

Review for Unit Test #1: Medical Emergencies

Answers to Multiple Choice Questions:

1. c	11. c	21. b	31. d	41. a	51. c	61. a	71. a	81. b
2. d	12. d	22. a	32. a	42. a	52. c	62. a	72. a	82. c
3. a	13. d	23. d	33. b	43. c	53. d	63. c	73. b	83. c
4. b	14. a	24. a	34. b	44. d	54. c	64. a	74. a	84. c
5. a	15. b	25. d	35. d	45. a	55. a	65. d	75. c	85. d
6. b	16. d	26. c	36. a	46. a	56. b	66. b	76. d	86. a
7. a	17. c	27. c	37. a	47. b	57. a	67. b	77. a	87. b
8. d	18. c	28. c	38. b	48. c	58. c	68. a	78. c	88. a
9. a	19. b	29. d	39. c	49. d	59. c	69. a	79. c	89. c
10. d	20. d	30. c	40. d	50. c	60. a	70. b	80. a	90. d

Part A: Introduction to Medical Emergenciesb (short and long answer questions)

- What are six (6) types of hazards at an emergency scene that could put the emergency personnel at risk?
 - fire
 - downed electrical wires
 - hazardous materials such as gasoline or spilled chemicals
 - broken glass and other physical hazards
 - violent or unpredictable people
 - criminal activity such as gangs or drugs
- What is the “rhyme” that can be used to remember the basic types of hazards at a scene?
 - no fire, no wire
 - no gas, no glass
 - no thugs, no drugs
- Classify the following body fluids as high risk or low risk for transmitting pathogens:

a) Semen	high	f) Vomitus	low
b) Feces	low	g) Amniotic fluid	high
c) Saliva	low	h) Mucous	low
d) Blood	high	i) Urine	low
e) Cerebrospinal fluid	high	j) Vaginal secretions	high
- Which of the following are pathogens?

a) trichinella parasites in pork	yes	(it is a parasite)
b) Staph aureus bacteria in pimples	yes	(it is a bacteria)
c) X-rays that cause cancer	no	(it is not a biological, or living, agent)
d) cigarette smoke that causes lung cancer	no	(it is not a biological, or living, agent)
e) varicella virus that causes chicken pox	yes	(it is a virus)
f) drinking alcohol that causes liver disease	no	(it is not a biological, or living, agent)
- Which of the following are universal precautions?
 - Using PPE such as glove: yes
 - Hand-washing: yes
 - Wearing an SCBA at all fires: no (it is a type of PPE, but it does not prevent the spread of disease)
 - Using a disposable face shield when performing ventilations (rescue breathing): yes
 - Never re-capping sharps such as needles: yes
 - Using alcohol to sterilize equipment: yes
 - Locking out a machine before working on it: no (it is a good practice, but does not prevent the spread of disease)

6. An ambulance just transported a child who was bleeding badly. The inside of the ambulance is covered with blood. List three (3) universal precautions the attendants should take when cleaning the ambulance.
 - a) wear gloves
 - b) they may want to wear a gown or apron so they don't get blood on their clothes
 - c) use an antiseptic to sterilize all surfaces
 - d) remove the gloves carefully when they are finished
 - e) wash their hands carefully when they are finished
 - f) send out any clothes that got blood on them for washing
7. What is the single most important thing that emergency personnel can do to prevent the transmission of pathogens?
 - wash their hands properly and frequently
8. When treating any patient, what assumption should be made by emergency personnel?
 - assume all patients are infected with transmissible pathogens such as HIV/AIDS and take appropriate precautions
9. Describe the proper method for effective hand-washing. What two regions of the hands are often missed?
 - wet hands with warm water
 - use soap, scrub and lather hands for 20 seconds (scrub under and around nails)
 - rinse hands well
 - dry with a paper towel
 - turn off the tap using the paper towel

