IBSC FP-C - Quiz Questions with Answers

I. Safety and Transport

1.

Which of the Federal Aviation Regulations (FARs) addresses whether an air medical transport may operate under Visual Flight Rules (VFR) or Instrument Flight Rules (IFR)?

Part 135

Part 91.155

Part 91.605

Part 91

Correct answer: Part 135

Federal Aviation Regulations (FARs) governing the requirements for flight operations in the face of weather are located in Part 135. Part 135 describes in straightforward language the required weather minimums for safe operations using either Visual Flight Rules (VFRs) or Instrument Flight Rules (IFRs). Limitations are imposed during unfavorable weather, and the pilot, and medical air transport crew members, are mandated to comply with these limitations.

Part 91.155 discusses basic weather minimums at specific altitudes which must be met in order for all aircraft to fly using VFR.

Part 91.605 addresses the weight and balance limits of aircraft.

Part 91 flight regulations are general regulations and rules for all civil aircraft.

2.

Which stressor of air transport may cause exacerbation of spinal disorders?

Vibration

Flicker vertigo

Alcohol consumption

Fatigue

Correct answer: Vibration

The most common stressors of air transport include medications, supplements, nicotine, alcohol, fatigue, vibrations, and flicker vertigo. Vibrations in rotor-wing transport can affect the whole body and can cause symptoms of motion sickness, hyperventilation, headache, and a decrease in vision as well as pain in the legs, buttocks, and back, indicating exacerbation of spinal disorders.

Flicker vertigo typically causes spatial disorientation due to confusion of the vestibular system. Alcohol consumption and fatigue may impair crew members but will not typically directly cause insult to the spine.

3.

A medical air transport helicopter has been forced to make an emergency water landing. All of the following statements regarding how to escape in this scenario are false except:

Wait to attempt to exit the aircraft until it is upside down

Swim out of the helicopter

Begin escape procedures immediately upon impact with the water

Move away from the fuselage of the aircraft before it sinks

Correct answer: Wait to attempt exiting the aircraft until it is upside down.

The type of aircraft involved in an emergency water landing or crash in water determines what steps the crew members should take in escaping from the aircraft. Helicopters will almost always sink, or capsize, after impact with water; an emergency escape should not be attempted until crew members can see that the rotors have stopped spinning and the helicopter has turned completely upside down.

Attempts should not be made until the cabin of the aircraft has almost completely filled with water, at which time crew members should release their seat belt buckles. Once the buckle is released, crew members will float, and if unsure of their position in the water, should attempt to visualize released air bubbles in the water to help determine their way to the surface. No attempts to kick or swim away from the aircraft should be made, as this is more likely to result in a crew member becoming entangled within the aircraft or accidentally injuring another crew member. Crew members should instead pull themselves through and out of the aircraft.

4.

All of the following procedures are standard as part of Helicopter EMS (HEMS) pre-crash sequence except:

Assume the crash position with knees together, feet 8 inches apart and placed under the seat.

Turn off all oxygen in use, removing it from the patient.

Assist in laying the patient flat and ask them to cross their arms across their chest if possible.

Ensure helmets are strapped tightly with visor down.

Correct answer: Assume the crash position with knees together, feet 8 inches apart and placed under the seat.

The design of all aircraft continues to evolve and change in an attempt to improve survival during aircraft crashes. Landing gear, fuel systems, and aircraft seat design are all aspects of the aircraft that have undergone significant improvements in recent years to ensure these systems specifically are more capable of withstanding the massive forces experienced during a crash. Aircraft seats are now designed to both absorb the energy of a crash and decrease the G forces experienced by the individuals occupying the seats. This being said, aircraft seats will break apart with a crash landing, and all passengers of the aircraft should ensure that when they assume the crash position, their legs are not positioned under the seats and 6 inches apart.

Correct pre-crash sequence includes the following:

- *Make sure to follow sterile cockpit.*
- *Assist the pilot per their direction.*
- *Tighten your helmet strap, pull your visor down, tighten seat belts, and assume the crash position.*
- *Position the patient with their head down and arms crossed, tighten patient seatbelts.*
- *Secure all equipment, shut off oxygen and inverter.*
- *Assist the pilot in looking for appropriate landing sites.*
- *If directed by the pilot, start emergency communication.*

5.

The Pilot in Charge (PIC) of the rotary-wing aircraft and the clinical crew members sit down to discuss the mission plan after receiving notification that they are required to transport a 10-year-old male who was severely burned in a house fire. Which of the following terms most accurately describes the practice that the PIC and clinical crew members are participating in within this scenario?

Air Medical Resource Management (AMRM)

Crew Resource Management (CRM)

Operational Risk Assessment (ORA)

Mission Planning Initiative (MPI)

Correct answer: Air Medical Resource Management (AMRM)

Within both commercial aviation and military aviation (specifically the U.S. Air Force), a process referred to as Crew Resource Management (CRM) exists to reduce the risk of aviation error and stress by involving all members of the flight crew in mission planning and safety and decision-making regarding the proposed flight.

Within medical air transport, an identical process has been adopted and is referred to as Air Medical Resource Management (AMRM). All members of the air transport crew, including the pilot and the clinical team members, meet to discuss all potential assignments, and all members have an equal say in accepting or declining an assignment based on the available information. This process was adopted after several severe accidents occurred during which solely the pilot was allowed to decide on whether to proceed with the assignment. The AMRM requires the entire crew to use good communication and problem-solving skills, as well as teamwork, when evaluating all the components of a potential assignment.

6.

All of the following statements regarding the use of Night Vision Goggles (NVGs) during air medical transport missions are correct except:

Wearing NVGs does not increase the weight of the flight helmet.

Both pilot and medical crew members typically wear NVGs during night transport missions.

Someone pointing a laser at an aircraft can cause significant eye damage to someone wearing NVGs.

NVGs use an electronic system to improve night visibility.

Correct answer: Wearing NVGs improves safety by multiplying light up to 5,000 times.

The use of Night Vision Goggles (NVGs) by Helicopter Emergency Medical Service (HEMS) crews has increased rapidly in the last few years after many years of usage by military pilots. NVGs work through the use of an electronic system that amplifies available light by up to 10,000 times, lending itself to significant improvements in night transport safety. However, there is some added weight to the flight helmet as well as a decrease in depth perception and peripheral vision.

The use of rotating strobe-type lights on the ground at Landing Zones (LZ) during taking off and landing should be minimized, and lights should never be shined directly at the aircraft during night transport missions, and overhead lighting of LZs is not advisable, as it tends to erode the perimeter lighting used to mark off the LZ. It is most common for both the pilot and members of the medical team to wear NVGs during night transport missions.

7.

Your Helicopter EMS (HEMS) team responds to the scene of a vehicle crash on a busy interstate highway. All of the following factors are potential causes of secondary incidents (accidents) in scene situations similar to the one in this scenario except:

Medical air transport helicopter landing zone was established too far from the accident scene

Insufficient buffer space established around the scene of the accident

Rescue crew not trained correctly in use of safety equipment

Medical air transport crew distracted by the need to provide intensive care to multiple victims in timely manner

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Correct answer: Medical air transport helicopter landing zone was established too far from the accident scene

When participating in a medical rescue or transport at the scene of an incident, the risk of the rescue and/or transport crews being involved in a secondary incident (accident) is high. All personnel who respond to on-scene incidents need to be thoroughly trained in management of an accident scene, not only to ensure the victims are safely cared for, but also to keep the members of the rescue and transport crews safe.

A lack of appropriate training, being distracted by details at the scene (lack of awareness of the situation), a failure to ensure traffic has been diverted appropriately to provide an ample buffer in which to work, poor use of lighting at the accident scene, incorrect usage of rescue or safety equipment, or positioning the medical air transport helicopter landing zone too close to the scene of the accident are all common potential causes of secondary incidents.

8.

A helicopter landing zone should generally be at least what size?

100 ft x 100 ft

50 ft x 50 ft

150 ft x 150 ft

125 ft x 125 ft

Correct answer: 100 ft x 100 ft

Generally, 100 ft x 100 ft is a large enough minimum landing zone for these options. While a 75 ft x 75 ft landing zone is acceptable in daytime conditions, a 50 ft x 50 ft would be too small. Therefore, the most appropriate answer is 100 ft x 100 ft.

9.

All of the following may be utilized as efficient means for signaling to would-be rescuers in the event of a downed medical air transport aircraft except:

Shouting for help

Using whistles to signal for help

Using a signal mirror

Using dyes placed in the water

Correct answer: Shouting for help

There are several efficient means of signaling for help to would-be rescuers in the event of an emergency landing of a medical air transport aircraft. Crew members may elect to use personal cell phones to access the local 911 dispatch system or may be able to utilize any portable radios carried by the aircraft. Fire may be made both to provide warmth and to use to signal; natural materials such as green leaves or green wood, or synthetic materials such as rubber or plastics from the aircraft may be added to the fire to create smoke for smoke signals during daylight hours. Any flashlights, strobe lights, or flares carried by the crew or present on the aircraft should be used to signal, and should be used when aircraft or other rescue vehicles can be heard, even if they cannot be seen. Signal mirrors should also be used when aircrafts can be heard, even if not visible, and any brightly colored clothing can be waved or laid out for possible air rescuers. Dyes can be placed in the water in the event of water landings, or in the snow during wintertime to improve visibility to rescuers, and other ground-to-air signals such as using debris on the ground to spell out "SOS," or a letter "X" should be made. Whistles are also considered an efficient means of signaling.

Shouting for help is not considered an efficient means of signaling for help.

10.

Which of the following statements regarding flight crew traveling as a crew member in a ground transport vehicle is most accurate?

All crew members should be trained in response to ground vehicle accidents.

All crew members are required to wear a seat belt at all times.

Only the patient is required to remain seat belted at all times in ground transport vehicles.

Training for response to ground vehicle accidents is not required for medical air transport crew.

Correct answer: All crew members should be trained in response to ground vehicle accidents.

In order to be prepared in case of a ground vehicle transport, all programs should have response plans in place for both aircraft and ground vehicle accidents.

Both the patient and all crew members riding in the front of the ground transport vehicle are required to remain buckled in their seat belts at all times while the vehicle is in motion. If possible, crew members in the patient compartment should also remain buckled in their seat belts, but may need to remove their seat belts and move around the compartment in the provision of patient care.

