Chapter 6 Quiz

Name: ___________________________ Date: ___________________________

**Directions:** Write the correct letter on the blank before each question.

1. Which factor MOST determines the flow and reach of a solid stream? (194)
   A. Water source
   B. Fire conditions
   C. Length of hose lay
   D. Size of the discharge orifice

2. Impinging stream nozzles MOST often provide a: (196)
   A. straight stream.
   B. wide-angle fog pattern.
   C. combination fog pattern.
   D. narrow-angle fog pattern.

3. A constant flow fog nozzle is designed to: (197)
   A. provide a relatively low volume of water delivery.
   B. change patterns while also changing nozzle pressure.
   C. allow the firefighter operating the handline to select flow rate to suit the fire and operating conditions.
   D. flow a specific volume of water on all stream patterns at a specific nozzle discharge pressure.

4. An automatic fog nozzle is designed to: (198)
   A. provide a relatively low volume of water delivery.
   B. change patterns while maintaining the same nozzle pressure.
   C. flow a specific volume of water on all stream patterns at a specific nozzle discharge pressure.
   D. allow the firefighter operating the handline to select flow rate to suit the fire and operating conditions.
5. A high pressure fog nozzle is designed to: (199)
   A. provide a relatively low volume of water delivery.
   B. produce a stream that has very little forward velocity.
   C. provide efficient water flow at structural fire fighting.
   D. change patterns while maintaining the same nozzle pressure.

6. If handlines would be ineffective at an incident, which would be the BEST option? (199)
   A. Use master stream nozzles.
   B. Increase water pressure to handlines.
   C. Allow the fire to burn out on its own.
   D. Use handlines on a smaller area of the fire.

7. A nozzle that is commonly used in aircraft fire fighting or to apply water to voids, attics, or other areas inaccessible to standard fire streams is called a: (201)
   A. cellar nozzle.
   B. piercing nozzle.
   C. impinging nozzle.
   D. combination nozzle.

8. Which term refers to a counterforce that pushes back against firefighters operating the hoseline? (202)
   A. Water hammer
   B. Nozzle reaction
   C. Residual pressure
   D. Kickback pressure
Directions: Write a brief answer to the questions below.

9. What is the formula for the customary discharge rate? (195)

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10. What are the three types of master stream appliances? (200)

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11. In the formula for nozzle reaction for solid stream nozzles (customary), \( NR = 1.57 \times d^2 \times NP \), explain the meaning of \( NR \), \( d \), and \( NP \). (203)

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12. In the formula for nozzle reaction for fog stream nozzles (metric), \( NR = 0.0156 \times Q \times \sqrt{NP} \), explain the meaning of \( Q \) and \( NP \). (204)

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Chapter 6 Test

Name: ___________________________ Date: ______________________

**Directions:** Write the correct letter on the blank before each question.

**Objective 1:**
**Distinguish among types of fire hose nozzles.**

________ 1. A solid stream nozzle produces a fire stream that has a: (194)
   A. tight stream and little spray or shower effect.
   B. variable stream with little spray or shower effect.
   C. wide stream with intermittent spray or shower effect.
   D. tight stream that has significant spray or shower effect.

________ 2. A solid stream nozzle is designed so that the volume of water flowing through the nozzle: (194)
   A. is intermittent and reaches the orifice in bursts.
   B. is gradually reduced until just before the orifice.
   C. is gradually increased until just before the orifice.
   D. may either increase or decrease before the orifice.

________ 3. Which factor BEST determines the flow and reach of a solid stream? (194)
   A. Water piping and connections
   B. Age of nozzle and firefighter training
   C. Ambient temperature and wind direction
   D. Nozzle pressure and size of the discharge orifice

________ 4. Solid stream nozzles on handlines should generally be operated at a maximum of: (194)
   A. 20 psi (140 kPa) nozzle pressure.
   B. 30 psi (210 kPa) nozzle pressure.
   C. 50 psi (350 kPa) nozzle pressure.
   D. 80 psi (560 kPa) nozzle pressure.
5. Master stream appliances should be operated at a maximum of:
   (194)
   A. 50 psi (350 kPa).
   B. 80 psi (560 kPa).
   C. 100 psi (700 kPa).
   D. 150 psi (1050 kPa).

