Hazardous Materials for First Responders

Questions and Answers

From IFSTA Hazmat for First Responders 4th Edition

Air Monitoring and Sampling

1. Which of the following is NOT considered a limitation of the CGI meter?
p. 530

A.) Too little oxygen will interfere with accurate readings
*B.) Meter response is exaggerated in cold weather
C.) Cell phones may interfere with readings
D.) Sensitivity to battery life

2. What should be done first when the multi-gas meter has been started up?
p. 553

A.) Ensure the meter has been maintained
*B.) Obtain fresh-air calibration
C.) Select appropriate test strips
D.) Obtain contaminated air sample

3. What should be done if a piece of monitoring equipment is suspected to be damaged?
p. 519

A.) Recalibrate according to manufacturer's instructions
B.) Report it at the end of the incident
*C.) Remove it from service immediately
D.) Check it against another piece of equipment

4. Above what oxygen percentage level is the danger of fire and explosion greater?
p. 528

A.) 20.5%
*B.) 23.5%
C.) 22.5%
D.) 19.5%

5. What does the pH of a solution measure?
p. 524

A.) Oxygen ions
*B.) Hydrogen ions
C.) Nitrogen ions
D.) Magnesium ions

6. What level PPE may be needed in the hot zone when hazardous liquids are present?
p. 520

A.) Level C
*B.) Level B
C.) Level A
D.) Level D

7. What is the raman spectrometer used to identify?
p. 541

A.) Solids, liquids and gases
B.) Gases and liquids
C.) Solids and gases
*D.) Liquids and solids

8. What is used to calibrate the flammable ionization detector?
p. 540

*A.) Methane
B.) Nitrous oxide
C.) Carbon dioxide
D.) Benzene

9. Which is NOT correct regarding instrument calibration?
p. 523

A.) Store devices in accordance with manufacturers' recommendations
B.) Be mindful of expiration dates on sensors and test strips
*C.) Test instruments only after they have been used
D.) Use recommended calibrant gases

10. Which type of gas displaces oxygen and creates an asphyxiation hazard?
p. 521

*A.) Inert
B.) Toxic
C.) Oxidizing
D.) Corrosive

11. What is the Recommended Exposure Limit (time-weighted average) made by NIOSH?
p. 516

*A.) 10-hours
B.) 12-hours
C.) 16-hours
D.) 14-hours

12. Which is usually used to express extremely low concentrations of unusually toxic gases or vapors?
p. 514

A.) Milligrams per cubic meter
B.) Grams per kilogram
*C.) Parts per billion
D.) Parts per million

13. What does the ion chamber use as the detection gas?
p. 545

A.) Carbon monoxide
B.) Zinc sulfide
C.) Sodium iodide
*D.) Ambient air

14. Which is NOT considered a limitation of the colorimetric tube?
p. 539

A.) Exposure to light, even for a few hours, can cause the tubes to degrade and become non-functioning
*B.) Certain models of the air draw devices are not intrinsically safe
C.) They have a limited shelf life
D.) It may be difficult to read the color change in certain kinds of lighting

15. Which is used to identify biological agents and toxins?
p. 550

A.) Wet chemistry testing kits
B.) Surface acoustical wave devices
*C.) Polymerase chain reaction devices
D.) Thermoelectric conductivity

16. At what phase in RDD and IND incidents should sheltering in place be used?
p. 548

*A.) Early
B.) Termination
C.) Advanced
D.) Intermediate

17. What pH reading may hydrocarbons give?
p. 526

A.) 8-10
B.) 12-14
C.) 0-3
*D.) 4-6

18. What must be done to pH papers being used on a pike pole to alert responders to a change in conditions before entering the area?
p. 528

A.) Apply neutralizing agent
B.) Secure with nonadhesive tape
*C.) Wet with distilled water
D.) Apply control chemicals

19. What must be used to calibrate the PID?
p. 537

*A.) Isobutylene
B.) Hexane
C.) Nitric oxide
D.) Toluene

20. What should be done if no vapors are present at a liquid spill and a pH test is being performed?
p. 552

A.) Get a sensitive testing monitor
*B.) Take sample of the product with a pipette
C.) Obtain MSDS from personnel
D.) Leave the area

21. Who should be contacted before purchasing detection and air monitoring equipment to get information about the equipment?
p. 523

*A.) Current users
B.) Potential hazard locations
C.) Manufacturer
D.) Allocation department

