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(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)
UNIVERSITY SUPPLEMENTARY/SPECIAL EXAMS**

SCHOOL OF NURSING MIDWIFERY AND PARAMEDICAL SCIENCES

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN PARAMEDIC
science**

COURSE CODE: NPP 423

COURSE TITLE: hazardous materials and environmental emergencies

DATE: 12/4/2023

time: 8AM – 11AM

INSTRUCTIONS TO CANDIDATES

All questions in the three sections (A, B and C) are compulsory

DURATION: 3 Hours

MMUST observes ZERO tolerance to examination cheating

SECTION A: MULTIPLE CHOICE QUESTIONS (MCQs); 20 MARKS

Choose the most appropriate answer

1. As you approach the scene, what would be the primary concern given the possible release of a chemical into the air in regard to the location where you are staging?
 - A. Number of patients
 - B. Amount of chemical stored in the area
 - C. Chemical reaction with water
 - D. Wind direction

2. After staging, you receive an update that multiple patients have been seen stumbling away from an enclosed scene with smoke coming from within. What type of exposures do you expect to see from the patients?
 - A. Absorption
 - B. Inhalation
 - C. Ingestion
 - D. Injection

3. When is emergency decontamination appropriate?
 - A. When patients are ambulatory and can walk away from the scene
 - B. When patients have an immediate life threat due to exposure
 - C. When patients are anxious about being near the incident
 - D. When first responders have been contaminated upon arrival

4. After transporting a patient to the hospital, you are asked to respond to the scene to assist with evaluations on the hazardous materials crew. This process is known as:
 - A. Medical monitoring.
 - B. Entry evaluation.
 - C. Exit evaluation.
 - D. Forecasting

5. The patient's body reacts to hot environmental conditions by releasing stored heat and energy by a process called:
 - A. Thermolysis.
 - B. Hemolysis.
 - C. Thermogenesis.
 - D. Shivering.

6. All of the following are ways the patient's body can compensate for an increased core body temperature EXCEPT:
 - A. Increased cardiac output.
 - B. Opening of sweat glands.

- C. Increased basal metabolic rate.
- D. Cutaneous vasoconstriction

7. The only way the patient's body can dissipate heat when the ambient temperature approaches body temperature is through:

- A. Perspiration (sweat).
- B. Decreasing respirations.
- C. Shivering.
- D. Increased basal metabolic rate.

8. A severe heat-related disturbance in the body's thermoregulation system characterized by mental status changes, typically accompanied by a core body temperature more than 40°C, is called:

- A. Heat exhaustion.
- B. Heatstroke.
- C. Heat syncope.
- D. Heat cramps.

9. Patients with heatstroke are at risk for the development of:

- A. Metabolic alkalosis.
- B. Seizures.
- C. Hyperglycemia.
- D. Exertional hypernatremia

10. Which of the following is true of frostbite:

- A. Commonly occur in upper extremities.
- B. Transient numbness and tingling that resolves after rewarming
- C. Ice crystals form in the extracellular tissue
- D. No tissue destruction.

11. In the principles of pressure effects, the following is true of Boyle's law:

- A. Volume of a gas is inversely proportional to its pressure at a constant temperature
- B. Volume of a gas is directly proportional to its pressure at a constant temperature
- C. Each gas in mixture exerts same partial pressure it would exert if it were alone in the same volume
- D. The amount of gas dissolved in a liquid is directly proportional to the partial pressure of the gas above the liquid

12. In squeeze injuries:

- A. Ambient pressure increases with descent under water
- B. Failure of the diver to clear eustachian tube with exhalation during ascent
- C. Gastrointestinal tract, thorax, teeth and bladder affected.
- D. Barotrauma occurs during ascent

13. A buffer area within a hazmat incident is known as:

- A. Hot zone
 - B. Warm zone
 - C. Cold zone
 - D. Contamination zone
14. The most highly ranked hazardous materials according to DOT Classification criteria is:
- A. Explosives
 - B. Gases
 - C. Flammable liquids
 - D. Toxic and infectious substances
15. Computer-Aided Management of Emergency Operations (CAMEO) is used to establish:
- A. pH of spills
 - B. Specific agents
 - C. Downwind concentrations
 - D. All of the above
16. Which type of personal protective equipment (PPE) is specifically used in decontamination?
- A. Level A ensemble
 - B. Level B ensemble
 - C. Level C ensemble
 - D. Level D ensemble
17. In toxicology terms, the concentration of hazardous materials that a person should never be exposed to is referred to as:
- A. Threshold limit value (TLV)
 - B. Threshold limit value- short term exposure (TLV-STEL)
 - C. Threshold limit value- ceiling (TLV-C)
 - D. Threshold limit value- skin (TLV-S)
18. The most common method of decontamination in the field is:
- A. Disposal
 - B. Neutralization
 - C. Absorption
 - D. Dilution
19. Which of the following statement is true of corrosives:
- A. Basically acid chemicals
 - B. Capable of dissolving other substances
 - C. May give off potent vapors
 - D. Once decontaminated, treatment is supportive
20. Treatment of choice for Cyanide smoke inhalation is:
- A. Amyl nitrite
 - B. Sodium thiosulphate
 - C. Hydroxocobalamin

D. Administration of 100% supplemental oxygen

SECTION B: SHORT ANSWER QUESTIONS (SAQS); 40 MARKS

Answer all the questions

1. Explain two (2) reasons why older and younger people are more predisposed to environmental emergencies (4 marks)
2. State five (5) ways of identification of hazardous materials (5 marks)
3. Outline the poisoning treatment paradigm (6marks)
4. Differentiate between mass and technical decontamination in hazardous materials exposure (4 marks)
5. State five (5) requirements of Awareness level of training in the hazardous materials regulations and standards (5 marks)
6. Outline five (5) general principles in the treatment of local cold injury (5 marks)
7. Explain three (3) factors that can affect the clinical outcome of a submersion incident (6 marks)
8. Explain Pulmonary Overpressurization Syndrome (POPS) (5 marks)

SECTION B: LONG ESSAY QUESTIONS (LEQS); 40 MARKS

1. You are employed by a rural EMS system and are dispatched to the scene of an airplane crash with a possible hazardous materials exposure. The plane crashed into the terminal of the regional airport, releasing an unknown chemical into the area. Describe your response to this call. (20 Marks)
2. While on search and rescue mission with a local agency, you encounter a victim who was on mountain climbing expedition, lost track and went missing for a day at the foot of Mt Kenya. On exam, his core body temperature reading is 32° C. Describe the pathophysiology, assessment and prehospital management of this patient (20 marks)

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