deliver nearly 100% oxygen. Mouth-to-mask devices at 15 L per minute can deliver close to 55% oxygen.

70.

Which of the following represents normal PaO_2 levels?

80–100 mmHg

94–100 %

90–100 mmHg

95–100%

Correct answer: 80–100 mmHg

PaO_2 represents the partial pressure of arterial oxygen in the blood. The PaO_2 is a parameter of an Arterial Blood Gas (ABG) sampling, and is obtained by analyzing a sample of arterial blood. The partial pressure of oxygen is measured in mmHg , and normal PaO_2 levels are 80–100 mmHg. Levels less then 80 mmHg are considered hypoxemia.

71.

Which of the following patients receiving bag-mask ventilations would benefit from a PEEP valve attached to the bag-mask device?

Patient with CHF exacerbation

Patient with anaphylaxis

Patient with an asthma attack

Patient with pulmonary embolism

Correct answer: Patient with CHF exacerbation

A Positive End Expiratory Pressure (PEEP) valve may be used during bag mask ventilations to improve oxygenation. PEEP can increase alveolar recruitment and thus oxygenation if oxygenation is compromised even with 100% oxygen due to atelectasis. The patient in CHF (Congestive Heart Failure) exacerbation most likely has atelectasis and would benefit from PEEP. A patient with anaphlaxsis, asthma, or pulmonary embolism would most likely not benefit from a PEEP valve attached to a bag mask device during ventilation.

72.

Which of the following is not an indication for insertion of an advanced airway?

A GCS score of 12

A GCS score of 7 and a failed attempt at ET intubation

A fully apneic patient without an intact gag reflex

A patient on CPAP for more than five minutes with an SpO2 of 75%

Correct answer: A GCS score of 12

"If the GCS is 8, intubate."

Indications for insertion of an advanced airway include deeply unresponsive, apneic patients without an intact gag reflex and patients in whom endotracheal intubation is not possible or has been unsuccessful. A patient on CPAP that is not improving after 5 minutes most likely requires placement of an advanced airway.

73.

Carbon monoxide poisoning can cause which of the following?

Select the four answer choices that are correct.

- **Metabolic acidosis**
- **Tissue hypoxia**
- **Altered mental status**
- **Dizziness**
- Respiratory alkalosis

Carbon Monoxide (CO) is a byproduct of combustion. CO reacts with oxygen, creating Carboxy Hemoglobin (COHb), which leads to tissue hypoxia. That hypoxia results in anaerobic metabolism and lactic acid buildup, causing metabolic acidosis. The combination of acidosis and hypoxia often leads to altered mental status, nausea, dizziness, blurred vision, and respiratory arrest.

CO poisoning does not cause respiratory alkalosis.

74.

If you subtract the amount of dead space from the tidal volume, you have calculated:

Alveolar ventilation

Vital capacity

Residual volume

Minute volume

Correct answer: Alveolar ventilation

Alveolar ventilation is the amount of air that actually reaches the alveoli for gas exchange. Residual volume is the amount that remains after maximal expiration. Vital capacity is the maximum volume of air expelled after maximal inspiration. Minute volume is the amount of air moved over the course of one minute, that is, tidal volume times respiratory rate.

75.

What are the signs of croup?

Fever, barking cough, and stridor in a pediatric patient

Fever, sore throat, and exudate at the back of the throat

Coughing spells with a "whooping" sound and fever

Sudden-onset fatigue, cough, fever, and sore throat

Correct answer: Fever, barking cough, and stridor in a pediatric patient

The signs/symptoms of croup are fever, a barking cough, and stridor, mostly seen in pediatric patients.

Fever and sore throat with pharyngeal exudate indicate diphtheria. Coughing spells with a "whooping" sound and fever are signs/symptoms of pertussis. Sudden-onset fatigue, cough, fever, and sore throat are indications of influenza.

76.

Your adult patient presents with an acute onset of wheezing and stridor. What disease or condition do you expect they are suffering?