22. Up to what amount of time is the exposure period for the emergency Response Planning Guideline Level 2?
p. 517

*A.) 1 hour
B.) 2 hours
C.) 1 1/2 hours
D.) 2 1/2 hours

23. What was the usual route tested when determining the lethal dose of a material?
p. 532

A.) Transdermal
B.) Rectal
*C.) Oral
D.) Venous

24. How often should the responder check the self-reading dosimeter while working in the hot zone?
p. 546

A.) 30- to 45-minute intervals
B.) 20- to 30-minute intervals
*C.) 15- to 30-minute intervals
D.) 5- to 10-minute intervals

25. What reflects the amount of acid or base that is mixed with water?
p. 524

A.) Dilution
B.) Strength
C.) pH
*D.) Concentration

26. How should the unknown liquid be approached when conducting a pH test?
p. 552

*A.) Uphill, upwind
B.) Uphill, downwind
C.) Downhill, downwind
D.) Downhill, upwind

27. Which statement is correct?
p. 519

A.) Rely on the most advanced equipment only
*B.) Always assume more than one hazard is present
C.) Gases only need to be tested for at ground level
D.) Remove PPE if no hazards are detected

28. What distance from the material must the multi-gas meter remain when performing air monitoring?
p. 553

A.) 2 inches (50 mm)
B.) 3 inches (75 mm)
*C.) 1 inch (25 mm)
D.) 4 inches (100 mm)

29. What type of readings may be obtained from the FID due to calibration issues?
p. 540

A.) Higher than actual
B.) Higher or lower than actual
C.) There are no calibration issues
*D.) Lower than actual

30. Which statement is NOT correct?
p. 518

A.) Exit IDLH atmospheres immediately, and NEVER enter them without appropriate PPE, which must include SBCA
B.) As long as your exposure level never exceeds the lowest number indicated by any of the listed exposure levels forthat material, you should be safe from any toxic effects
*C.) The higher the exposure limit, the more potentially harmful the substance is
D.) Wear appropriate PPE for potential and suspected hazards until the actual hazards are identified

31. Above what dose is work on a voluntary basis for emergency workers?
p. 549

A.) 2 rem
B.) 3 rem
*C.) 5 rem
D.) 4 rem

32. What does the photoionization detector use to ionize samples of gaseous materials?
p. 536

*A.) Ultraviolet lamp
B.) Infrared lamp
C.) Reagent
D.) Hydrogen flame

33. Which material is undetectable with the PID?
p. 537

*A.) Hydrogen cyanide
B.) Acetylene
C.) Isopropyl ether
D.) Cyclohexane

34. Which is generally more useful when detecting a small amount of radiation?
p. 545

A.) Dosimeter
*B.) Scintillation detector
C.) Ion chamber
D.) GM detector

35. Which is used to detect nerve and blister agents?
p. 550

A.) Thermoelectric conductivity
B.) Wet chemistry testing kits
*C.) Surface acoustical wave devices
D.) Polymerase chain reaction devices

36. Which is a chemical analysis instrument used to separate and identify chemicals?
p. 549

*A.) Gas chromatography detector
B.) Mass spectrometer
C.) Biological immunoassay indicator
D.) Chemical agent monitor

37. What term is used to describe the amount of a toxin ingested or absorbed through the skin?
p. 532

*A.) Dose
B.) Measure
C.) Concentration
D.) Level

38. Which type of radiation are scintillation crystals that are sealed in a metal body better for detecting?
p. 546

A.) Alpha
B.) Beta
C.) X-ray
*D.) Gamma

39. Which term is often used in the context of chemical warfare agents?
p. 533

*A.) Incapacitating dose
B.) Lethal concentration
C.) Median incapacitating concentration
D.) Lethal dose

40. What pH value is assigned to pure water?
p. 525

A.) 2
B.) 14
*C.) 7
D.) 0

41. How many locations can the colorimetric indicator tube be used to test?
p. 556

A.) Two
B.) Four
*C.) One
D.) Three

42. Which is NOT considered a limitation of pH paper?
p. 527

A.) Difficulty reading the paper if the material sampled chemically strips the paper
B.) Inability to detect the concentration of the material
*C.) Need to sample distant from the material
D.) Difficulty reading the paper if the material sampled is contaminated with opaque materials

43. What is the elapsed time between the movement of an air sample into a monitoring device and the reading provided to the user?
p. 512