The parts of the hands that are most often missed when hand-washing are the wrists and around the fingernails. The creases in the hands also trap bacteria.
10. Give two examples of diseases that are spread by **air-borne** transmission.
 - chicken pox
 - tuberculosis
11. Give two examples of diseases that are spread by body fluids.
 - hepatitis B and C
 - HIV/AIDS
12. What are the five Rs that must be checked before administering or assisting with medication?
 - right medication
 - right patient
 - right dose (how much to give them)
 - right route (method of administration eg. oral or spray under tongue)
 - right time (they haven't taken too much in too short a period of time)
13. A fire truck is dispatched by tiered response to a domestic dispute. A woman with two small children is being threatened by her husband, who is armed with a long knife. He threatens to kill anyone who comes inside. What should the firefighters do?
 - report back to the dispatcher that the scene is violent and police are needed
 - wait a safe distance away (stage) and let police secure the scene before approaching
14. A police car is dispatched by tiered response to a MVC. A truck has hit a hydro pole and wires are draped over the truck. The driver is in the truck and seems to be badly hurt. What should the police do?
 - stay back a safe distance from downed wires (2x the distance between the hydro poles)
 - call for hydro or E-1 to secure the scene and turn off the power to the wires before approaching

Part B: Respiratory System and Emergencies

1. What are the normal or average values for the following:
 - a) Number of breaths most people take, on average, per minute: 12 – 15 breaths/minute
 - b) Tidal volume: 350 – 500 mL (1/2 L)
 - c) Vital capacity (maximum air exchanged in one breath): 4 – 4.5 L
2. Explain the difference between tidal volume and vital capacity.
 - tidal capacity is the amount of air breathed in and out in one normal breath
 - vital capacity is the amount of air that can be forcefully exhaled after breathing in as much air as possible
 - vital capacity is much greater than what is normally breathed in and out in one breath
3. Describe the steps that take place during one complete breath (breathing in and out).
 - the diaphragm contracts
 - the muscle shortens and pulls down
 - the volume of the chest cavity increases
 - the pressure in the chest cavity is decreased so air moves into the lungs
 - the diaphragm relaxes
 - the muscles lengthen and move up
 - the volume of the chest cavity decreases
 - the pressure in the chest cavity is increases to air moves out of the lungs
4. Why is exhalation considered to be a “passive” process?
 - exhalation occurs when the muscles of the diaphragm relax, and relaxing is passive
5. What is the main signal that triggers us to take a breath?
 - high levels of CO₂ (carbon dioxide) in the blood
6. What are three factors that can affect vital capacity?
 - body size (large chests hold more air)
 - sex (males are usually larger)
 - smoking (decreases lung capacity)
 - fitness
 - illness (diseases such as asthma, emphysema and bronchitis decrease lung capacity)
7. What two age groups of people are at the greatest risk for choking?
 - young children (less than 3 years)
 - elderly people
8. What are two diseases or medical conditions that increase the risk of choking?
 - stroke
 - Parkinson’s disease
 - Lou Gehrig’s disease (multiple sclerosis and related illnesses)
9. Why are people who are intoxicated with drugs or alcohol at a high risk for choking?
 - when people are intoxicated, the reflex that causes the epiglottis to close over the trachea is impaired
 - if a person swallows or vomits when they are intoxicated, the epiglottis may not cover the trachea so food or vomit may be inhaled into the lungs