11.

An adult patient is loaded head forward into the air medical transport aircraft in preparation for departure. According to patient transport standards established by the Commission for Accreditation of Medical Transport Systems (CAMTS), how must this patient be secured prior to liftoff?

With the use of three cross straps and a shoulder harness

With the use of three cross straps

With the use of a shoulder harness

With the use of pads inserted into the pad voids and two cross straps and a shoulder harness

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Correct answer: With the use of three cross straps and a shoulder harness

The Commission for Accreditation of Medical Transport Systems (CAMTS) is responsible for patient safety standards which must be maintained during medical air transport. Regardless of patient position in the aircraft, the patient must be secured by the use of three cross straps—positioned at the chest, hips, and knees. In addition, when patients are positioned head forward in the aircraft, a shoulder harness must also be fastened.

Pediatric patients will need to be secured using a specifically sized device used to secure smaller individuals and, if an infant is to be transported using a car seat, the seat must be one that is approved by the Federal Aviation Administration (FAA) and have an FAA approval sticker already in place.

12.

According to the safety initiatives established by the Commission on Accreditation of Medical Transport Services (CAMTS), Helicopter Emergency Medical Services (HEMS) pilots must:

Complete 1,000 hours as pilot in command (PIC) to qualify to fly

Be instrument rated for all flights to qualify to fly

Possess Airline Transport Pilot (ATP) certificate to qualify to fly

Complete 1,500 hours of flight time in helicopters to qualify to fly

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Correct answer: Complete 1,000 hours as Pilot in Command (PIC) to qualify to fly

The Commission on Accreditation of Medical Transport Services (CAMTS) has established safety initiatives detailing qualifications necessary for both fixed-wing aircraft pilots and rotary wing (helicopter) pilots. In order to qualify to fly as a HEMS pilot, the pilot must:

- *have completed 2,000 hours of total flight time, 1,200 of which must have been in piloting of helicopters,*
- *have completed 1,000 hours as the PIC, 100 hours of which must have taken place during night flights,*
- *be instrument rated for flying in instrument meteorological conditions (IFR in IMC),*
- *obtain Airline Transport Pilot (ATP) certification within 5 years of qualifying as a HEMS pilot, and*
- *have completed an air orientation of his/her area (5 hours total, 2 of which must be at night) prior to being allowed to accept any solo mission.*

13.

Which of the following statements about ground ambulances is most accurate?

The majority of crashes involving ground transport ambulances occur during emergency use.

Vehicles traveling on the highway will be able to hear the ambulance siren from a distance of approximately 250 feet.

63% of fatalities in accidents involving ground ambulances occur in the ambulance.

Ambulances are required to have two red lights visible 360^{o} from 250 feet.

Correct answer: The majority of crashes involving ground transport ambulances occur during emergency use.

According to the National Highway Traffic and Safety Administration (NHTSA), the majority of crashes involving ambulances take place when the ambulance is in emergency use. Of the accidents involving fatalities studied by NHTSA, 63% involved the death of someone in the other involved vehicle, not within the ambulance. Lights and sirens used during emergency transport must be able to be seen and heard from 500 feet away under normal operating conditions. At least one red strobe light with 360^{o} capacity must also be used during emergency transport.

14.

Which of the following is the most accurate statement regarding crew resource management?

Mission acceptance under crew resource management is based on the concept of "all to go, one to say no"

All decisions made utilizing crew resource management are group decisions regardless of rank or title

Very few threats to safety are caught using crew resource management techniques

Crew resource management involves cognitive skills, technical aspects of flight, and interpersonal skills

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Correct answer: Mission acceptance under crew resource management is based on the concept of "all to go, one to say no"

Crew resource management was developed as a response to the KLM Royal Dutch Airlines/Pan America airline crash in 1977. Known as the deadliest crash in aviation history, the cause was found to be unclear communication between the pilot and the control tower. Crew resource management allows for all crew members to have a voice in decision making aboard the aircraft to allow for safe flight operations. Mission acceptance is one scenario in which all crew members have a say, with the idea of "all to go, one to say no" guiding whether an aircraft accepts a mission.

While subordinates are able to have a hand in decision making, participation and the ultimate decision is situation dependent. For example, a critical care paramedic attending a patient will not give flight instructions to the pilot but may intervene if the pilot is displaying unsafe behavior.

Studies have shown that crew resource management is able to catch most threats during flight with no detrimental consequences.

Crew resource management utilizes cognitive skills for tasks like situational awareness and interpersonal skills like communication for effective decision making. The technical aspects of flight are not a concern of crew resource management.

15.

In the event of an open-water emergency landing in which the survivors are too far from shore to be able to reasonably swim, which of the following survival strategies may be the next best step?

Assume the HELP posture.

Huddle together.

Wear a flight helmet.

Begin signaling for help.

Correct answer: Assume the HELP posture

If involved in an open-water landing while part of a medical air transport mission, all survivors should attempt to reach the shore. If this is not possible due to extreme distance from shore or in the case of injured parties whose injuries prevent them from attempting to swim to shore, the next best step is for survivors to assume the HELP position in an attempt to try to prevent the development of hypothermia. HELP stands for Heat Escape-Lessening Posture and involves placing oneself in the fetal position with knees tucked up against the chest and arms crossed over the chest. A flotation device must be worn when using the HELP position.

Flight helmets should be worn when in the water, as they provide a degree of insulation, and can aid in being spotted by rescuers. Survivors should then huddle together to, again, decrease development of hypothermia, and should signal to would-be rescuers. In addition, any life rafts should be carefully maintained.

16.

The pilot of an air medical transport flight instructs the crew to prepare for an emergency landing on water due to engine fire. The crew members should take all of the following steps prior to impact with the water except:

Jettison the aircraft doors

Plan their escape path

Place one hand on their seat belt buckle.

Place one hand on a known reference point within the aircraft.

Correct answer: Jettison the aircraft doors

In the event of a planned emergency ditching, the crew of a medical air transport aircraft should take several steps in an attempt to improve survivability. Crew members should assume the crash position, making sure their legs/knees are not placed under any of the aircraft seats, and should then begin planning how they will escape from the aircraft after impact. They should know exactly where the nearest door is in relation to their crash position, and keep one hand placed on a known point of reference within the aircraft to help prevent disorientation after the crash. One hand should be left on the seat belt buckle so that it can be easily released after impact in the water. Each crew member should also disconnect their ICS (Incident Command System) cable.

Doors should only be opened or jettisoned at the direction of the pilot; otherwise, doors should be left closed and intact.

17.

During a night air medical transport mission, an experienced member of the medical crew becomes concerned that the (new) pilot is not flying at correct altitude for the mission route. All of the following statements of communicating concern in this scenario are correct and appropriate except:

"Captain McDonald, don't you think our altitude is too high?"

"Captain McDonald, I'm concerned that we are flying at too low of an altitude."

"Hey, Captain McDonald, there's a mountain ridge over there that we're going to slam into if you don't bring us up to a higher altitude."

"Captain McDonald, if you are unfamiliar with this flight path, I am asking you to abort the mission and turn back to avert a disaster."

Correct answer: "Captain McDonald, don't you think our altitude is too high?"

All members of the medical air transport mission need to be assertive enough to speak up and state their concerns in a situation, even when other or more senior team members do not agree with the position of concern. Assertiveness involves the need to maintain the opposing viewpoint either until they are persuaded to change their position based on the presentation of hard facts, or until the rest of the crew is compelled to change their stance due to a non-unanimous "vote."

When practicing assertiveness in potentially dangerous situations, there are several key components to appropriate communication.

First, show respect by using the individual's appropriate name, title, and/or rank when communicating. Denigrating the communication through the use of nicknames or other derogatory-type names that can be construed as disrespectful.

Second, the concern needs to be stated clearly ("Captain McDonald, I'm concerned that we are flying at too low of an altitude."). Making a statement such as "Captain McDonald, don't you think our altitude is too high?" is a weak statement and leaves too much room for the pilot to ignore the experienced flight member's legitimate concern.

Third, the crew members need to clearly state what they believe will be the negative outcome if immediate action is not taken ("Hey, Captain McDonald, there's a mountain ridge over there that we're going to slam into if you don't bring us up to a higher altitude."). This statement should be made so that there is no question as to what potential negative outcomes may occur if change is not brought about.

And, finally, the crew member needs to clearly state a solution for the problem ("Captain McDonald, if you are unfamiliar with this flight path, I am asking you to abort the mission and turn back to avert a disaster.").

18.

Which of the following descriptors most accurately describes the term "sterile cockpit?"

Restricting intercom communication throughout the aircraft during critical phases of flight

Limitations placed on intercom usage during straight or level flight

Restricting intercom communication in the cockpit only during takeoff and landing

Requirement for pilot to wear all appropriate PPE when transporting immunocompromised patients

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Correct answer: Restricting intercom communication during critical phases of flight

The Federal Aviation Administration (FAA) is responsible for the regulation of all the details pertaining to civilian flights, including medical air transport. The FAA requires that a sterile cockpit be maintained during all critical phases of the flight: takeoff, landing, during refueling, and during taxiing either on the ground or in the air. Intercom communication throughout the aircraft is restricted during these critical phases, and normal intercom communication can be resumed once straight or level flight is resumed.

19.

While on a night flight, the critical care paramedic sees another aircraft showing a red light on its left wing, a white light in the middle, and a green light on the right wing. This aircraft is:

Moving away from his or her aircraft

Above his or her aircraft's altitude

Moving towards his or her aircraft

Below his or her aircraft's altitude

Correct answer: Moving away from his or her aircraft

Navigation lights consist of a red light on the left/port wing tip, a green light on the right/starboard wing tip and a white light on the aircraft tail. Dual systems are often installed to provide redundancy in the event of a bulb failure. The aircraft in this scenario is traveling away.

20.

Which of the following are correct weather minimums for Helicopter EMS (HEMS) operating in non-mountainous terrain?

Local Daytime: 800', 2 miles

Local Daytime: 800', 3 miles

Cross Country Daytime: 800', 2 miles

Cross Country Daytime: 1000', 3 miles

Correct answer: Local Daytime: 800', 2 miles

CAMTS Rotorwing Standards for Non-Mountainous Terrain:

- *Local Daytime: 800', 2 miles*
- *Local Night: 800', 3 miles*
- *Cross Country Daytime: 800', 3 miles*
- *Cross Country Night: 1000', 3 miles*

21.