*A.) Instrument reaction time
B.) User reaction time
C.) Sampling reaction time
D.) Hazard reaction time

44. What is the first step that must be taken when using the colorimetric tube?
p. 539

*A.) Break off the tips
B.) Attach the indictor valve
C.) Insert into the reader
D.) Draw air through the tube

45. What is the maximum concentration below which it is believed nearly all individuals could be exposed for up to one hour without experiencing other than mild transient effects?
p. 516

*A.) ERPG-1
B.) AEGL-2
C.) ERPG-2
D.) AEGL-1

46. What is useful for keeping track of the wearer's total accumulated radiation dose?
p. 546

A.) Ion chamber
B.) Scintillation detector
*C.) Dosimeter
D.) Gas-filled detector

47. Within what time period does the lethal concentration of a substance prove to be fatal in the test group?
p. 532

*A.) 1 to 4 hours
B.) 3 to 6 hours
C.) 4 to 7 hours
D.) 2 to 5 hours

48. Which can cause an abnormally high reading from the oxygen meter?
p. 529

A.) Sulfur
B.) Ethanol
C.) Hydrogen
*D.) Chlorine

49. What term refers to the maximum concentration to which an employee may be exposed at any time, even instantaneously?
p. 515

*A.) PEL ceiling limit
B.) Immediately Dangerous to Life or Health
C.) STEL
D.) LOC

50. What is the normal oxygen level in air?
p. 528

*A.) 20.9%
B.) 23.4%
C.) 21.7%
D.) 19.5%

51. What percent of the IDLH limit is classified as a level of concern?
p. 515

A.) 15%
B.) 25%
C.) 20%
*D.) 10%

52. What do most combustible gas indicators measure?
p. 530

A.) Percentage of gas per volume of air
B.) ppm
C.) REL
*D.) LEL

53. Which is used to set radiation dose limits for emergency responders?
p. 543

*A.) Roentgen equivalent in man
B.) Gray
C.) Radiation absorbed dose
D.) Roentgen

54. What will be detectable when dealing with reactive materials?
p. 547

A.) Light
B.) Radiation
*C.) Heat
D.) Odor

55. Which material can be detected with the weakest lamp in the PID?
p. 537

A.) Hydrogen fluoride
B.) Cyclohexane
C.) Acetylene
*D.) Isopropyl ether

56. Which type of gas can damage and penetrate firefighter protective clothing and SCBA?
p. 521

A.) Flammable
B.) Oxidizing
*C.) Corrosive
D.) Toxic

57. Which statement about testing materials with a raman spectrometer is correct?
p. 541

A.) Responders must test the full sample
*B.) It can test through clear containers
C.) The laser only works from a distance
D.) Raman spectrometers do detect water

58. Which organization is responsible for setting the AEGL-1?
p. 516

A.) NIOSH
B.) NFPA
C.) ACGHI
*D.) EPA

59. What way do reagents typically react to chemicals when used for detection?
p. 538

A.) Viscosity change
*B.) Color change
C.) Temperature change
D.) State change

60. What color does the testing paper turn in the presence of fluorides?
p. 528

A.) Reddish-orange
B.) Greenish-blue
*C.) Yellowish-white
D.) Pinkish-red

61. Which detection device ionizes samples in order to determine their composition?
p. 549

A.) Fourier Transform Infrared spectrometer
B.) Gas chromatography detector
C.) Ion-mobility spectrometer
*D.) Mass spectrometer

62. Which of the following has a conversion factor of over 1.00?
p. 531

A.) Iso-pentene
B.) Vinyl acetate
*C.) Mineral spirits
D.) Methanol

63. What is a general rule about the toxicity of a material?
p. 532

A.) There is no correlation between the value and toxicity
*B.) The lower the value shown, the more toxic
C.) The lower the value shown, the less toxic
D.) The higher the value shown, the less toxic

64. Which type of gases cause explosions?
p. 521

A.) Inert
*B.) Oxidizing
C.) Flammable
D.) Toxic

65. Which expression is used for expressing concentrations of dusts, gases or mists in air?
p. 514

A.) Milligrams per liter
*B.) Milligrams per cubic meter
C.) Milligrams per kilogram
D.) Milligrams per liter of air