Anaphylaxis

Croup

Epiglottitis

Asthma

Correct answer: Anaphylaxis

Anaphylaxis occurs when the body has an inappropriate inflammatory response to an allergen. This response results in flushed skin, hives, and edema. Stridor can be heard as the upper airway closes, and wheezing can be auscultated from lower airway constriction.

Croup is a condition that is seen in pediatric patients. Croup can be a bacterial or viral condition. Patients with croup will present with a fever, barking cough, and stridor. The onset of the croup is significantly longer than the onset of anaphylaxis. A fever and barking cough are also not associated with anaphylaxis.

Epiglottitis is a condition that is most often seen in pediatric patients. Epiglottitis is the infection and subsequent swelling of the epiglottis. Patients with epiglottitis present with a high fever, drooling, and stridor. The onset of epiglottitis is much slower when compared to anaphylaxis, and it is not associated with a high fever and drooling.

Asthma is a reactive airway condition that environmental factors like pollen and pollutants can exacerbate. Patients with asthma present with wheezing and, at times, coughing. Stridor is not a finding associated with asthma, where constriction occurs in the lower airways.

77.

Your patient is a 56-year-old male who is a known alcoholic. His family reports he had several episodes of vomiting prior to "shaking violently" before becoming unresponsive, and that he is trying to quit drinking. His last drink was about ten hours ago. A paramedic unit is responding to the scene, and is four minutes out. Patient vital signs are BP 145/88; HR 100; RR 12; SpO_2 95%. Which of the following actions should the AEMT should take?

Select the three answers that are correct.

Suction the airway

Administer oxygen and support ventilations as needed with bag-mask device

Obtain IV access

Place a supraglottic airway device and provide ventilations with 100% oxygen.

Give a bolus of Lacted Ringers

This patient is having alcohol withdrawal seizures and is post-ictal. He requires benzodiazepine administration by the paramedic that is en route. Maintaining the airway, oxygenation, and establishing an IV for medication administration are the priorities for this patient. A supra-glottic airway is contraindicated in this patient, as he most likely has esophageal disease. This patient will require isolation of the trachea with an ET (Endotracheal) tube if airway management is needed due to the significant risk of aspiration. Lactated ringers should be avoided in patients with known alcoholism due to the high probability of liver disease.

78.

In which of the following patients would an advanced airway be contraindicated?

39-year-old female suspected opiate overdose with intact gag reflex

67-year-old female unresponsive with suspected stroke

58-year-old male in cardiac arrest

19-year-old male near drowning who is unresponsive and apneic

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Correct answer: 39-year-old female suspected opiate overdose with intact gag reflex

Indications for insertion of an advanced airway include deeply unresponsive, apneic patients lacking an intact gag reflex in whom ET intubation is not possible or has been unsuccessful.

Contraindications of an advanced airway include inability to successfully place the airway and intact gag reflex.

79.

All of the following may interfere with an accurate pulse oximeter reading *except:*

High blood pressure

Poor perfusion

Bright ambient light

Nail Polish

Correct answer: High blood pressure

A pulse oximeter uses a light emitting diode to measure hemoglobin levels in the nail bed. Conditions that can interfere with an accurate reading of the sensor light include bright ambient light, poor perfusion to the extremities such as in shock, cold extremities, or low blood flow. Nail polish can also interfere with the accurate pulse oximeter reading because it dampens the light reaching the sensor. High blood pressure is not a condition that would interfere with accurate pulse oximeter readings.

80.

Your patient called 911 for shortness of breath. You find the patient seated at the kitchen table in the tripod position. You notice that they breathe through pursed lips and appear cyanotic despite receiving oxygen through a home oxygen condenser. What condition do you expect?

Emphysema

Heart failure

Pneumonia

Pulmonary embolism

Correct answer: Emphysema

Emphysema is a condition that results from damage or collapse of the alveoli. Patients with emphysema are often seen pursing their lips to breathe. This increases their interthoracic pressure and helps keep the alveoli open. As a result of this type of breathing, patients also develop a "barrel chest" and are often seen sitting in a tripod position. Emphysema patients are chronically hypoxic, and you will often find them receiving oxygen therapy at home through condensers. A barrel chest and pursed lip breathing are reliable indicators of an emphysema patient.