Which of the following statements regarding Emergency Locator Transmitters (ELT) on Emergency Medical Services (EMS) aircraft is most accurate?

The ELT can be activated manually or automatically.

The ELT is automatically activated in response to an impact of 3 Gs or less.

The ELT transmission is broadcast on distress frequency 121.5 MHz, which is monitored by the COSPAS-SARSAT search and rescue satellite system.

The Federal Aviation Administration (FAA) requires that the ELT transmit its distress signal on frequency 405 MHz, which provides information about the aircraft's Global Positioning System (GPS) location.

Correct answer: The ELT can be activated manually or automatically.

The Federal Aviation Administration (FAA) requires all EMS aircraft to have an Emergency Locator Transmitter (ELT) on board in the incident of an aircraft crash. Each crew member, including the members of the medical air transport crew, should know the position of the ELT(s) and should be instructed on how to activate the ELT manually if it is not automatically activated by the crash. ELTs should automatically activate in response to a crash that exceeds 4 G forces, but this should be confirmed by a crew member, not just assumed.

Distress signals are broadcast over frequencies 121.5 MHz and 406 MHz; distress frequency 121.5 MHz is no longer monitored by the COSPAS-SARSAT (an international humanitarian search and rescue organization) search and rescue satellite system.

22.

Which of the following statements most accurately defines the fixed-wing medical air transport method referred to as "swoop and scoop"?

Transfer of the patient to the tarmac

Removal of the patient from wilderness terrain incidents

Transport of the patient from hazardous materials (hazmat) incidents

Loading of the patient while the helicopter rotors are still in motion

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Correct answer: Transfer of the patient to the tarmac

Under most conditions, a thorough evaluation and assessment of the patient can be completed prior to packaging a patient for transport. In addition, typically, the patient is also stabilized prior to loading into the aircraft. In urgent situations, such as when a patient's condition is rapidly deteriorating or there is the potential for deterioration over the duration of the air medical transport, or when the patient is transferred on the tarmac, a method referred to as "swoop and scoop" may be employed. During a "swoop and scoop" transport situation, patient assessment and/or stabilization prior to packaging and loading may be omitted in favor of speeding up the transfer and transport time of the patient.

23.

Where can first responders quickly locate general information about hazardous materials when responding to an incident in the field?

In the first response vehicle

At Incident Command

At the Department of Transportation

In the possession of the operations manager

Correct answer: In the first response vehicle

Each first response vehicle, including medical air transport aircraft, has a copy of the Emergency Response Guidebook (ERG), in which general information about hazardous material is contained. This emergency text is divided into six sections, each section of which deals with a different component of response to a hazardous materials (hazmat) incident. The ERG should only be used for reference during the initial stage of response to a hazmat incident in an attempt to keep both the general public and first responders safe.

24.

You are a flight paramedic with a Helicopter EMS (HEMS) team in flight when the pilot requests that you make an emergency radio call. Which of the following statements about emergency radio calls during medical air transport is most accurate?

The aircraft tail number should be declared during an emergency radio call

Use of the term "Mayday" during the call indicates precautionary and emergency landing situations

All air medical transport crew members are responsible for making emergency radio calls

Emergency radio calls are made through use of the 911 dispatch radio system

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Correct answer: The aircraft tail number should be declared during an emergency radio call.

The pilot of any aircraft is the individual ultimately responsible for completion of an emergency radio transmission; however, the pilot may request a crew member make the emergency transmission. If a crew member may be called upon to complete emergency radio calls, this should be clearly stated within the medical air program policies, and all crew members should be trained in how to make distress calls. In the event of a true emergency, the term "Mayday" should be used to communicate the seriousness of the aircraft's situation; the aircraft tail number or other aircraft identifiers, the location of the aircraft, and the nature of the emergency should all be included in the Mayday call.

The term Mayday should only be used to identify true emergency situations; alternate language should be used in precautionary situations. In some instances, it may be advisable to radio through the use of the 911 system, as this may decrease response time of the local emergency responders whose help is needed in the emergency or precautionary situation.

25.

In the event of an in-flight emergency, all crew members must be familiar with all of the following except:

Operation of landing gear

Oxygen and medical gas shutoff

Operation of doors and emergency exits

Emergency engine shutdown

Correct answer: Operation of landing gear

All transport team members should be familiar with multiple aspects of the aircraft in order to prepare for in-flight emergencies. Training should be performed regularly on both the primary and backup aircraft. Specific items that crew members should become familiar with include:

- *Operation of seat belts and harnesses*
- *Operation of doors and emergency exits*
- *Procedures for emergency egress for crew and patients, both with and without a backboard*
- *Emergency engine shutdown*
- *Emergency communications*
- *Shutdown procedures for oxygen and medical gas*
- *Location and operation of fire extinguishers and other emergency equipment*
- *Procedures for hot-loading and offloading*

Only the pilot is responsible for operation of the aircraft itself, including the landing gear.

26.

The crew of an air medical transport aircraft has been involved in an emergency landing situation in wilderness terrain. All of the following are considered to be acceptable sources of water for hydration except:

Snow

Dew

Puddles

Condensation on the aircraft windshield

Correct answer: Snow

In the event of an emergency landing or crash of a medical air transport aircraft in a wilderness location, after assessing survivors for injuries and providing for medical stabilization, priority should be placed on obtaining water for drinking. Acceptable sources of water include dew found on plant leaves or other surfaces, running water sources such as streams or rivers, standing surface water such as puddles, or condensation that collects on surfaces such as the aircraft windshield. All water should be purified prior to drinking, either by the use of purification tablets included in survival kits or by boiling or filtering of the water.

Snow should not be ingested to provide water, as this can cause heat loss and contribute to hypothermia; instead, it should be melted over fire or in the sun to bring the water temperature up to a more temperate level.

27.

The pilot of a helicopter medical transport flight is preparing to land on an unsecured Landing Zone (LZ) in a farm field to pick up a patient at 1300 hours. Prior to completing the landing, the pilot should:

Make 2 passes of the LZ.

Request police secure the helipad.

Ensure a windsock and perimeter lighting have been placed around the LZ.

Request 2 crew members confirm readiness of the LZ.

Correct answer: make 2 passes of the LZ

Prior to touch down on an unsecured or Hasty Landing Zone (HLZ), the pilot of a helicopter medical transport flight is required to complete 2 passes of the landing zone. The purpose of each pass is to allow for scrutiny of the LZ and discovery of any potential hazards which may prevent a safe landing. The first pass should be a "high" pass followed by a "low" pass. Any identified potential hazards should be radioed in to the ground crew in an attempt for rapid repair of the situation. If the hazard cannot be rapidly removed or repaired, plans should be made for an alternate landing site.

Windsocks and perimeter lighting are requirements at permanent helipads, not an HLZ.

28.

According to Federal Aviation Administration (FAA) regulations, a helicopter air ambulance certificate holder must have an Operations Control Center (OCC) if they operate how many helicopters from the site?

10 helicopters

5 helicopters

Any number of helicopters

7 helicopters

Correct answer: 10 helicopters

Helicopter air ambulance centers must adhere to regulations established by the FAA in operation of the center and the medical transport aircraft. It is not uncommon for the OCC of an air ambulance center to be located at the same site as where the aircraft are kept/launched, due to the need for significant radio, internet, and other technology for both. Helicopter air ambulance certificate holders who operate 10 helicopters are required to have an OCC; certificate holders who operate fewer than 10 helicopters are not held to this requirement.

29.

The crew of an air medical transport aircraft are meeting to discuss the potential transport of a bariatric patient. Prior to the takeoff of this medical transport, the pilot is responsible for completing all of the following calculations except:

Net weight of the aircraft

The patient's weight

The crew members combined weight

Weight of the fuel load

Correct answer: Net weight of the aircraft

The responsibility for calculating and managing all the weights associated with the aircraft falls to the pilot of the aircraft. Safe, optimal aircraft performance is predicated upon careful management of both weight and balance of the aircraft, and the pilot is responsible for daily management of the daily operational weight. The gross weight of an aircraft is not arbitrary but is instead predetermined by the flight manual.

The pilot must request information regarding patient weight, particularly if the patient is a bariatric patient, total crew weight, weight of the fuel load and all equipment, and the weights of any additional passengers, such as family members of the patient, in determining whether it is safe to undertake the mission. The pilot may be required to eliminate weight from the aircraft, including refusing to allow family members to travel or leaving behind any unnecessary crew members or equipment, prior to takeoff.

30.

What are the flight following standards for HEMS?

15 minutes when flying, 45 minutes when on the ground

15 minutes when flying, 30 minutes when on the ground

30 minutes when flying, 45 minutes when on the ground

15 minutes when flying, 15 minutes when on the ground

Correct answer: 15 minutes when flying, 45 minutes when on the ground

Flight following is the process of control checking in with the aircraft or the aircraft checking in with control during missions. If a flight misses a flight following check in, the emergency action plan is activated 15 minutes after the failed check-in time. Current standards require check-ins every 15 minutes when flying and every 45 minutes when on the ground.

31.

Which of the following items should be carried in the flight paramedic's personal survival kit in the event of an emergency crash landing?

Nylon cord

Cooking kit

Water purification tablets

Insect repellant

Correct answer: Nylon cord

Each member of the air medical crew should carry a personal survival kit on each mission in the event of an emergency or crash landing. In addition, each aircraft should be fully equipped with a basic aircraft survival kit available for use by surviving crew members, and depending upon the specific conditions in which the medical air transport program operates, additional, more specific survival kits may be advisable.

The basic personal survival kit of each crew member should include:

- *A flashlight or headlamp*
- *Water bottle*
- *Knife*
- *Nylon cord*
- *Plastic whistle*
- *Sunglasses*
- *Waterproof matches*
- *Space blanket (or heavy-duty trash bag)*
- *Compass*
- *Energy bars*

Water purification tablets and insect repellants should be kept as part of the basic aircraft survival kit.

32.

Who has the final authority in regard to flight-related issues?

Pilot in Command

Medical crew team members

Dispatch commander

The company’s medical director

Correct answer: Pilot in Command

The Pilot in Command has the final authority when it comes to flight-related issues. During flight, not even the company’s medical director can override the Pilot in Command when it comes to flight-related issues.