6. Which is a reason that driver/operators may need to determine the amount of water discharged from a solid stream nozzle? (194-195)
   A. Determine cost of water per minute flowing
   B. Verify that the nozzle discharges stamped amount
   C. Calculate amount of foam solution to add to the nozzle
   D. Test the water supply when a nozzle is attached to a hydrant

7. Which is the customary formula for discharge rate? (195)
   A. GPM = 29.7 x d^2 x √NP
   B. GPM = 14.7 x d^2 x √NP
   C. GPM = d^2 x √NP x 1.7
   D. GPM = d^2 x √NP x 2.5

8. Which is a constant in the metric formula for discharge rate? (195)
   A. 0.03
   B. 0.067
   C. 0.096
   D. 1.75

9. Which manner of producing fog streams occurs by deflecting water around an inside circular stem in the nozzle? (196)
   A. Circular stream nozzles
   B. Impinging stream nozzles
   C. Pressure-deflected streams
   D. Periphery-deflected streams
10. Which pattern is MOST often provided by impinging stream nozzles? (196)
   A. Solid stream
   B. Variable stream
   C. Wide-angle fog pattern
   D. Narrow-angle fog pattern

11. What directly affects the reach of the fog stream? (197)
   A. Ambient temperature
   B. Stage of fire growth
   C. Number of personnel
   D. Volume of water flowing

12. Which nozzle is designed to flow a specific volume of water on all stream patterns at a specific nozzle discharge pressure? (197)
   A. Automatic fog nozzle
   B. Constant flow fog nozzle
   C. High pressure fog nozzle
   D. Selectable gallonage nozzle

13. Which nozzle is designed to allow the firefighter operating the handline to select a flow rate to suit the fire and operating conditions? (197)
   A. Automatic fog nozzle
   B. Constant flow fog nozzle
   C. High pressure fog nozzle
   D. Selectable gallonage nozzle

14. Which is a type of variable flow nozzle with the ability to change patterns while maintaining the same nozzle pressure? (198)
   A. Automatic fog nozzle
   B. Constant flow fog nozzle
   C. High pressure fog nozzle
   D. Selectable gallonage nozzle
15. What happens to an automatic nozzle when the pump discharge pressure rises above the constant operating pressure? (199)
   A. Automatic nozzle stops functioning efficiently
   B. Automatic nozzle increases its operating pressure to match that of the pump discharge
   C. Automatic nozzle decreases its operating pressure to compensate for the pump discharge
   D. Automatic nozzle maintains its constant operating pressure, within the limitation of its design

16. High pressure fog nozzles are BEST suited for: (199)
   A. wildland fires.
   B. structural fires.
   C. multiple alarm fires.
   D. hazardous materials fires.

17. High pressure fog nozzles: (199)
   A. have very little forward velocity.
   B. produce a stream of slow-moving large spray.
   C. have a relatively low volume of water delivery.
   D. have a relatively high volume of water delivery.

Objective 2:
Identify considerations for selecting nozzles.

Objective 3:
Distinguish among types of special purpose nozzles.

18. Generally, the maximum flow for a handline is 350 gpm (1 400 L/min) because greater flows will: (199)
   A. cause the nozzle to malfunction.
   B. require the nozzle to be replaced during fire fighting efforts.
   C. place too much strain on the water supply system and nozzle itself.
   D. produce a nozzle reaction that is difficult or dangerous for firefighters to handle.
19. Master stream nozzles would MOST likely be used at an incident where: (199)

A. handlines would be ineffective.
B. water flow can be relatively low.
C. extra personnel are available.
D. conditions require an offensive posture.

20. Which is a characteristic of master stream nozzles? (199)

A. Designed to be used from a mobile position
B. Require considerable personnel for operation
C. Generate little nozzle reaction even at higher flow rates
D. Offer ability to operate at a greater distance from the fire

21. Which statement about master stream appliances is MOST accurate? (200)

A. Only fixed monitors are able to change the stream direction or angle while water is being discharged.
B. Each type of monitor cannot change the stream direction or angle while water is being discharged.
C. Each type of monitor has ability to change the stream direction or angle while water is being discharged.
D. Only combination monitors are able to change the stream direction or angle while water is being discharged.