10. What are three ways that a person's airway can be obstructed?
 - Suffocation when an object covers the mouth and nose, for example when a child puts a plastic bag or pillow over its head
 - Strangulation when an object is wrapped around the throat, for example when a string from a hoodie gets wrapped around a child's throat
 - Asphyxiation (aspiration) when an object is inside the airway and blocking it, for example, a child choking on a peanut or hard candy
11. What are three common causes of strangulation in children?
 - strings on window blinds that have a loop at the bottom
 - sleepers, jackets or hoodies that have strings around the neck or hood
 - the straps on bicycle helmets
12. Explain three things that happen during an asthma attack that makes breathing difficult.
 - the muscle around the bronchioles contracts, squeezing the bronchiole shut
 - cells in the bronchiole make too much mucous, which plugs up the bronchioles
 - the lining of the airways (bronchioles) become inflamed and swollen, so the bronchioles get smaller inside
13. Which emergency service(s) can legally administer medications, such as a puffer or epi-pen?
 - only EMS (paramedics) can administer medications
14. Before administering any medications, what must the emergency personnel check?
 - they must check the 5 R's
 - right medication
 - right patient
 - right dose (how much to give them)
 - right route (method of administration eg. oral or spray under tongue)
 - right time (they haven't taken too much in too short a period of time)
15. Describe what happens to a person's lungs when they have emphysema.
 - emphysema is a disease of the alveoli
 - the alveoli are damaged and the cells separating them from each other die
 - instead of being many small alveoli with large surface area, they join together into large alveoli with much smaller surface area
 - lower surface area means that the person has trouble exchanging enough air, so they feel short of breath
 - often, people with emphysema also have chronic bronchitis, so their lungs are full of mucous
16. How does COPD affect tidal volume?
 - COPD stands for chronic obstructive pulmonary disease, and includes both emphysema and chronic bronchitis
 - COPD damages the lungs and decreases both tidal volume and vital capacity
17. What part of the respiratory system is affected by asthma? Emphysema? Chronic bronchitis?
 - asthma is a disease of the bronchioles
 - emphysema is a disease of the alveoli
 - chronic bronchitis affects the bronchi and bronchioles
18. What are four symptoms of an anaphylactic reaction?
 - hives (itchy, red rash)
 - difficulty breathing (coughing, noisy wheezing or "stridor")

- cyanosis (blue tinge around the lips)
- rapid heart rate
- swollen face, lips, eyes, tongue and neck
- clammy, cool skin (early shock)
- vomiting
- person may be confused or unresponsive

19. What are four common allergens that can trigger an anaphylactic reaction?

- venoms such as bee or wasp stings
- ingested allergens such as peanuts, shellfish, soy
- skin contact with poison ivy, latex
- drugs such as penicillin, sulfa drugs

20. What is the most effective first aid treatment for anaphylaxis?

- administer epinephrine in the form of an epi-pen

21. You come across a person in a public washroom who is choking. The person is coughing forcefully. Describe exactly what you should do.

- as long as the person is coughing effectively, do not touch them
- encourage them to cough
- watch them carefully in case the situation gets worse or the person loses consciousness

22. You see a student in hallway who is stumbling. Her face is swollen and her breath is noisy and laboured. Describe exactly what you should do.

- tell her to sit down, loosen tight clothing
- call for help, 911
- ask her if she is anaphylactic or look for a medic alert bracelet or necklace
- if she is anaphylactic and conscious, help her give herself the epi-pen
- if she is unconscious or unable to give her the epi-pen, get a teacher to help or give it yourself
- stay with her until help arrives
- if necessary, give a second epi-pen
- she should go to the hospital

Part C: Cardiovascular System and Emergencies

1. Be able to describe the flow of blood through the heart and body for one cardiac cycle, including the four chambers of the heart and major blood vessels.
 - vena cava brings deoxygenated blood to heart, goes into right atrium
 - right atrium pumps it through tricuspid valve into the right ventricle
 - right ventricle pumps it into the pulmonary artery to the lungs
 - the blood picks up oxygen and gives off carbon dioxide in the lungs
 - oxygenated blood returns to the heart via the pulmonary vein
 - pulmonary vein delivers blood to the left atrium
 - left atrium pumps oxygenated blood through the bicuspid valve and into the left ventricle
 - left ventricle pumps oxygenated blood out to the body through the aorta
 - from the body, the deoxygenated blood returns to the heart via the vena cava
2. Be able to describe the flow of electricity through the heart's conduction system during one cardiac cycle.
 - the sino-atrial (SA) node is the primary pacemaker, it fires and sends an electric impulse across the atria to the atrio-ventricular (AV) node
 - the AV node fires and sends an electric impulse down the Bundle of His and through the Purkinje fibres, which cause the ventricles to contract
 - then the SA node fires again
3. Explain why the atria must contract before the ventricles contract for good blood flow.
 - the atria contract and pump blood into the ventricles. This fills the ventricles full of blood
 - once the ventricles are full of blood, they contract and pump the blood to the body
 - if the ventricles are not completely full, they can not squeeze effectively so they don't pump the blood with enough pressure to go out to all parts of the body
4. What is the primary (most important) pacemaker for the heart?
 - the sino-atrial (SA) node
5. How is the left ventricle different from the right ventricle? Explain why.
 - the left ventricle is much thicker than the right ventricle
 - this is because the right ventricle only has to pump blood to the lungs, which are a short distance from the lungs so it doesn't need much pressure
 - the left ventricle pumps blood to the top of the head and the tip of the toes, which are much longer distances, so the left ventricle must pump with more pressure, so it is a much thicker muscle
6. Know the values that define high and low blood pressure.
 - high blood pressure is a systolic pressure over 140 mmHg or diastolic over 90 mmHg
 - low blood pressure is a systolic pressure under 90 mmHg or diastolic under 60 mmHg
 - a) What are three causes of high blood pressure?
 - excessive salt intake
 - atherosclerosis (the inside of the arteries is hard and clogged with plaque)
 - genetics
 - kidney problems