33.

What frequency does an upgraded ELT transmit on?

406 MHz

121,5 MHz

135 MHz

206 MHz

Correct answer: 406 MHz

Emergency Locator Transmitters (ELT) can be manually activated, or auto activate at 4G of force. Old ELT's transmit on 121.5 MHz. FAA 135 requires upgraded ELTs to transmit on 406 MHz.

34.

You are flying to a rural hospital to pick up a patient. During transport, your pilot suffers from a medical emergency and needs to land the aircraft. The pilot shuts down the throttle and fuel but then loses consciousness. What is the next most appropriate action for you to take?

Shut down the battery

Activate the brake

Shut down the rotors

Activate the ELT

Correct answer: Shut down the battery

In an emergency, shut down procedures, in order, are to first shut down the throttle, then the fuel, followed by the battery and activation of the brake to shut down the rotor. The Emergency Locator Transmitter, or ELT, can be manually activated but can also be activated when 4-g forces are reached. The pilot in this scenario was able to shut down the throttle and fuel, so the next step would be to shut down the battery.

35.

Which position is the safest approach for loading a patient in most aircraft?

3 o'clock or 9 o'clock

10 o'clock or 2 o'clock

11 o'clock or 2 o'clock

7 o'clock or 5 o'clock

Correct answer: 3 o'clock or 9 o'clock

The ground crew should seek permission prior to approaching any recently landed medical air transport vehicles. Once permission is obtained from the Pilot-in-Command (PIC), the safest position in which the ground crew should approach with a patient to load into the aircraft is from the 3 o'clock or 9 o'clock position, and they should approach using extreme caution. This may vary, depending on the aircraft, but the safest position for most aircraft is the 3 o'clock or 9 o'clock position. Approaching from the 11 o'clock or 1 o'clock position is considered an acceptable approach position, as is the 12 o'clock position. Approaching from the 10 o'clock or 2 o'clock position is not recommended because you may be obscured from pilot view. Approaching from the 7 o'clock or 5 o'clock positions is expressly prohibited due to the inherent danger of operating around the tail rotor of the aircraft.

36.

The pilot of a fixed-wing aircraft who is providing medical air transport is being guided during their flight by air traffic control. This manner of flight is referred to as:

Instrument Flight Rules (IFR)

Air traffic control systems flight

Inadvertent Instrument Meteorological Flight Conditions (IIMC)

Visual Flight Rules (VFR)

Correct answer: Instrument Flight Rules (IFR)

Instrument Flight Rules (IFR) govern flight operations when conditions necessitate flying solely by instrument guidance, versus allowing the pilot to use Visual Flight Rules (VFR) to govern the flight. Flying under IFR is common when traveling in a fixed-wing aircraft, but is less commonly used when piloting helicopters. IFR is utilized most commonly when weather conditions do not permit safe flight by use of VFR. During use of IFR, air traffic control surveils the aircraft's position on radar, providing detailed instructions to keep the aircraft on a safe flight path.

VFR applies solely when weather and terrain conditions permit the pilot to operate the aircraft using visual surveillance, and instruments are not utilized during VFR flights.

Inadvertent Instrument Meteorological Flight Conditions (IIMC) indicate that when the flight was initiated, weather conditions and the surrounding terrain permitted flight by VFR but, once flying, the pilot encountered unexpected weather that necessitated flying by IFR.

37.

Patients with a history of (or injury predisposing them to) what condition should be protected from the effects of flicker vertigo?

Seizures

Vision loss

Barotitis

Migraines

Correct answer: Seizures

Flicker vertigo is an imbalance in brain-cell activity caused by exposure to the low-frequency flickering (or flashing) of a relatively bright light. It can be caused by sunlight passing through moving rotor blades, or rotational beacons. Patients with a history or injury predisposing them to seizures have a greater chance of developing this condition. Protecting the eyes from light and adequate ventilation during transport will help reduce the risk of flicker vertigo.

38.

When communicating by radio within an air medical transport program, how is it preferable to communicate?

Using plain language

Using region-specific air transport codes

Using standard medical codes

Using generally accepted air transport codes

Correct answer: Using plain language

While it is obvious that specific language, jargon, and codes exist both within the air transport industry and emergency medical services at large, communication via radio within an air medical transport program becomes incredibly complex when one attempts to communicate using these specific languages including region-specific air transport codes, standard medical codes, or generally accepted air transport codes. Any codes considered generally accepted or standard in one area can also differ from language used in another region, making them confusing when being used during long transports. For purposes of preventing error and aiding in clear communication, it is preferable to communicate by radio using plain language.

39.

Who is responsible for the patient until they arrive at the next facility during a transfer?

Sending physician

Flight paramedic

Flight RN

Receiving physician

Correct answer: Sending physician

According to EMTALA, the sending physician is responsible for the patient until they arrive at the next facility unless otherwise specified.

40.

Your patient is a 34-year-old female being transported due to COPD exacerbation. She tells you that she typically smokes a pack of cigarettes each day. During transport, your patient's oxygen saturation continues to drop despite adequate ventilation and administration of 15 lpm via nonrebreather mask.

What is the likely cause of this patient's hypoxia?

Hypemic hypoxia

Hypoxic hypoxia

Histoxic hypoxia

Stagnant hypoxia

Correct answer: Hypemic hypoxia

Persons who smoke are exposed to higher levels of carbon monoxide regularly than those who do not. Carbon monoxide has a strong affinity for hemoglobin, which interferes with the oxygen carrying capacity of the blood, causing hypemic hypoxia. Three cigarettes a day, or twenty to thirty in a 24-hour period, can saturate up to 10% of the total hemoglobin in the body with carbon monoxide.

Hypoxic hypoxia is caused by a lack of oxygen, or an inability for that oxygen to diffuse into the bloodstream. This patient has an adequate source of oxygen. Histotoxic hypoxia is caused by an inability of the tissues to accept oxygen from the hemoglobin. While this can be caused by chewing tobacco, it is not usually seen due to smoking cigarettes. Stagnant hypoxia occurs when the blood can carry oxygen, but the body is not able to transport the oxygenated blood due to conditions such as heart failure or myocardial infarction. There is no indication the patient is suffering from these conditions or anything similar.

41.

According to the Occupational Safety and Health Administration (OSHA) regulations requirements regarding the use of hearing protection for members of air medical transport crews, all of the following items are considered best for use in protecting hearing except:

Earplugs

The flight helmet

Earmuffs

Noise canceling circuitry added to the flight helmet

Correct answer: Earplugs

OSHA provides requirements on the use of hearing protection for all medical air transport crew members who are routinely exposed to noise levels ≥ 85 decibels (dB). A running helicopter produces noise in the decibel level of 90 to 100 dB. Equipment considered best for use in protecting hearing includes the flight helmet, ear muffs, and custom-fitted earplugs. Noise-reduction or noise-canceling circuitry or communications earplugs which are added to the flight helmet are also considered best for hearing protection.

Off-the-shelf or non-custom fitted earplugs, while considered adequate for providing some hearing protection, are not considered the best hearing protection equipment.

42.

Equipment to aid in the loading of a patient into an air medical aircraft may be obtained from which of the following sources?

Equipment manufacturers

Air ambulance manufacturers

The Federal Aviation Administration (FAA)

The National Transportation Safety Board (NTSB)

Correct answer: Equipment manufacturers

After the patient has been packaged for air medical transport, the next step is the loading of the patient into the aircraft. The patient must be packaged in such a manner as to render the overall package as slight as possible in order to be able to actually insert the patient through the narrow aircraft door(s). The narrow character of the aircraft door(s) can pose an impediment to expeditious loading of the patient; with the increase of air medical transport, the development of specific equipment to facilitate these situations has also increased. There are many manufacturers of specific equipment for loading of air medical transport which may be used to obtain the necessary equipment for this task.

Air ambulance manufacturers manufacture and fabricate the transport vehicles used in HEMS and EMS and their interiors. The Federal Aviation Administration (FAA) creates aviation regulations and dictates aviation operations. The National Transportation Safety Board (NTSB) investigates accidents and their causes.

43.

Which of the following statements regarding sensitive radio traffic is most accurate?

News media may be able to hear patient information being transmitted to a receiving hospital.

Radio transmission of sensitive patient information is completed through the use of secured channels.

Air medical transport crews are required to use pre-established patient aliases when communicating via radio.

Air medical transport crews are prohibited from sharing any sensitive patient information via radio.

Correct answer: News media may be able to hear patient information being transmitted to a receiving hospital.

Effective communication is at the heart of a good air medical transport program, and radio is the heart of all communication when entering and exiting a transport program. It is inevitable that members of the air transport team will need to relay sensitive patient information either to a receiving hospital or through the CS, and this sharing of information will all take place using radio communication. These radio channels are often monitored by extraneous, outside individuals who know specific radio channel access codes and have access to a radio, making it also inevitable that outsiders, who do not need to know, will be informed of patient information transmitted to and from the air medical transport team.

News media may also actively scan radio frequencies in hopes of learning the details of specific local incidents to feed to their news stations. As a general rule of thumb, sensitive patient identifiers, such as name, address, specific patient descriptors, or any information considered to be protected as part of HIPAA should not be used when communicating by radio. In addition, any information delivered via radio should be done so in a non-emotional, straightforward manner, to prevent the escalation of emotion in any unauthorized, but listening, parties, who could potentially disseminate sensitive information.

44.

After beginning a flight using Visual Flight Rules (VFR), an air medical transport crew unexpectedly encountered a severe storm during transport of their patient, requiring them to switch to the use of Instrument Flight Rules (IFR). The situation in this scenario is referred to as:

Inadvertent Instrument Meteorological Conditions (IIMC)

Inadvertent meteorological or terrain awareness conditions

Unexpected meteorological conditions

Unexpected meteorological or terrain instrument conditions

Correct answer: Inadvertent Instrument Meteorological Conditions (IIMC)

The development of Inadvertent Instrument Meteorological Conditions (IIMC) is considered to be an emergency and is described as occurring when a flight has embarked during normal weather conditions which permitted the use of Visual Flight Rules (VFR) and at some point during the flight, unexpected weather conditions arose which then required the use of Instrument Flight Rules (IFR). While this situation is considered an emergency, in an aircraft that is capable of IFR (most) and with a pilot who is skilled in flying by use of IFR, risks of flying in these conditions are fewer.