Heart failure is a condition where the heart cannot adequately pump blood, resulting in edema in the extremities and the lungs (pulmonary edema). Pulmonary edema results in "crackles" being heard in the lungs. Some heart failure patients may receive in-home oxygen therapy but do not breathe through pursed lips as their alveoli are not collapsed; instead, they are covered in edema and fluid.

Pneumonia is an infection in the lung tissue resulting from a virus, bacterium, or foreign object aspiration–patients who have pneumonia present with fever, chills, and coughing. The coughing will produce green, red, or rust-colored sputum. Pursed lip breathing and home oxygen therapy are not associated with pneumonia.

A Pulmonary Embolism (PE) is a condition that develops suddenly. A PE occurs when the pulmonary vasculature becomes obstructed by a volume of gas, plaque, amniotic fluid, or a blood clot. This obstruction causes intense sharp chest pain and a sudden onset of shortness of breath and tachycardia. Patients suffering from PE will initially have clear lung sounds. A large PE will cause a significant V/Q (Ventilation-Perfusion) mismatch, resulting in patients gasping for air, also known as air hunger. There is no pursed lip breathing associated with PE.

81.

Your patient is a six-year-old female who presents with difficulty breathing, expiratory wheezing and rhonchi lung sounds, and pale skin with capillary refill of three seconds. You note retractions and slightly labored respirations. Her mother reports she has had a fever for four days with a runny nose and a productive cough. Her immunizations are up to date. Based on this information, which of the following could be suspected?

Select the three answer choices that are correct

RSV

Infuenza

Bronchiolitis

Croup

Asthma

Based on the symptoms, this patient presents with a lower airway illness such as influenza, Respiratory Syncytial Virus (RSV), or bronchiolitis. Other possible conditions include COVID-19 or pneumonia. A definitive diagnosis will be made after viral panels, chest x-ray, and physician evaluation. Treatment for this patient would include supportive care, humidified oxygen, and, if protocol allows, an inhaled bronchodilator.

Croup is an upper airway problem that presents with a distinct barking cough. The absence of a barking cough and the presence of lower airway obstruction makes this highly unlikely to be croup.

Asthma is a reactive airway disease that presents with many of the same symptoms as this patient, but the presence of a runny nose and fever make it more likely that this is a viral or bacterial infection, and not reactive airway disease.

82.

Which of the following is an indication of adequate artificial ventilation?

Breath sounds can be heard during auscultation.

Breath sounds cannot be heard during ausculation.

Minimal or no chest rise and fall

Skin is mottled.

Correct answer: Breath sounds can be heard during auscultation.

When evaluating the effectiveness of artificial ventilations, look for visible and equal chest rise and fall, breath sounds that can be heard during auscultation, ventilations being delivered at an appropriate rate (for age), pulse rate that returns to the normal range, skin color that improves, and oxygen saturation levels that improve.

83.

Which of the following is a Schedule III drug?

Buprenorphine

Librium

Ezogabine

Marijuana

Correct answer: Buprenorphine

The rate of potential drug abuse is a determinant factor in the DEA drug scheduling scheme. Schedule I drugs have a high potential for abuse and the potential to create severe psychological and/or physical dependence. As the drug schedule number goes up, the abuse potential goes down—Schedule V drugs represent the least potential for abuse. Some examples are listed below:

- ***Schedule I:*** *Heroin, LSD, marijuana (cannabis), peyote, and MDMA (Ecstasy)*
- ***Schedule II:*** *Hydromorphone, methadone, meperidine, oxycodone, fentanyl, methylphenidate, codeine, and hydrocodone*
- ***Schedule III:*** *Codeine-mixed ingredient products with <90mg per dose unit (e.g., acetaminophen with codeine), dronabinol, buprenorphine, ketamine, anabolic steroids*
- ***Schedule IV:*** *Zolpidem, Librium, fenfluramine, Darvon, benzodiazepines (e.g., alprazolam, clonazepam)*
- ***Schedule V:*** *Pregabalin, cough preparations containing less than 200 milligrams of codeine per 100 milliliters or per 100 grams, and ezogabine*

84.

