Hazardous Materials for First Responders

Questions and Answers

From IFSTA Hazmat for First Responders 4th Edition

Chemical Properties and Hazardous Materials Behavior

1. What should be done if it is not possible to make all predictions required to analyze the hazardous materials incident?
p. 214

A.) Go with the information you have
*B.) Look for assistance
C.) Pull back from the incident
D.) Contact dispatch for instruction

2. Which statement is NOT correct?
p. 200

A.) Vapor pressures reported on MSDSs in mmHg are usually very low
B.) The higher the temperature of a substance, the higher the vapor pressure will be
*C.) The higher the boiling point of a substance, the higher the vapor pressure will be
D.) A low boiling point means less heat is required to change some of the liquid into gas

3. Which type of liquid release flows downslope whenever there is a gradient away from the point of release?
p. 222

A.) Pile
B.) Plume
C.) Pool
*D.) Stream

4. Which stressor may change the shape of the container?
p. 216

A.) Thermal
B.) Ecological
C.) Chemical
*D.) Mechanical

5. What is the first event that occurs in a haz mat incident?
p. 214

A.) Breach of the container
*B.) Stress of the container
C.) Release of the material
D.) Dispersion of the material

6. What is the simplest dispersion pattern of a solid in many cases?
p. 223

A.) Cloud
*B.) Pile
C.) Stream
D.) Plume

7. What is the product of complete combustion of organic materials?
p. 198

A.) Carbon monoxide
*B.) Carbon dioxide
C.) Hydrogen cyanide
D.) Hydrogen sulfide

8. Almost what portion of all reported haz mat incidents are caused by container failure?
p. 215

*A.) One-fourth
B.) One-third
C.) Two-thirds
D.) Three-fourths

9. Which of the following gases does NOT have a vapor density lighter than air?
p. 204

A.) Helium
*B.) Hydrogen sulfide
C.) Methane
D.) Carbon monoxide

10. Which model is used to describe how hazardous materials are accidentally released from their containers and how they behave after the release?
p. 211

A.) IAACL
B.) BLEVE
C.) FLAPT
*D.) GEBMO

11. Which is a triangular-shaped pattern of an airborne hazardous material release with a point source at the breach and a wide base downrange?
p. 221

*A.) Cone
B.) Stream
C.) Cloud
D.) Hemispheric

12. What is a material with a high flash point called?
p. 196

A.) Noncombustible
B.) Flammable
*C.) Combustible
D.) Nonflammable

13. What is usually the cause of a hemispheric release?
p. 0219

A.) Even release
*B.) Rapid release
C.) Uneven release
D.) Slow release

14. What is the ability of a chemical to remain in the environment?
p. 207

A.) Solubility
B.) Resistance
*C.) Persistence
D.) Reactiveness

15. What does solubility refer to?
p. 205

A.) Whether the vapor mixes with air
*B.) Whether the solid mixes with water
C.) Whether the solid mixes with air
D.) Whether the vapor mixes with water

16. What is the maximum temperature the DOT assigns to a flammable liquid?
p. 196

A.) 200 degrees Fahrenheit (93 degrees Celsius)
*B.) 141 degrees Fahrenheit (60.5 degrees Celsius)
C.) 104 degrees Fahrenheit (40 degrees Celsius)
D.) 100 degrees Fahrenheit (38 degrees Celsius)

17. Which is an accurate statement about an oxidizing agent?
p. 209

A.) Stronger the agent, brighter the reaction
*B.) Stronger the agent, stronger the reaction
C.) Stronger the agent, more toxic the reaction
D.) Stronger the agent, longer the reaction

18. What is a chemical reaction in which a catalyst causes simple molecules to combine to form long chain molecules?
p. 209

A.) Oxidization
B.) Reduction
*C.) Polymerization
D.) Activation

19. Which material has an almond odor and is irritating to the eyes, nose and throat?
p. 199

A.) Formaldehyde
B.) Nitrogen dioxide
*C.) Benzaldehyde
D.) Benzene

20. Which of the following is NOT one of the first things to consider when evaluating container stress?
p. 215

A.) Type and amount of stress
B.) Potential duration
*C.) Amount of material involved
D.) Type of container