- b) What are three causes of low blood pressure?
- heart problems such as valve problems or damage to the heart from a heart attack
 - the person may have an arrhythmia such as V-tach or V-fib
 - low blood volume due to dehydration or blood loss
 - the person is in shock due to injury
- c) What are three negative effects of (problems caused by) high blood pressure?
- the heart has to pump harder so the heart enlarges
 - damage to brain, kidneys, eyes and other organs
 - person may have a stroke
7. What is shock (hypoperfusion)?
- shock is when there is not enough blood flow through the body's organs and tissues
- a) Describe shock's vicious cycle that can result in death.
- there is inadequate blood moving through a tissue
 - the tissue becomes hypoxic (has low oxygen) so it creates lactic acid
 - the heart pumps faster to try and increase blood flow
 - breathing rate increases to try and increase oxygen to tissues
 - if blood volume is not increased, cells in the tissue die
 - the dead cells break apart and release histamine, which causes blood to pool in the tissue
 - because blood is pooling, the circulating blood volume is further decreased
 - more cells become hypoxic and die
 - the cycle continues and the person dies
- b) What are three different causes of shock? Give an example of each.
- **cardiogenic shock** is caused by problems with the heart (eg heart attack or valve problems)
 - **hypovolemic shock** is caused by reduced blood volume (eg. due to blood loss or severe dehydration)
 - **vasodilation** (distributory shock) is caused when blood pools in the tissues (eg. due to anaphylactic shock or septic shock from an infection)
- c) Which tissues are the first to be damaged by shock?
- the first tissue to be damaged by shock is the brain, then the kidneys, heart and others
8. What is a cardiac arrhythmia?
- a cardiac arrhythmia is when the heart beat does not have a regular rhythm
- a) What are three common types of arrhythmias? Be able to recognize them from an ECG.
- ventricular fibrillation (V-fib): the ECG has no pattern at all, you can not see the QRS complex
 - ventricular tachycardia (V-tach): the ECG has QRS complexes very together. You can not see the P or T waves. The heart beat is very rapid
 - atrial fibrillation (A-fib): the ECG shows a normal QRS complex but there are many P waves in between each QRS because many cells in the atrium are firing
- b) What causes an arrhythmia?
- an arrhythmia is usually caused by damage to the heart, for example from a heart attack