Your patient ascended into the mountains on a hike, and, as he climbed, he became increasingly short of breath. When you find the patient, he appears short of breath and slightly hypoxic, and you auscultate clear lung sounds. What function of breathing is being disrupted and causing this patient to become short of breath?

Oxygenation

Ventilation

Respiration

Neural control

Correct answer: Oxygenation

Oxygenation is the process of loading oxygen molecules onto the bloodstream's hemoglobin. At high altitudes, there is less oxygen available for the patient to inhale, which has resulted in his presentation of shortness of breath and slight hypoxia. Oxygen therapy and taking the patient down to an altitude where oxygen is readily available is the best treatment for this patient.

Ventilation is the physical act of moving air into and out of the lungs. At high altitudes, ventilation does not disrupt breathing, rather the lack of oxygen molecules in the atmosphere is.

Respiration is exchanging oxygen and carbon dioxide at the alveolar and tissue levels. Respiration is still occurring despite being at a high altitude with a low partial pressure of oxygen. In this situation, the body effectively exchanges the little oxygen being inspired for carbon dioxide.

Neural control refers to the neurologic control of breathing which originates in the brain stem and the pons. Neural control is responsible for increasing the respiratory rate of patients when they become hypoxic. In this scenario, you would find the patient slightly hypoxic and tachypneic. The low partial pressure of oxygen is the cause of hypoxia, and, in response, the brain stem increases the respiration rate.

85.

Which of the following is considered a normal breath sound?

- **Vesicular**
- Rales
- Adventitious
- Wheezing

Correct answer: Vesicular

Vesicular breath sounds are soft and low-pitched with a rustling quality during inspiration and are even softer during expiration. They are normal.

Rales are small clicking, bubbling, or rattling sounds in the lungs, also described variously as moist, dry, fine, or coarse. They are believed to occur when air opens closed air spaces. They are heard on inhalation.

Adventitious breath sounds are abnormal sounds that include fine and coarse crackles (or rales), wheezes (sometimes called rhonchi), pleural rubs, and stridor.

Wheezes are high-pitched sounds produced by narrowed airways. Wheezing and other abnormal sounds can sometimes be heard without a stethoscope.

86.

You are performing an interfacility transport of a patient with respiratory failure. The patient is currently on BPAP at settings of 20 / 8. What do these settings indicate?

The patient receives 20 cm H_2O on inhalation and 8 cm H_2O on exhalation.

The patient receives 8 cm H_2O on inhalation and 20 cm H_2O on exhalation.

The patient receives a constant airway pressure set at 28 cm H_2O.

These settings indicate the respiratory rate and airway pressure.

Correct answer: The patient receives 20 cm H_2O on inhalation and 8 cm H_2O on exhalation.

Bilevel Positive Airway Pressure (BPAP) is similar to CPAP (Continuous Positive Airway Pressure), providing continuous positive airway pressure to the patient. BPAP differs because it allows for airway pressure at two different levels or settings. BPAP administers a higher pressure to the patient on inhalation and a lower pressure on exhalation. In this scenario, the patient receives 20 cm H_2O of airway pressure on inhalation and 8 cm H_2O on exhalation.

BPAP is a setting on a ventilator that provides the patient with two different airway pressures depending on if they are inhaling or exhaling. The inhalation pressure will always be higher than the exhalation pressure. In this scenario, the patient receives 20 cm H_2O of airway pressure on inhalation and 8 cm H_2O on exhalation.

BPAP provides the patient with two different pressure levels—a higher pressure on inhalation and a lower pressure on exhalation.

The settings on a BPAP indicate the airway pressure for inhalation and exhalation. BPAP settings do not account for or try to alter a patient's respiratory rate.

87.