21. What condition is commonly seen when a BLEVE occurs?
p. 202

A.) Too much water is applied to the tank shell
B.) Flames contact tank shell below the liquid level
C.) Adequate water is applied to the tank shell
*D.) Flames contact tank shell above the liquid level

22. What is the degree or readiness to which two or more gases or liquids are able to mix with or dissolve into each other?
p. 205

A.) Solubility
B.) Dissolvability
*C.) Miscibility
D.) Reactivity

23. Which timeframe is associated with a detonation?
p. 224

A.) Medium-term
*B.) Immediate
C.) Short-term
D.) Long-term

24. What is the temperature at which enough vapors are given off to support continuous burning?
p. 196

A.) Boiling point
B.) Ignition temperature
*C.) Fire point
D.) Flash point

25. What format is vapor pressure usually reported on MSDSs?
p. 200

*A.) mmHg
B.) kPa
C.) atm
D.) psi

26. Which term is used when percents from 1 to 10 dissolve in water?
p. 205

A.) Insoluble
B.) Slightly soluble
C.) Partly soluble
*D.) Moderately soluble

27. Which is a colorless gas with a chocking odor?
p. 199

A.) Acrolein
B.) Carbon monoxide
*C.) Sulfur dioxide
D.) Nitrogen dioxide

28. Which of the following determines the extent of a container breach?
p. 216

A.) Orientation of the container
*B.) Container construction
C.) Hazardous materials involved
D.) Level of stressors

29. Which type of breach is associated with a BLEVE?
p. 216

A.) Attachments open
B.) Disintegration
*C.) Runaway cracking
D.) Split or tear

30. Which type of stressor should be suspected when corrosion of the container surfaces is observed?
p. 215

A.) Mechanical
B.) Ecological
*C.) Chemical
D.) Thermal

31. What is force applied at right angles?
p. 215

*A.) Pressure
B.) Contusion
C.) Deformity
D.) Strain

32. Within what amount of time do violent ruptures occur within?
p. 217

A.) One-half second
*B.) One second
C.) One-quarter second
D.) Two seconds

33. Which acts as the fuel source for the reaction in the fire tetrahedron?
p. 209

A.) Polymer energy
*B.) Reducing agent
C.) Oxidizing agent
D.) Activating energy

34. Which has specific shape and volume?
p. 193

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

35. Which type of breach is commonly seen from couplers coming in contact with a container?
p. 217

A.) Attachments open
B.) Disintegration
C.) Split or tear
*D.) Puncture

36. Which is a ball-shaped pattern of release where the hazardous material has collectively risen above the ground?
p. 220

A.) Hemispheric
B.) Cone
*C.) Cloud
D.) Plume

37. What is the most commonly encountered product of combustion in structure fires?
p. 197

*A.) Carbon monoxide
B.) Hydrogen sulfide
C.) Hydrogen cyanide
D.) Carbon dioxide

38. Which is NOT a common element of a haz mat incident?
p. 214

A.) Exposure to people or the environment is possible
B.) Materials present a hazard to the people at the scene
*C.) Materials present at the scene are unknown to the responders
D.) Container has the potential to fail

39. What is exerted by a saturated vapor above its own liquid in a closed container?
p. 200

A.) Saturation pressure
*B.) Vapor pressure
C.) Contained pressure
D.) Liquid pressure

40. Which is a fluid that has neither independent shape nor volume?
p. 193

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

41. What do all reactions require to get them started?
p. 208

A.) Oxygen
*B.) Energy
C.) Light
D.) Fuel

42. Which flow in accordance with the laws of gravity?
p. 193

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

43. Which of the following has occurred when an instantaneous and explosive release of stored chemical energy of a hazardous materials results?
p. 217