- c) Why are arrhythmias dangerous?
- arrhythmias are dangerous because the heart is not pumping in an organized efficient pattern
 - if the atrium and ventricles do not contract in order, the ventricles do not fill properly so they do not contract effectively to pump enough blood to the brain and body
 - if the heart is too ineffective, the person can die
- d) What two types of arrhythmias can be treated with a defibrillator?
- V-tach and V-fib are shockable
- e) What does a defibrillator do?
- a defibrillator delivers a high voltage, low amperage shock to the heart
 - the idea is that the shock will stop the heart, and then when it starts beating again, it will beat in an organized, effective pattern
9. What are the normal or average values for the following, for an adult:
- a) Resting heart rate, per minute: 72 beat/min c) Systolic blood pressure: 120 mmHg
b) Total volume of blood in the body: 5 – 6 L d) Diastolic blood pressure: 80 mmHg
10. Explain what happens during an angina attack.
- when a person has angina, it is a symptom that one or more of the coronary arteries has coronary artery disease and is partially blocked with plaque
 - when the person exerts themselves, the heart muscle does not get enough oxygen rich blood, so the heart muscle becomes hypoxic (lacking oxygen) and this causes the pain of angina
- a) How does coronary artery disease cause angina?
- coronary artery disease means that the coronary arteries are blocked with plaque
 - the plaque narrows the artery so it can not deliver as much blood to the heart muscle
 - the heart muscle is starved for blood and oxygen, so it causes the pain of angina
- b) What medication is used to treat angina? What does it do?
- angina is treated with nitroglycerine
 - nitroglycerine is a vasodilator, so it causes the coronary arteries to open up and allows more blood to flow through them
- c) What five things must EMS check before administering or assisting with medication?
- the 5 R's (again): right person, medication, dose, time and route
- d) What two types of surgery can be used to treat angina?
- angioplasty in which a balloon is inserted into the coronary artery and then inflated to press the plaque against the wall of the artery, and open the coronary artery up wide. A stent (wire mesh tube) may be inserted into the artery to keep it open.
 - coronary bypass surgery uses a piece of a vein from the person's arm or leg to bypass the area of the artery that is blocked
11. What is a heart attack (myocardial infarction)?
- a heart attack happens when blood flow part of the heart muscle is reduced to the point that the heart muscle cells die (heart muscle cells are called myocardial cells, and infarction means cell death due to lack of oxygen)

- a) What are three causes of heart attack?
- plaque completely blocking a coronary artery
 - a plaque rupturing and causing turbulence in the blood which causes a clot to form, and this blocks a coronary artery
 - one of the coronary arteries goes into spasm and squeezes shut (no one knows why this happens)
- b) What are the most common symptoms of a heart attack?
- pain in the upper chest, neck, shoulders and down the arms, especially the left arm
 - squeezing or pressure in the chest (feels like an elephant is sitting on my chest)
 - nausea and vomiting
 - rapid, weak heart rate
 - rapid, shallow breathing
 - cyanosis
 - heavy sweating (diaphoresis)
 - the person may go into shock and have cool, clammy skin
- c) Describe first aid for a heart attack.
- position the person however they are comfortable
 - if they have nitroglycerine, help them take it
 - if advised by the hospital, give them aspirin (ASA) to decrease clotting
 - administer oxygen and transport to the hospital
 - monitor to make sure they don't go into cardiac arrest. If they do, begin CPR
- d) To be effective, how quickly after cardiac arrest must defibrillation be applied?
- defibrillation should be started as soon as possible, within 8 minutes of a heart attack
- e) In what percentage of heart attacks can defibrillation be used?
- 80% of heart attacks are V-tach or V-fib, so defibrillation can be used

12. What is a stroke?

- a stroke (cerebrovascular accident) occurs when there is reduced blood flow and reduced oxygen to part of the brain. This part of the brain is damaged or dies.
- a) Explain the difference between a hemorrhagic stroke and an ischemic stroke.
- a hemorrhagic stroke occurs when a blood vessel in the brain starts to bleed, so blood flow to part of the brain is reduced
 - an ischemic stroke occurs when a piece of plaque or a blood clot blocks an artery to the brain, so that part of the brain has reduced oxygen and dies
- b) What are the most common symptoms of a stroke?
- FACE: one half of the face is "paralyzed" so one eyelid droops, the smile is uneven, the person may drool or the wrinkles on one side of the face may smooth out
 - ARM: one half of the body is paralyzed so the person can not raise one arm
 - SPEECH: the person can not repeat a simple statement and may slur their speech
 - other symptoms include a sudden, severe headache, unequal pupils, nausea or vomiting, they may have seizures
- c) What test should first responders use to rapidly diagnose a stroke.
- the FAST test: face, arms and speech test

- d) Why is tPA used to treat ischemic stroke but not hemorrhagic stroke? What does tPA do?
- tPA is a “clot buster” that breaks down blood clots
 - it is used to treat ischemic stroke because these often are caused by a blood clot in the brain that blocks blood flow to part of the brain
 - hemorrhagic strokes are caused by bleeding in the brain. If tPA was used with these strokes, the bleeding would increase and the person would be worse
- e) What is the “golden window” in which to deliver tPA?
- tPA should be used within 3 hours of the onset of stroke symptoms to be most effective