A laryngeal mask airway is contraindicated in which of the following patients?

Select the three answer choices that are correct

A patient with known esophageal disease

A patient has an intact gag reflex

A patient who is 26 weeks pregnant

A patient in respiratory arrest

An unresponsive patient

A Laryngeal Mask Airway (LMA) can be used to ventilate a patient in respiratory arrest. It is not the ideal airway for EMS, because the risk of aspiration is high with an LMA. Contraindications to LMA include:

- *An intact gag reflex*
- *Ingestion of caustic substances*
- *Known esophageal disease*
- *Pregnancy or morbid obesity (due to increased risk of regurgitation)*

88.

Which of the following is not a sign or symptom of bronchiolitis?

Bloody sputum

Fever

Coryza

Wheezing

Correct answer: Bloody sputum

Bronchiolitis is an acute inflammatory injury of the bronchioles, usually as a result of a viral infection (e.g., respiratory syncytial virus). Although it may occur in persons of any age, severe symptoms are usually seen only in young infants.

The signs and symptoms of bronchiolitis include shortness of breath, wheezing, coughing, fever (low-grade), dehydration, coryza, tachypnea, and tachycardia; infants may display feeding difficulties.

Bloody sputum is an indication of cancer or bacterial lung infection such as tuberculosis or S. pneumoniae.

89.

The amount of air that is moved in or out of the lungs during one breath is called what?

Tidal volume

Minute volume

Alveolar minute volume

Alveolar ventilation

Correct answer: Tidal volume

Tidal volume is the amount of air that is moved in or out of the lungs during one breath.

Alveolar ventilation is the volume of air that reaches the alveoli; it is calculated by subtracting the amount of dead space air from the tidal volume.

Minute volume is the volume of air moved through the lungs in one minute; it is calculated by multiplying tidal volume and respiratory rate.

Alveolar minute volume is the volume of air moved through the lungs in one minute, less dead space; it is calculated by multiplying tidal volume (minus dead space) and respiratory rate.

90.

Multiplying the tidal volume and the respiratory rate will give you the:

Minute volume

Alveolar ventilation

Residual volume

Vital capacity

Correct answer: Minute volume

Minute volume is the amount of air moved over the course of one minute (i.e., tidal volume times respiratory rate). Alveolar ventilation is the amount that actually reaches the alveoli for gas exchange. Residual volume is the amount that remains after maximal expiration. Vital capacity is the maximum volume of air expelled after maximal inspiration.

91.

The most important step in caring for any emergency care patient is to:

- **Obtain and maintain a patent airway**
- Ascertain the chief complaint
- Maintain body temperature
- Identify the patient

Correct answer: Obtain and maintain a patent airway

Brain cells begin to die within 4-6 minutes of oxygen deprivation. Primary assessment follows the ABCs, with variation for trauma patients (XABC) and cardiac arrest (CAB). For a medical emergency patient, airway management is the first and foremost concern.

92.

Your patient's ABG's are pH 7.48; PCO_2 22 mmHg; PaO_2 112; H_2CO_3 24 mEq/L. These values indicate:

Respiratory alkalosis

Respiratory acidosis

Metabolic alkalosis

Metabolic acidosis

Correct answer: Respiratory alkalosis

Respiratory alkalosis results from hyperventilation, and is reflected by an elevated pH, low CO_2 , and low H_2CO_3 (bicarbonate) levels in the Arterial Blood Gas (ABG). Treatment is often focused on treating the underlying cause of the hyperventilation.

93.

Your patient presents with a cough, rhinitis, and a sore throat. What condition are they most likely suffering from?

The common cold

Influenza A

Pertussis

Pneumonia

Correct answer: The common cold

The common cold is an infection that is often not serious unless a person is immunocompromised. The common cold presents a cough, stuffy and running nose, and a sore throat. A fever is not present with the common cold; if the patient is febrile, another condition like influenza, pertussis, or pneumonia is likely causing the infection.