22. Pre-piped waterways on elevated master streams generally feature a master stream that may be remotely controlled from the apparatus turntable, and is generally able to move: (200)

A. only up and down.
B. only side to side up to 30 degrees.
C. both up and down and side to side.
D. ten degrees from initial position that was set.

23. Which nozzle may also be referred to as a distributor? (200)

A. Cellar nozzle
B. Broken nozzle
C. Piercing nozzle
D. Chimney nozzle
24. Which nozzle may require insertion of an inline shut off valve at a location back from the nozzle to increase safety and ease of operation? (201)
   A. Cellar nozzle
   B. Broken nozzle
   C. Piercing nozzle
   D. Chimney nozzle

25. Which nozzle is commonly used in aircraft fire fighting or to apply water to voids, attics, or other areas inaccessible to standard fire streams? (201)
   A. Cellar nozzle
   B. Broken nozzle
   C. Piercing nozzle
   D. Chimney nozzle

26. Which nozzle consists of a solid piece of brass or steel with many small impinging holes that produce a very fine mist? (201)
   A. Cellar nozzle
   B. Broken nozzle
   C. Piercing nozzle
   D. Chimney nozzle

Objective 4:
Summarize facts about nozzle pressure and reaction.

27. Nozzle reaction occurs as water is discharged from a nozzle at a given pressure and: (202)
   A. a forward pressure pulls firefighters operating the hoseline.
   B. the resulting vibration of water against the nozzle damages the hose.
   C. firefighters anticipating the water discharge hold the nozzle stationary.
   D. a counterforce pushes back against firefighters operating the hoseline.
28. Why are most fog nozzles designed to operate at or below 100 psi (700 kPa) nozzle pressure? (202)
   A. Above this pressure, handlines will produce erratic fire streams.
   B. Above this pressure, nozzles will likely separate from the hose couplings.
   C. Above this pressure, pump discharges will not keep up with needed supply.
   D. Above this pressure, handlines become unwieldy for firefighters attempting fire suppression operations.

29. Which is the customary formula for determining nozzle reaction for solid stream nozzles? (203)
   A. \( NR = d^2 \times NP \)
   B. \( NR = 1.57 \times d^2 \times NP \)
   C. \( NR = 0.057 \times d^2 \times NP \)
   D. \( NR = 29.7 \times d^2 \sqrt{NP} \)

30. Which is a simple guideline for the customary system of measurement that may be used to achieve approximate solid stream nozzle reaction on the fireground? (203)
   A. \( NR = Q/2 \)
   B. \( NR = Q/3 \)
   C. \( NR = Q \times 1.5 \)
   D. \( NR = Q \times 2.7 \)

31. Which is the customary formula for nozzle reaction for a fog stream nozzle? (204)
   A. \( NR = Q \times \sqrt{NP} \)
   B. \( NR = 0.025 \times Q \times \sqrt{NP} \)
   C. \( NR = 0.0505 \times Q \times \sqrt{NP} \)
   D. \( NR = 0.50 \times Q \times \sqrt{NP} \)

32. In the metric formula for nozzle reaction for a fog stream nozzle, what does Q stand for? (204)
   A. Nozzle reaction in Newtons (N)
   B. Nozzle pressure in kilopascals (kPa)
   C. The sum of nozzle reaction and nozzle pressure
   D. Total flow through the nozzle in liters per minute (L/min)
Chapter 6 Quiz Answers

1. D
2. B
3. D
4. B
5. A
6. A
7. B
8. B
9. GPM = 29.7 x dx^2 /√NP
10. Fixed, combination, and portable
11. NR = Nozzle Reaction in pounds (lb); d = Nozzle diameter in inches; NP = Nozzle Pressure in pounds per square inch (psi)
12. Q = Total flow through the nozzle in liters per minute (L/min); NP = Nozzle Pressure in kilopascals (kPa)
Chapter 6 Test Answers

Objective 1
1. A
2. B
3. D
4. C
5. B
6. D
7. A
8. B
9. D
10. C
11. D
12. B
13. D
14. A
15. D
16. A
17. C

Objective 2

Objective 3
18. D
19. A
20. D
21. C
22. C
23. A
24. A
25. C
26. D

Objective 4
27. D
28. D
29. B
30. B
31. C
32. D