45.

You are participating in an air medical transport mission and your patient experiences full cardiac arrest. The pilot of your aircraft may request priority landing in this situation by use of which of the following status codes?

Lifeguard status

Critical incident status

Code blue status

Expeditious landing status

Correct answer: Lifeguard status

Lifeguard status may be requested by medical air transport pilots in an attempt to obtain priority in landing due to critical or urgent medical incidents affecting their patients (or ill or injured crew members). The request to be granted lifeguard status should not be requested cavalierly, but should be requested only during urgent medical crises such as full cardiac arrest or a rapidly deteriorating condition. When lifeguard status is granted, all other aircraft are required to hold, delaying takeoff and landings at the cost of potentially thousands of dollars, in order to allow the aircraft which has received lifeguard status to expeditiously complete their urgent takeoff or landing.

Code blue status, critical incident status, and expeditious landing status are not terms used in HEMS.

46.

Regarding the Commission on Accreditation of Medical Transport Systems (CAMTS) safety initiatives, which of the following statements is most accurate?

Medical air crew must perform adult, pediatric, and infant intubations on a quarterly basis to maintain competency.

The provision of patient care is paramount during medical air transport missions.

Crew members of medical air transport may remove seatbelts as needed to deliver patient care.

Flight crew suits must be able to be pulled 1/8" away from the body.

Correct answer: Medical air crew must perform adult, pediatric, and infant intubations on a quarterly basis to maintain competency.

The Commission on Accreditation of Medical Transport Systems (CAMTS) has established safety initiatives which must be adhered to by all members of the medical air transport crew in order to maintain accreditation. Of paramount importance is that safe aircraft operations must take precedence over the provision of patient care during medical air transport missions. All flight crew members are required to wear flight suits, which are flame retardant, and can be pulled away from the body by 1/4". The crew is expected to wear seatbelts at all times except when traveling at altitude during level flight, or if the pilot in command (PIC) requests that seatbelts be removed.

Medical air crew members are required to complete at least 5 endotracheal intubations prior to beginning flying missions; these may be performed live, on cadavers, or another high fidelity intubation (not simulation). Once approved for flying missions, current CAMTS safety initiatives require that the air medical crew complete 9 intubations (3 infants, 3 pediatric, and 3 adults) each quarter.

47.

Critical phases of flight include all the following except:

Level flight

Taxi

Refueling

Short final

Correct answer: Level flight

Sterile cockpit is observed during critical phases of flight, meaning all nonessential communication is restricted. Only emergency communications should be given over the intercom at this time. Critical phases of flight include:

- *Takeoff*
- *Landing (short final)*
- *Refueling*
- *Taxi (ground or air)*

Level flight, or cruise flight, is not considered a critical phase.

48.

As part of the medical air transport crew, you are preparing to retrieve a bariatric patient for transport. All of the following accommodations potentially necessary to meet the needs of this patient should be made except:

Obtain an extraproximal length endotracheal tube

Obtain a laryngeal mask airway

Obtain intraosseous infusion supplies

Obtain seat belt extenders

Correct answer: Obtain an extraproximal length endotracheal tube

The bariatric patient may require the use of a variety of alternate supplies in order to provide basic safe, effective care during medical air transport. The medical crew should ensure that they are equipped with a transport stretcher able to support the greater weight and girth of the bariatric patient, and should have seat belt extenders on hand in order to make sure the patient is kept safe during flight. Obtaining a secure airway in a bariatric patient may pose challenges and increased risk of a failed airway; laryngeal mask airway devices should be available for use in this situation. Excess adipose tissue may make intravenous line placement challenging or even impossible, so ready access to Intraosseous (IO) infusion supplies is of critical importance. Some transport programs may have access to portable ultrasound equipment which may also be used to aid in placement of intravenous lines.

Extraproximal or distal length tracheostomy tubes are utilized for patients requiring tracheostomy and who have neck or tracheal abnormalities.

49.

The air medical crew has responded to the scene of a hazardous materials (hazmat) incident. In which of the zones of operation established by the Hazmat Team are the air medical crew members required to stage?

The Cold Zone

The Warm Zone

The Hot Zone

The Temperate Zone

Correct answer: The Cold Zone

Hazardous Material (Hazmat) crews are responsible for the establishment of zones of operation (Cold, Warm, and Hot), in which the various first responder and rescue personnel must work in order to minimize and prevent risk to these personnel. The members of the air medical transport crew are required to stage within the Cold Zone, the area farthest away from the actual incident site. This distance from the incident site is established to prevent contamination of the medical transport aircraft, as well as to prevent injury to those parties involved in the rescue and transport of already injured victims.

Responders who are specially trained in operations levels work and stage within the Warm Zone, and only responders trained as hazmat technicians may operate within the Hot Zone.

50.

The medical crew of an air transport mission successfully resuscitated their patient who experienced cardiac arrest after a difficult resuscitation attempt. Several minutes after stabilizing the patient, the crew begins to crack jokes about the situation. The crew in this scenario are most likely experiencing:

The effects of parasympathetic surge

The effects of stress inoculation

The effects of chronic stress exposure

The effects of fatigue

Correct answer: The effects of parasympathetic surge

It is normal for the medical crew members of an air transport program to experience repeated exposure to acute stress. Acute stress causes expected physiological changes, including elevations in heart rate and blood pressure, tensing of the muscles, and release of adrenalin from the adrenal glands. After the acute stress event is over, the body works to re-establish the norms through use of the parasympathetic nervous system. This parasympathetic surge results in feelings of giddiness or a significant release of tension which is often displayed by telling jokes or laughing or smiling at a time when an outsider may feel is inappropriate.

Stress inoculation is a training technique designed to help mitigate the effects of stress on performance.

51.

As part of providing patient care during a survival situation in which a medical air transport aircraft was downed as a result of the sudden death of the pilot during transport, which of the following statements is most accurate?

The crew should prepare for the death of the patient.

The crew should attempt to transport the patient to safety due to complex medical needs.

The crew should attempt to continue continuous monitoring of the patient.

The crew should maintain current intravenous fluid (IV) rate for the patient until IV fluid supply is exhausted.

Correct answer: The crew should prepare for the death of the patient.

As difficult as it may be to accept the fact that the patient being transported may suffer a negative outcome, the crew of the medical air transport aircraft needs to prepare, mentally and emotionally, for this likelihood. Patients who are being transported by medical air services are typically acutely ill or injured, hence the need for medical air transport; involvement in an emergency landing or crash situation of the transport vehicle does nothing to improve the patient's odds of survival from their underlying illness or injury. Priority should be made for ensuring the safety of the crew and providing shelter and warmth for the injured before addressing non-life-threatening conditions in patients.

Patient supplies such as battery-powered monitoring equipment and IV fluid should be conserved and only used intermittently in an attempt to prolong patient survival.

52.

Per CAMTS, a postaccident incident plan should include all the following except:

A protocol for communication with the family of the patient

Availability of resources for critical incident stress management

Personnel that should be notified in case of an incident in order of priority

Procedures for communication with the press

Correct answer: A protocol for communication with the family of the patient

While communication with the family of the patient is important, it is not a minimum CAMTS recommendation for a PostAccident Incident Plan (PAIP).

A PAIP is used to describe the actions that must be taken after an incident such as an emergency aircraft landing or ground ambulance crash. Different services may have different standards for what incidents trigger the PAIP. Generally, a PAIP must include the following elements, among others:

- *Personnel that should be notified in case of an incident in order of priority*
- *Guidelines for communication with the transport vehicle, initiation of search and rescue, and further transport of the patient and medical crew*
- *Guidelines for identification of a scene coordinator*
- *A time frame in which a PAIP should be activated if a vehicle is overdue*
- *Availability of resources for critical incident stress management*
- *Procedures for communication with the press*
- *Procedures for determining if the transport vehicle and crew will stay in service*

53.

Your crew leaves the hospital for a flight transfer at 1200 hours. You have a 35-minute flight time and arrive at 1235 hours. Once you are on the ground, your crew is informed there is a delay and you will have to wait to pick up your patient. At what time will your crew need to check in again with dispatch?

1320 hours

1250 hours

1305 hours

1300 hours

Correct answer: 1320 hours

Flight following is the process of knowing the location of the aircraft or vehicle at all times. This allows aircraft or other vehicles to be easily found in the event of an emergency when distress calls cannot be made. Satellite-based tracking is being used more frequently to get real-time location updates. However, when satellite-based tracking is not available, periodic communications must occur on a set schedule. When in the air, position checks must be relayed every fifteen minutes. On the ground, position check time must not exceed 45 minutes. Since the crew in this scenario is on the ground waiting for the patient, position checks will occur every 45 minutes. Once they are back in the air, they will need to relay their position every fifteen minutes.

54.

Which of the following most accurately reflects weather minimums for local daytime non-mountainous terrain?

800' - 2 miles

800' - 3 miles

1000' - 2 miles

1000' - 3 miles

Correct answer: 800'- 2 miles

Local daytime weather minimums over non-mountainous terrain are an 800' ceiling with 2 miles of visibility. The minimums decrease to 800' and 3 miles over mountainous terrain.

55.

Which of the following mnemonic devices should be considered as an aid to planning and safety when taking part in wilderness rescues?

TOMAS

ROMAN

THREAT

TAWS

Correct answer: TOMAS

At times, the medical air rescue crew may be called upon to aid in the rescue and transport of individuals involved in critical incidents in wilderness areas. The air medical rescue crew should have an already established safety plan for their role in assisting in wilderness incidents prior to acceptance of an assignment in wilderness transport. The mnemonic TOMAS can be utilized to help in the preparation of the plan and ensuring safety in wilderness locations.

- *T: Terrain (consider exposure to the elements, and the presence of cliffs, water, forest, vegetation, hiking terrain, possible presence of snow)*
- *O: Obstacles (consider what may inhibit rescue/transport, including trees, loose rocks, debris, wires, daylight, rotor wash, and blade clearance issues)*
- *M: Method (how will the air transport crew insert themselves into the location, possible landing zone sites, hover load)*
- *A: Alternatives (wait for certified search and rescue (SAR) personnel or ferry SAR personnel, relocate the patient prior to attempting transport, abort the mission)*
- *S: Safety (which should be first, last, and always)*

The ROMAN mnemonic is used when determining if a patient potentially has a difficult airway.