Influenza A, more commonly known as the "flu," is an infection that causes a cough, sore throat, and fatigue. A patient diagnosed with the flu will also present with a fever.

Pertussis is also known as whooping cough. A person diagnosed with whooping cough will report coughing that waxes and wanes, unlike the common cold or influenza A. When the patient coughs, the sound that is made will sound.

Pneumonia is an infection in the lungs caused by bacteria or a virus that develops in one or both lungs. The infection causes a fever, chills, and a productive cough or green, red, or rust-colored sputum.

94.

The major functions of the upper airway are to:

Warm, filter, and humidify air entering the body

Provide a site for gas exchange

Transport food from the mouth to the stomach

Allow drainage from the sinuses

Correct answer: Warm, filter, and humidify air entering the body

Major functions of the upper airway (passage to the lungs), include warming, filtering, and humidifying atmospheric air entering the body. Gas exchange occurs in the alveoli (lower respiratory tract), and transport of food from mouth to stomach is conducted by the esophagus. Drainage of the sinuses is primarily through the nasopharynx and esophagus.

95.

Which of the following is a contraindication for a nasopharyngeal airway?

Basilar skull fracture

Cervical neck injury

Altered mental status with an intact gag reflex

Patient unable to tolerate an OPA

Correct answer: Basilar skull fracture

Contraindications for the nasopharyngeal airway include severe head injury with blood draining from the nose, potential for basilar skull fracture, history of fractured nasal bone, or resistance during insertion.

A nasopharyngeal airway is usually better tolerated by patients with an intact gag reflex. It is not as likely as an OPA to cause vomiting, as the distal tip rests in the hypopharynx behind the tongue.

96.

Which of the following is a Schedule II drug?

Cocaine

LSD

Heroin

Diazepam

Correct answer: Cocaine

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- ***Schedule IV:*** *Zolpidem, Librium, fenfluramine, Darvon, benzodiazepines (e.g., alprazolam, clonazepam)*
- ***Schedule V:*** *Pregabalin, cough preparations containing less than 200 milligrams of codeine per 100 milliliters or per 100 grams, and ezogabine*

97.

Which of the following is called an irregular pattern, rate, and depth of breathing with intermittent periods of apnea?

Biot respirations

Apneustic respirations

Cheyne-Stokes respirations

Kussmaul respirations

Correct answer: Biot respirations

An irregular pattern, rate, and depth of breathing with intermittent periods of apnea is termed Biot or ataxic respirations.

Apneustic respirations are prolonged, gasping inhalations followed by extremely short, ineffective exhalations. Cheyne-Stokes respirations are rhythmic, gradually increasing in rate and depth, followed by a gradual decrease of respiration with intermittent periods of apnea. Kussmaul respirations are deep, rapid respirations. They are common in patients with diabetic ketoacidosis.

98.

Your adult patient is having a prolonged, severe asthma attack. The AEMT management of this patient should include which of the following?

Select the four answer choices that are correct.

Administration of 100% oxygen

Administration of an inhaled bronchodilator

Continuous waveform capnography monitoring

Peripheral IV access and fluid administration

Faster than normal ventilations with a bag valve mask if ventilator support is needed

IV administration of epinephrine

The AEMT management of a patient with a moderate to severe asthma attack should include (always follow local protocols):

- *Administration of high flow 100% oxygen*
- *Administration of CPAP (Continuous Positive Airway Pressure) or ventilator support with a bag-mask device if needed*
- *Continuous waveform capnography monitoring*
- *Administration of an inhaled bronchodilator if local protocol allows*
- *Peripherial IV access and fluid administration — so long as no contraindication exists, such as suspected fluid overload or CHF (Congestive Heart Failure)*
- *Paramedic back-up or intercept should be considered early*

If ventilator support with a bag mask device is needed, the AEMT must assure adequate expiratory times are allowed in patients with asthma. This requires slower rates of ventilation, not faster. The over-ventilation of an asthma patient may result in a dangerous buildup of air in the lungs known as autopeep. The AEMT is not permitted to administer IV epinephrine to the asthmatic patient.