A.) Rapid relief
B.) Violent rupture
C.) Spill/leak
*D.) Detonation

44. What is generated by liquids condensing from a vapor back to a liquid?
p. 194

A.) Vapor
B.) Dust
C.) Aerosol
*D.) Mist

45. Which reactive hazard class includes mixtures that include substances with flash points less than 100 degrees Fahrenheit (38 degrees Celsius)?
p. 210

A.) Strong reducing agent
B.) Explosive
*C.) Highly flammable
D.) Radioactive material

46. Which of the following is a solid particle whose length is several times greater than its diameter?
p. 194

A.) Aerosol
B.) Mist
*C.) Fiber
D.) Dust

47. Above what specific gravity will the material sink on water?
p. 205

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

48. What term is used to describe a material that will not ignite easily?
p. 196

A.) Unflammable
B.) Reflammable
*C.) Nonflammable
D.) Inflammable

49. What do materials contain when hydrogen cyanide is produced during combustion?
p. 198

A.) Carbon
*B.) Nitrogen
C.) Hydrogen
D.) Magnesium

50. Which type of release is caused by runaway cracks in the container?
p. 217

A.) Spill/leak
B.) Rapid relief
C.) Detonation
*D.) Violent rupture

51. Which is a secondary hazard of a liquid?
p. 194

A.) Splash
*B.) Inhalation
C.) Ingestion
D.) Contact

52. What do a majority of hazardous materials incidents involve?
p. 194

A.) Materials that are poisonous
B.) Materials that are corrosive
C.) Materials that are toxic
*D.) Materials that are flammable

53. In which of the following does the liquid typically accumulate in low areas?
p. 222

A.) Stream
B.) Plume
C.) Pile
*D.) Pool

54. What has occurred when a solid changes to a gas without becoming a liquid?
p. 203

A.) Evaporation
B.) Freezing
C.) Melting
*D.) Sublimination

55. Which of the following does the pattern of dispersion NOT depend upon?
p. 214

A.) Laws of physics
B.) Laws of chemistry
C.) Characteristics of the product
*D.) Characteristics of the container

56. What term is used to describe a material that is above the upper explosive limit?
p. 198

A.) Lean
B.) Pungent
*C.) Rich
D.) Isolated

57. Which of the following is an example of a strong oxidizing agent?
p. 210

A.) Sodium
B.) Titanium
C.) Vinyl chloride
*D.) Hydrogen peroxide

58. Which type of release can occur in a period of several seconds to several minutes?
p. 218

A.) Detonation
*B.) Rapid relief
C.) Spill/leak
D.) Violent rupture

59. What causes more fire deaths?
p. 197

A.) Entrapment
B.) Burns
*C.) Toxic smoke
D.) Heat energy

60. What is the temperature at which the vapor pressure of a liquid is equal to or greater than atmospheric pressure?
p. 202

*A.) Boiling point
B.) Flash point
C.) Freezing point
D.) Autoignition temperature

61. Which statement is correct?
p. 204

A.) Lighter vapors will dissipate in every situation
B.) Vapor density will predict the spread patterns
*C.) Heavier vapors will sink into low lying areas
D.) Only lighter vapors will mix with air

62. Which reactive hazard class is capable of undergoing self-reactions that release energy?
p. 210

A.) Air-reactive
B.) Water-reactive
C.) Explosive
*D.) Polymerizable

63. Which type of release is irregularly shaped due to wind and/or topography?
p. 220

*A.) Plume
B.) Hemispheric
C.) Cone
D.) Cloud

64. Which material has an upper flammable limit of 100.0?
p. 200

A.) Gasoline
*B.) Acetylene
C.) Carbon monoxide
D.) Propane

65. Which of the following is NOT an element of dispersion?
p. 219

A.) Energy release may propel the hazardous material and container parts
*B.) With a puff release the concentration of gas in the cloud decreases over time
C.) Dispersion of energy is affected by terrain and cloud cover
D.) Energy generally travels outward in all directions from the point of release

66. Which timeframe is associated with a gas or vapor cloud?
p. 224

A.) Long-term
*B.) Short-term
C.) Immediate
D.) Medium-term