The THREAT mnemonic is used for outlining the critical actions needed during an active shooter incident.

TAWS is an abbreviation that stands for "terrain awareness and warning systems."

56.

The proper shut down procedure for most aeromedical aircraft would be in what priority?

Throttle, fuel, battery, rotor brake

Fuel, throttle, battery, rotor brake

Rotor brake, throttle, fuel, battery

Fuel, battery, rotor brake, throttle

Correct answer: Throttle, fuel, battery, rotor brake, oxygen

The proper shut down procedure for most aeromedical aircraft would be throttle, fuel, battery, and rotor brake.

57.

Which of the following statements regarding the involvement of air medical transport in a crash is most accurate?

Helicopters almost always sink after impact with water.

Helicopters almost always float for a few minutes after impact with water.

Fixed-wing aircraft almost always maintain float after impact with water.

Fixed-wing aircraft almost always sink after impact with water.

Correct answer: Helicopters almost always sink after impact with water.

Air medical transport programs that routinely or frequently complete missions over large bodies of water should train all crew members in emergency preparations in the event of a crash or landing in water. Emergency egress varies for each type of aircraft due to the unique propensity for floating or capsizing during water landings. Upon impact with water, helicopters will almost always sink, or capsize, while fixed-wing aircraft will almost always float for a few minutes prior to capsizing.

58.

Which is not considered a critical phase of flight?

Cruising

Takeoff

Taxiing on airport ramp

Landing

Correct answer: Cruising

Communication is a key aspect of safe and efficient functioning in high-risk environments; however, accident investigations have shown that too much communication can create hazardous distractions for a flight crew. FAR part 135 regarding sterile cockpit restricts communication during critical phases of flight; these phases include all ground operations involving taxi, takeoff, and landing, and all other flight operations except cruising.

59.

Most aircraft fire extinguishers are filled with:

Halon

Carbon dioxide

Foam

Monoammonium phosphate

Correct answer: Halon

Engine fires and cabin fires are the two comprehensive classifications of fires which may occur during air medical transport; all aircraft are required to carry fire extinguishers for this possibility. All members of the air medical transport crew are required to be trained in and familiar with the use of aircraft fire extinguishers, as well as trained in the other steps of managing an aircraft fire. Most aircraft fire extinguishers are filled with halon gas, which is an eco-friendly, non-conductive gas which leaves no residue when discharged and is safe to be used with people present. The gas works by reducing oxygen levels, posing risk of asphyxiation if used in an enclosed area (such as an aircraft); if necessary, the aircraft should be ventilated by opening windows or doors if no other means of ventilation is available.

60.

When faced with an emergency survival situation, an air medical crew needs to establish priorities. Which of the following strategies for helping establish priorities in survival situations should be implemented in this scenario?

The rule of threes

Food-water-shelter

Water-shelter-food

The rule of fours

Correct answer: The rule of threes

All air medical transport programs should train crew members in survival strategies in the event of an aircraft emergency that forces the crew to land outside the planned landing(s) on the transport path. In any survival situation, priorities need to be established, and using the rule of threes can help the transport crew in an emergency survival situation.

The rule of threes states that a person can survive 3 minutes without oxygen, 3 hours without adequate shelter (in extreme weather situations), 3 days without water, and 3 weeks without food. With these "3's" in mind, if all survivors are adequately oxygenating and have no acute risk of respiratory complications, the priority should be on first building a shelter and then on locating water. Once these two priorities have been met, the crew can then focus on locating food.

61.

Three crew members of a medical air transport mission have survived an emergency open-water landing, during which the pilot and 2 other crew members were killed. Which of the following factors poses the greatest threat to the ongoing survival of the crew?

Panic

Hypothermia

Contaminated water source

Injuries

Correct answer: Panic

All members of all medical air transport programs need to be highly trained in survival skills for emergency situations, such as during forced landings due to aircraft mechanical problems or dangerous weather situations or unforeseen changes to the mission preventing the crew from resuming transport. There are many factors that place the crew at risk of perishing in emergency situations like these, but the greatest of all the threats to crew survival is panic. Hypothermia, injuries, and contaminated water are all potential threats to survival, but none are as dangerous as panic. Even the most highly trained crew member can become overwhelmed and paralyzed by fear or anxiety that leads to panic, which ultimately can cause the crew member to make rash decisions or to give up hope. Keeping a positive mental outlook and maintaining confidence in one's own ability to survive in an emergency situation does more to improve the likelihood of survival than any other factor.

62.

Which of the following is incorrect regarding aircraft navigational direction?

An aircraft with red light on the left side is traveling toward you

East is 90^{o}

Starboard side is the right side if you are facing forward in seat

An aircraft with green light on the left is traveling toward you

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Correct answer: An aircraft with a red light on the left side is traveling toward you.

Aircraft navigational direction is associated with degrees on a compass, with true North being 0^{o}, and South being 180^{o}.

The port side is the left side if you are facing forward, and the starboard side is the right side if you are facing forward.

Aircraft have a red light on the port side and a green light on the starboard side. If an aircraft is approaching you, you will see a green light on the left side.

63.

Which act protects indigent uninsured patients from being denied access to emergency care by hospitals or from being transferred inappropriately between hospitals based on the patient's ability to pay?

COBRA

HIPAA

EMTALA

Affordable Care Act

Correct answer: COBRA

COBRA was enacted in 1985 with the purpose of protecting a patient's right to receive medical care in emergency situations, and to stop hospitals from transferring patients on the basis of economic status and ability to pay for healthcare services.

HIPAA was enacted to protect patient privacy. EMTALA is a law contained within the COBRA Act. The Affordable Care Act is the health care insurance statute signed in 2010.

64.

A half-duplex system consists of all the following except:

Cell phone

Portable radio

Transmit and receive on different channels

Repeater-tower

Correct answer: Cell phone

A half-duplex system consists of a radio frequency being activated when a radio is keyed up, bouncing off a repeater/tower, and then being received by another radio on the same frequency. The line to talk is only open when the push to talk/mic is activated. A cell phone would be an example of simplex system.

65.

At 35,000 feet, what would be the time of useful consciousness if the aircraft suddenly loses cabin pressure?

30 – 60 seconds

5 – 10 seconds

1 – 2 minutes

90 seconds

Correct answer: 30 – 60 seconds

The Time of Useful Consciousness (TUC) or Effective Performance Time is the period of elapsed time from the interruption of normal air supply or exposure to an oxygen-poor environment until the time when the ability to function usefully is likely to be lost. Sudden decompression of an aircraft creates an oxygen-poor environment very rapidly. At 35,000 feet, TUC is 30 – 60 seconds.

66.

Per National Transportation Safety Board (NTSB) and Air Surface Transport Nurses Association (ASTNA), recommendations on the use of Personal Protective Equipment (PPE) for air medical crewmembers participating in helicopter missions, all of the following items are required except:

Eye shields/flight goggles

Boots

Flight suits

Helmets

Correct answer: Eye shields/flight goggles

Just as the use of PPE is required when providing care to patients who present risk of the transmission of infectious agents (or for those who are at increased risk of becoming infected), so specific PPE is required for all medical crew members participating in medical air transport or rescue on helicopter missions. Long-sleeved fire retardant flight suits, leather or Nomex boots, and visored helmets are all required components of the PPE for medical crew members of helicopter transport teams.

Eye shields and/or goggles are not required PPE components for helicopter transport crews.

67.

FAA Chapter 4 requires that permanent hospital helipads have all the following except:

Elevation of the pad clearly painted on the NE corner of the pad

At least 2 approach and departure headings

Perimeter lighting on the helipad

A windsock

Correct answer: Elevation of the pad clearly painted on the NE corner of the pad

FAA Chapter 4 requires all permanent hospital helipads to have:

- *At least 1 approach and 1 departure heading*
- *Permitter lighting on the helipad*
- *Landing beacon*
- *Windsock*
- *Secured access*

Some helipads may have numbers painted on them, but these indicate weight limit, not elevation.

68.

All the following are correct regarding IFR except:

IFR does not occur if inadvertently entering instrument meteorological conditions

If the weather conditions allow visual flight rules a pilot may still fly under these conditions

Weather conditions do not allow safe flight by sight alone and the pilot must be able to use instruments to fly

IFR occur during instrument meteorological conditions

Correct answer: IFR does not occur if inadvertently entering instrument meteorological conditions.

Instrument Flight Rules (IFR) means that weather conditions do not allow safe flight by sight alone and the pilot must be able to use instruments to fly. IFR occurs during IMC (Instrument Meteorological Conditions). If the weather conditions allow Visual Flight Rules (VFR) a pilot may still fly under these conditions. If a pilot began in VFR but encountered weather, IFR rules refer to this as Inadvertent Instrument Metrological Conditions (IIMC).

69.

If involved in an air medical helicopter crash landing, at which clock position should the crew members evacuate to for regrouping?

12 o'clock

6 o'clock

3 o'clock

9 o'clock

Correct answer: 12 o'clock

In the event of an air medical crash or other on-board incident of a rotor wing aircraft requiring an emergency landing, the individual crew members should evacuate and regroup to the 12 o'clock position. Once the risk of fire or other potential hazards has been evaluated, crew members who are able should then begin rescue attempts of any injured or trapped crew members or patients.

70.

From the seat of the airplane being flown, a green light should be located:

On the right wing

On the left wing

On the aft, or tail section

On the forward, or nose section

Correct answer: On the right wing

Lights on airplanes indicate the direction of flight. From the seat of the aircraft being flown, a green light should be located on the right wing, a red light should be on the left wing, and a white light is on the rear.

71.

What is the accrediting body for medical transport companies?

CAMTS

Joint Commission

NHTSA

FAA

Correct answer: CAMTS

CAMTS is an acronym for Commission for the Accreditation of Medical Transport Systems.

The Joint Commission accredits hospitals. The National Highway Traffic and Safety Administration (NHTSA) is not an accrediting body, nor is the Federal Aviation Administration (FAA).

72.

Which of the following most accurately represents the actions to take during an active shooter multiple casualty incident?