66. Which of the following pH values is given to a basic material?
p. 525

A.) 0
B.) 7
C.) 4
*D.) 11

67. What color does the peroxide test strip turn when exposed to an organic peroxide?
p. 542

A.) Green
*B.) Blue
C.) Yellow
D.) Red

68. What may be indicated if the potassium iodide starch paper changes color to blue quickly?
p. 542

A.) A corrosive
B.) A fluoride
C.) A flammable
*D.) An explosive

69. At what level can responders begin to perform air monitoring at haz mat incidents?
p. 511

A.) Awareness
*B.) Operations
C.) Technician
D.) Specialist

70. Which statement about the limitations of the raman spectrometer is NOT correct?
p. 542

A.) They are limited to identifying visible quantities of liquids and solids
*B.) Some instruments cannot take readings through clear containers
C.) They cannot be used to identify black materials because they absorb laser light
D.) Unshielded lasers may present an eye hazard

71. Which form of hazardous material is easier to protect against?
p. 520

A.) Liquid
*B.) Solid
C.) Gas
D.) Vapor

72. Which type of gas-filled detectors are sealed from the outside and not typically affected by temperature or humidity?
p. 545

*A.) GM detector
B.) Dosimeter
C.) Ion chamber
D.) Scintillation detector

73. What must responders remember about gases that will allow them to better sample the air for hazards?
p. 513

A.) Concentrations high enough to be detected are fatal
*B.) Most gases are heavier than air
C.) Large air samples are always needed
D.) Sampling equipment does not detect most gases

74. What is indicated when the pH reading is between 0 and 3?
p. 526

A.) Oxidizer
B.) Neutral
C.) Strong base
*D.) Strong acid

75. Which is used to measure gamma and X-ray radiation?
p. 543

A.) Raman
B.) Curies
C.) Becquerel
*D.) Roentgen

76. What is the maximum concentration allowed for a 15-minute exposure period?
p. 515

A.) Threshold Limit Value
B.) Permissible Exposure Limit
C.) Levels of Concern
*D.) Short-term Exposure Limit

77. Which of the following does a typical 4-gas monitor NOT detect?
p. 535

A.) Oxygen
B.) Hydrogen sulfide
*C.) PEL
D.) Carbon monoxide

78. How much of something else in the air will drop the oxygen level by one percent?
p. 528

A.) 25,000ppm
B.) 10,000ppm
*C.) 50,000ppm
D.) 30,000ppm

79. How many more times acidic is a material with a pH value of 5 than a material with a pH value of 7?
p. 525

A.) 10 times
B.) 10,000 times
C.) 1,000 times
*D.) 100 times

80. Which term references the maximum concentration in air below which it is believed nearly all individual could be exposed without experiencing irreversible health effects that could impair their abilities to take protective action?
p. 517

*A.) TEEL-2
B.) TEEL-1
C.) TEEL-0
D.) TEEL-3

81. What level PPE must be used with hydrogen fluoride?
p. 528

A.) Level C
B.) Level D
*C.) Level A
D.) Level B

82. Which is a factor influencing toxicity that is related to the environment?
p. 535

A.) Preceding diseases
B.) Heredity
C.) Hormones
*D.) Temperature

83. What is the typical display reading of styrene when the actual percentage of LEL is 50%?
p. 531

*A.) 26%
B.) 63%
C.) 50%
D.) 100%

84. What should be obtained when the gas-filled detector is started up?
p. 557

A.) Appropriate test strip
*B.) Background radiation level
C.) Adequate power supply
D.) Fresh-air calibration

85. Where should the PID be used instead of the CGI?
p. 536

A.) At the center of the hot zone
B.) Near the decon corridor
*C.) At the edge of a release
D.) Next to the hazardous material

86. Which organization is responsible for assigning the temporary emergency exposure limits?
p. 517

A.) EPA
*B.) DOE
C.) AIHA
D.) NIOSH

87. Which of the following does the self-reading dosimeter generally measure?
p. 546

A.) Alpha, Beta, Gamma and X-ray radiation
B.) Beta and Gamma radiation
*C.) Gamma and X-ray radiation
D.) Alpha and X-ray radiation

88. What error rate are the colorimetric indicator tubes known to have?
p. 538

*A.) 25% to 35%
B.) 15% to 25%
C.) 45% to 55%
D.) 35% to 45%

89. What will dictate the detection and monitoring strategies used at an incident?
p. 518

A.) Building layout
B.) Number of victims
C.) Responder's training
*D.) Hazards present