THREAT

DOPE

TOMAS

ABCDE

Correct answer: THREAT

Active Shooter Multiple Casualty Incidents (AS/MCI) are incidents that often involve one or more shooters causing injury or death to multiple patients. Evidence from the Federal Bureau of Investigation and the American College of Surgeons has identified hemorrhage as the leading cause of death in AS/MCI. The acronym THREAT takes into consideration this evidence as well as other priorities in AS/MCI to guide actions taken. The recommended actions are listed in order as follows:

- ***T**: Threat suppression*
- ***H**: Hemorrhage control*
- ***R/E**: Rapid extrication to the cold zone*
- ***A**: Assessment*
- ***T**: Transportation to the hospital*

The DOPE mnemonic is used with intubated patients to diagnose failure to intubate. TOMAS is used with planning and safety for wilderness rescue. ABCDE guides priorities on medical calls and is more appropriate in AS/MCI during transport to the hospital, not while the patient is on scene.

73.

What is the preferred method of transport for diving injuries?

Ground transport

It does not matter what method is used.

High altitude flight

It is not recommended to transport the patient until symptoms resolve.

Correct answer: Ground transport

Ground transport is the preferred method due to the importance of keeping the pressure variations minimal. If flight is the only option, care should be taken to fly at low altitudes to avoid major pressure changes, which could worsen the patient's condition.

74.

According to FAR Part 135, what is the maximum allowed total flying time for a HEMS pilot in a 24-hour period?

8 hours

14 hours

12 hours

There is no maximum flying time.

Correct answer: 8 hours

Air medical pilots are responsible for adhering to regulations on both length of duty day and allowable flight hours established by the Federal Aviation Administration (FAA) FAR Part 135. Any pilots that is operating for hire, which includes air ambulance services, are not allowed to fly longer than 8 hours in a 24-hour period and are limited to a 14-hour length of duty day.

There are no set standards for those pilots who are flying not-for-hire, including no set length of duty day and no maximum allowable flight time in a 24-hour period.

75.

All of the following statements regarding requirements for air medical transport programs which operate over large bodies of water are correct except:

All crew members are required to be familiar with manual activation of the strobe light attached to the aircraft.

All crew members are required to know how to swim.

All crew members are required to wear a Personal Flotation Device (PFD).

All crew members must be trained in open-water survival techniques.

Correct answer: All crew members are required to be familiar with manual activation of the strobe light attached to the aircraft.

Any medical air transport program that frequently flies missions over large bodies of water is required to have procedures and plans in place in the event of a forced water landing, often referred to as ditching. All crew members are required to know how to swim, and must wear a Personal Flotation Device (PFD) for the duration of flights over large bodies of water. The PFD should be equipped with an attached strobe light which will activate on contact with water.

Some programs may also require the crew members to wear additional survival gear or vest systems which contain alternate signaling mechanisms. Crew members must be trained in open-water survival techniques, as well as thoroughly trained in exiting an aircraft that has crashed in, or been forced to make an emergency landing in, the water.

76.

Which of the following radio frequencies is reserved for aircraft emergency communication use only?

121.5 MHz

800 MHz

127.7375

463.025 MHz

Correct answer: 121.5 MHz

The radio frequency 121.5 MHz is included in the band of frequencies (118 to 137 MHz) assigned for use by Air Traffic Control (ATC) and is specifically reserved for use during aircraft emergencies. This frequency may also be used by ATC to warn an aircraft if they are approaching restricted airspace. All aircraft should monitor for emergency calls on frequency 121.5 MHz, and report any heard transmissions to ATC.

The 800 MHz frequencies have been set aside by the Federal Communications Commission (FCC) for use by digital communications controlled by computers, such as public safety radio systems, and are heavily trafficked.

The frequency 127.7375 MHz is included in the ATC band of frequencies.

The frequency 463.025 MHz is included in the 10 frequencies contained in the MED channels, which are ultrahigh frequencies designated by the FCC solely for use by Emergency Medical Services (EMS).

77.

For purposes of ensuring the best radio communication in air medical transport, which of the following radio systems is most useful in mountainous regions?

A repeater system

A full duplex system

A simplex system

A multiplex system

Correct answer: A repeater system

Several basic types of radio systems exist for use in medical communication. The simplex system communicates in one direction at a time and is not used with a repeater. Duplex systems, of which there are two types (full duplex and half-duplex), use two frequencies; the half-duplex system can only receive and transmit communication in one direction at a time, while the full duplex system can concurrently transmit and receive communication with the two frequencies. The half-duplex system boosts their transmissions by use of a repeater system, which, when receiving a radio communication, immediately retransmits the message on their second frequency. This allows communication to be transmitted longer distances. Repeater stations placed at elevated sites help to facilitate communication across mountainous regions. A multiplex system can transmit communication from two or more sources at the same time, and over the same frequency.

78.

While packaging a patient for air medical transport from the scene of the crime during which the patient was shot in the head, you discover a handgun. What is the next best step in this scenario?

Leave the weapon where it is, notify law enforcement, and then transport the patient around the location of the weapon.

Take a photo of the weapon in the location where it was found, ensuring that reference points can be identified in the photo.

Leave the weapon where it is, and take a photo to reference the location later for documentation.

Notify law enforcement of the weapon, then pick up the weapon using the grips and move it into a neutral location so the patient can be safely transported.

Correct answer: Leave the weapon where it is, notify law enforcement, and then transport the patient around the location of the weapon.

Members of medical air transport crews may at times encounter firearms (or other weapons) at the scene of the transport site. When at all possible, the weapon should be left in place and law enforcement should be notified.

The medical air transport crew should always assume firearms are loaded and able to operate correctly, even if the weapon appears to be damaged or is not fully intact. If the weapon needs to be relocated in order to provide medical care to the victim or in order to ensure safe transport of the victim, the weapon should be photographed in place, making sure to include as many of the details of the surrounding environment as possible. Do not attempt to remove ammunition from firearms, but a count of any ammunition visible in the cylinder chamber or the presence and location of any expended ammunition should be made. Only one individual should be responsible for the actual touching of the firearm and should pick up the weapon using the grips held between the fingers, without concern of obscuring any possible fingerprints.

79.

During a pre-crash sequence, all of the following should be completed except:

Elevate the patient’s head as much as possible.

Lay the patient flat.

Turn off any oxygen.

Secure seat belt and assume crash position.

Correct answer: Elevate the patient’s head as much as possible.

In a pre-crash sequence, the patient is laid flat. In this position, the patient is able to absorb the most G forces. Prior to a crash, all oxygen sources are turned off and seat belts are secured.

80.

The pilot of a Helicopter Emergency Medical Services (HEMS) aircraft is preparing to make a night landing at a scene response. The preferred Landing Zone (LZ) dimensions for accommodation of nighttime helicopter landings is:

125 x 125 feet

100 x 100 feet

75 x 75 feet

150 x 150 feet

Correct answer: 125 x 125 feet

In the ideal scenario, the LZ for nighttime helicopter landings should measure approximately 125 x 125 feet. Helicopter LZ acceptable for daytime landings should measure at least 75 x 75 feet. Obviously, a larger LZ is more desirable than a smaller one.

A helicopter LZ which measures 100 x 100 feet is considered acceptable for both daytime and nighttime landings.

II. Flight Physiology

81.

You are transporting a patient by fixed-wing aircraft over long distance when you notice the new development of a diffuse, sunburn-like rash on the patient's skin. Which of the following potential complications related to air transport has most likely contributed to the patient's cutaneous symptoms in this scenario?

Decompression sickness

Sepsis

Aircraft vibration

Flicker vertigo

Correct answer: Decompression sickness

Patients who are being transported by air may experience adverse effects specifically related to the method of transportation. Vibration from any source, including the aircraft or the atmosphere, difficulty in regular changing of the patient's position, and decompression sickness, are all complications directly related to air transport, and all may result in cutaneous changes. The friction which results from vibration may affect the skin, as may the inability to adequately reposition the patient. And while sepsis may cause a petechial rash, in this scenario, only decompression sickness may result in the development of a diffuse, sunburn-like rash. Other cutaneous symptoms of decompression sickness include a sensation of insects crawling on the skin, mottling of the skin, and pruritus. Flicker vertigo occurs in rotor wing aircraft, and is caused by the flickering of sunlight by the rotor blades.

82.

All of the following are included in the four stages of hypoxia except:

The hypoxic stage

The indifferent stage

The critical stage

The disturbance stage

Correct answer: The hypoxic stage

The pathologic progression of hypoxia is divided into four stages: the indifferent stage, the compensatory stage, the disturbance stage, and the critical stage.

During the indifferent stage, patients typically retain the reasoning ability but may exhibit a slight increase in both heart rate and breathing. This stage may begin at sea level, and progress to an altitude of 10,000 feet. Changes in night vision may occur at 5,000 feet.

The compensatory stage may occur between 10,000 to 15,000 feet, and individuals typically experience significant increases in heart rate and breathing (as the body attempts to protect against hypoxia), and slowing of judgment may occur.

Between 15,000 and 20,000 feet, the disturbance stage of hypoxia occurs. Individuals typically exhibit slurred speech and significant impairments in judgment, making the individual appear drunk.

The final stage of hypoxia is the critical stage, which takes place between 20,000 to 30,000 feet. Individuals in the final stage of hypoxia are at extreme risk of death.

83.

Which gas law explains decompression sickness?

Henry’s Law

Boyle’s Law

Fick’s Law

Charles’ Law

Correct answer: Henry’s Law

Henry’s Law explains that increased pressure increases the solubility of a gas. When pressure is suddenly decreased, as when a diver surfaces too fast, the gas solubility also decreases and comes out of the blood into the tissues.

Boyle’s Law describes gas volume changing in relation to gas pressure. Fick’s Law describes that increasing the PaO_2 will increase oxygenation. Charles’ Law relates gas temperature to its volume.

84.

FAR Part 135 states that an air medical pilot's maximum duty day is:

14 hours

12 hours

24 hours

16 hours

Correct answer: 14 hours

Federal Aviation Regulation (FAR) Part 135 addresses pilots who are flying passengers for money, and restricts a duty day to 14 hours.

85.

Which law describes the total pressure as the sum of all partial pressures?

Dalton’s Law

Boyle’s Law

Henry’s Law

Fick’s Law

Correct answer: Dalton’s Law

Dalton’s Equation is Total Pressure = P_1+P_2+P_3. This means that the total pressure is equal to the sum of all partial pressures in a mixture. As altitude increases, the partial pressure of oxygen decreases, thus increasing the need for supplemental oxygen. Remember “Dalton’s Gang.“ The total pressure is a sum of partial pressures like a gang is a sum of its members.

Boyle’s law deals with expansion of gas at changing pressures. Henry’s law defines the ability of a gas to go into or out of a solution. Fick’s law describes how a gas moves across a membrane-based upon its thickness.

86.

Partial pressure of gas decreasing in direct proportion to barometric pressure is associated with which gas law?

Dalton's Law

Boyle's Law

Fick's Law

Gay-Lussac's Law

Correct answer: Dalton's Law

Dalton’s Law = The pressure of a gas mixture is equal to the sum of the partial pressures of the gases in the mixture. Dalton's law illustrates that increasing altitude results in a proportional decrease in the partial pressure of the gas found in the atmosphere. Partial pressure decreases as a direct result of the decrease in barometric pressure as altitude increases.

Boyle’s Law = The volume of a gas is inversely proportional to pressure (as long as the temp is constant).

Henry’s Law = The amount of a gas dissolved in solution is directly proportional to the pressure of the gas over the solution.

Gay-Lussac’s Law= The pressure of a gas is directly related to temperature.

87.

All of the following statements regarding shock state in a patient are accurate except:

Patients with hypertension can maintain adequate perfusion in a shock state

In patients with hypertension, the development of hypotension may be ignored or missed

Changes to the patient's vital signs reflect the body's attempt to compensate

Uncompensated shock is defined by a decrease in blood pressure

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Correct answer: Patients with hypertension can maintain adequate perfusion in a shock state.

Patients can experience a shock state as a result of any number of different insults, including hypovolemia, vasomotor dysfunction, sepsis, anaphylaxis, or acute spinal cord injury (among others), but overall, the effect of shock is the same. The physical signs, including changes in vital signs, exhibited by a patient in shock are a reflection of the compensation attempts of the body, as well as a result of hypoxia. If the shock state is not treated rapidly, hypotension will ensue, indicating a failure of the body's compensatory mechanisms; this is typically referred to as "uncompensated shock."

In patients with an underlying history of hypertension, the development of a hypotensive state may be ignored or missed. It may be assumed that adequate perfusion is being maintained due to what appears to be normal systemic blood pressures. However, this may not be the case as patients with a history of hypertension have chronically higher than normal systemic blood pressures. Often, hypertensive patients in a shock state are ultimately grossly underperfused as a result of decreases in arterial blood pressure, due to their already dysfunctional blood pressure state.

88.

Which law describes that lower molecular weight molecules move with higher diffusion rates through a membrane?

Graham’s Law

Boyle’s Law

Dalton’s Law

Henry’s Law

Correct answer: Graham’s Law

Graham’s Law states that the rate of diffusion of a gas through a liquid medium is directly related to the solubility of the gas and inversely proportional to the square root of its density. This means that lower molecular weight molecules will diffuse faster through a membrane.

Boyle‘s Law relates gas pressure to volume. Dalton’s Law tells us the pressure of a gas is the sum total of all partial pressures. Henry’s Law describes gas diffusion into a liquid.

89.

Charles's Law states that as the temperature of a gas increases, you should expect what other change?

An increase in volume

An increase in pressure

An increase in gas solubility

A decrease in pressure

Correct answer: An increase in volume

Charles' law states that at a constant pressure, the volume of a gas is directly proportional to the absolute temperature of the gas. This is expressed by the equation $V_1 / T_1 = V_2 / T_2$.

Gay-Lussac's law deals with pressure and temperature and states that pressure and temperature are directly proportional. There are no gas laws that relate solubility and temperature.

90.

The compensatory stage of hypoxia occurs at what altitude?

10,000 – 15,000 ft

0 – 10,000 ft

15,000 – 20,000 ft

Above 20,000 ft

Correct answer: 10,000-15,000 ft

The four stages of hypoxia are:

- *The indifferent stage 0 – 10,000 ft.*
- *The compensatory stage 10,000 – 15,000 ft.*
- *The disturbance stage 15,000 – 20,000 ft.*
- *The critical stage 20,000 – 30,000 ft.*

91.

What are signs and symptoms of Type 1 Decompression Sickness?

Painful joints, mottled skin, pruritus (itching)

Altered mental status, ascending paralysis, visual disturbances

Hypertension, altered mental status, combative

Epistaxis, maxillary pain, renal failure

Correct answer: Painful joints, mottled skin, pruritus (itching)

Type 1 decompression sickness has signs and symptoms related to the skin and joints. Patients will present with itching, a sunburn-like rash, painful joints, and may feel like "ants are crawling on their skin." Type 2 decompression sickness is related to neurologic signs and symptoms.

92.

Which of the following breathing techniques most accurately describes the use of tactical breathing?

Inhale for 4 seconds, hold the inhaled breath for 4 seconds, exhale for 4 seconds, then hold the exhalation for 4 seconds.

Inhale for 4 seconds, hold the inhaled breath for 7 seconds, then exhale for 8 seconds.

Breathe in slowly through the nose, then exhale slowly through pursed lips.

Inhale slowly for a count of 15, then exhale slowly for a count of 30.

Correct answer: Inhale for 4 seconds, hold the inhaled breath for 4 seconds, exhale for 4 seconds, then hold the exhalation for 4 seconds.

Tactical breathing is a breathing technique that was designed by the military for use in extremely stressful situations to try to help quickly de-escalate in stressful situations and be able to continue working. This breathing technique aids in lowering heart rate and stress levels, and can help in moderating the surge in sympathetic nervous system activity in direct response to stress.

The technique of inhaling for 4 seconds, holding the inhaled breath for 7 seconds, then exhaling for 8 seconds, is referred to as "relaxing breath" or the "4-7-8 breathing technique" and is used to help in falling asleep or decreasing anxiety.

Pursed lip breathing is useful for improving shortness of breath.

93.

Reducing noise in the transport environment can:

Improve ability to monitor equipment

Reduce patient blood pressure

Impair communication among team members

Facilitate fatigue

Correct answer: Improve the ability to monitor equipment

Noise in the transport environment can result in degraded communications and the ability to maintain focus, as well as increased stress and fatigue for patient and transport teams. Reducing ambient noise can improve your ability to monitor equipment and the patient during transport.

94.

You are the flight paramedic headed to transfer a patient. As the aircraft is ascending, you start to experience dental pain. What is the cause?

Barodontalgia, air trapped in fillings is expanding

Barotitis, air trapped in middle ear is expanding

Barosinusitis, air trapped in sinuses is compressing

Barodontalgia, trapped air is compressing

Correct answer: Barodontalgia, air trapped in fillings is expanding

Due to Boyle's Law, air will expand when ascending to lower pressures, causing pain if it is trapped in the fillings. This is believed to be the cause of barodontalgia.

Barotitis would present as ear pain. Barosinusitis would present as sinus pain in the forehead/ nasal area. Compressing air is incorrect because, as you are ascending, the pressure is lower, causing volume expansion.

95.

You are called to transport an 87-year-old trauma patient from a rural hospital to a higher level of care facility by helicopter. You are flying at an altitude of 5000 feet. What physiologic change will you experience that you should be aware of?

Night vision decrease

Tachypnea

Tachycardia

Decreased motor function

Correct answer: Night vision decrease

Night vision begins to decrease at 5000 ft. As the provider, you should be aware of how this limitation may affect you and the treatment of your patient.

Tachycardia and tachypnea are changes that occur above 10,000 feet when there is no pressurized cabin or supplemental oxygen. This stage is known as the compensatory stage, and it occurs in response to decreasing oxygen levels. Decreased motor function begins at 15,000 feet altitude.

96.

Which of the following is not a self-imposed stressor of flight?

Thermal changes

Hypoglycemia

Alcohol

Exhaustion

Correct answer: Thermal changes

Thermal changes are an inherent stressor of flight.

The self-imposed stressors can be remembered by the pneumonic DEATH: Dehydration, Exhaustion, Alcohol, Tobacco, Hypoglycemia.

97.

During air transport of a patient, you begin experiencing severe pain in an upper front tooth during ascent. Which of the following are you most likely experiencing?

Barodontalgia

Barosinusitis

Barofacia

Barotitis media

Correct answer: Barodontalgia

Barodontalgia, also referred to as aerodontalgia, is a dental condition which results from the effects of barometric pressure changes on teeth with diseased pulp. Typically, an individual will experience moderate to severe tooth pain during ascent during air transport, and the pain can be localized to a specific tooth. Symptoms tend to resolve once the individual begins descent. Patients or crew members who have cavities which are unfilled or poorly filled, or unrecognized dental disease, may experience the symptoms of barodontalgia; in individuals who have fillings, air which is trapped in the filled space expands during ascent as a result of Boyle's Law, which states that "at a constant temperature, the volume of gas is inversely proportional to its pressure." Excellent dental care is a must for those involved in air transport.

Barosinusitis causes dental symptoms similar to those of barodontalgia; however, the dental symptoms of barosinusitis occur during both ascent and descent, and it typically affects the upper posterior teeth. Barofacia is not an actual term. Barotitis media is also referred to as ear block, and occurs during air transport as a result of negative pressure within the middle ear, creating a vacuum.

98.

Which of the following statements is most accurate in regard to the effects of G forces (gravitational forces) encountered during civilian air medical transport?

The G forces experienced by individuals who operate in medical air transport are insignificant and pose little risk of harm to the members of the air crew.

The effects of the G forces encountered during a civilian medical air transport are significant and they have been found to contribute to both short- and long-term physiologic changes in members of the air crew.

Medical air crew member flight times are monitored and restricted to aid in preventing the development of long-term physiologic changes caused by the effects of G forces.

Research has been unable to definitely state if chronic exposure to G forces during civilian flight poses risk of the development of either short- or long-term physiologic changes.

Correct answer: The G forces experienced by individuals who operate in air medical transport are insignificant and pose little risk of harm to the members of the air crew.

While gravitational forces (G forces) are encountered during air travel, the G forces experienced by individuals who operate in air medical transport are insignificant, posing little to no risk of harm to the members of the air crew.

Individuals who are most affected by G forces (typically high G forces) are those who are taking medications to control hypertension (particularly those taking beta blockers), or individuals who are dehydrated. The effects of G forces on the body cause a drop in blood pressure.