Reference Material: Note: Exam may contain "accepted practice" type questions not found in the reference material listed below

NFPA 1900: Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances , **(1901 section Chapters 18, 19)** and appropriate annex (800) 344-3555 or www.nfpa.org
NFPA 1910 Standard for Inspections, Maintenance, Refurbisment, Testing and Retirement of In-Service Emergency Vehlcles and Marine Firefighting Vessels, **(1911 section, Chapters 3, 6, 12, 13, 22, 24, 26)** and appropriate annex
IFSTA ***Principals of Foam Firefighting*** 2nd edition Chapters 2, 3, 4, 5, glossary and appendix
IFSTA Pumping Apparatus, ***Driver/Operator Handbook***, 3nd edition Chapters 14, 15, glossary and appendix.
Contact IFSTA at 800-654-4055

Fire pump manufacturer's operations manual
Hale FoamLogix Rotary Gear Manual 3.3/5.0/6.5
https://media.idexcorp.com/m/27be4479d5ae5cf2/original/FoamLogix-3-3-5-0-and-6-5-Manual.pdf
Hale Smart CAFS Troubleshooting Guide
https://media.idexcorp.com/m/1bff7d403a5d5471/original/SmartCAFS-Troubleshooting-Guide.pdf
Waterous "Eclipse" CAFS System Operation and Maintenance Form F1031 Section 2412
https://www.waterousco.com/media/pdfs/F1031-2412.pdf
Waterous 200P PTO Driven Compressor Kit Installation (3036) and Operations (2422) Instructions.
https://www.waterousco.com/media/pdfs/F1031-3036.pdf
https://www.waterousco.com/media/pdfs/F1031-2422_200-P_.pdf
FoamPro Form 829 Installation and Operation Manual &
FoamPro Power Fill Form 809 https://foampro.com/support/downloads/
Pierce Operator Manuals - PM-F-OM590-1224 Husky 3, PM-F-OM121-0124 Hercules, PM-F-OM131-0223 Husky 12
https://www.pierceparts.com Click Resource Tab
VFIS.com Firefighting Foam https://education.vfis.com/Portals/0/Documents/fire-and-ems-operations/VFIS-FirefightingFoam.pdf
FFFC.org Best Practice Guidance for use of Class B Firefighting Foams
https://www.fffc.org/_files/ugd/331cad_188bf72c523c46adac082278ac019a7b.pdf
Manufacturer's web sites
www.waterousco.com/ www.wsdarley.com https://www.fireresearch.com/foampro www.haleproducts.com

LEARNING OBJECTIVES

1. **Principals of Foam**: The Fire Apparatus Technician should understand the principals of foam firefighting
   a. Foam Types
   b. Characteristics
      (1) Expansion
      (2) Safety
         (a) environmental impact
         (b) personal impact
      (3) Benefits
      (4) Concentrate Properties
         (a) corrosion
      (5) Adding Foam to Tank
         (a) viscosity
         (b) drainage
      (6) Freezing and Thawing
      (7) Freeze protection
   c. Application/Uses
      (1) Induction
      (2) Injection
      (3) Pre-mix
      (4) Batch-mix
   d. Limitations
   e. Storage
   f. Definitions
      (1) Proportioning
      (2) Scrubbing
      (3) Foam Generators
         (a) low energy
         (b) high energy
      (4) Mixing Chamber/Static Mixer
      (5) Foam Solution
      (6) Surfactant
      (7) Milspec
      (8) CAFS
      (9) Slug Flow
      (10) Eduction
      (11) Venturi Principal
      (12) PFAS-Per & polyfluoroalkyl substances

2. **Foam Systems and Operations**: The Fire Apparatus Technician should understand the requirements for foam systems and operations
   a. Systems
      (1) Eductor Type
         (a) Characteristics
         (b) Requirements
      (2) Installed In-line Eductor System
      (3) Around the Pump Proportioners
      (4) By-pass Balanced Pressure Proportioners
         (a) Requirements
      (5) Variable Flow - Demand Type Pressure Proportioner
      (6) Variable Flow - Variable Rate Direct
      (7) C.A.F.S.
         (a) Compressor Engagements
         (b) Operation & Schematics
            (i) Air Flow
            (ii) Hydraulic
      (8) Direct injection

b. Operations
    (1) Cleaning and Flushing
    (2) Labeling
    (3) Safety
    (4) Proportioning
        (a) mixing proportions
        (b) Injections rates
    (5) Pressure
c. Foam Concentrate Storage

3. **Mechanical Components**: The Fire Apparatus Technician should understand the requirements for mechanical components
    a. Nozzles
        (1) Poor foam solution
    b. Tanks
        (1) Atmosphere
        (2) Pressure
        (3) Fill tower opening
        (4) Foam fill system
    c. Hose
    d. Strainers
    e. Check Valves
    f. Flow Meters
    g. Controllers
        (1) Electronics
    h. Proportioners
        (1) Eductors
            (a) inline
            (b) installed
            (c) foam class
        (2) Venturi
        (3) Flush Line
    i. Manifolds
    j. Water Filters
    k. Oil Separators
    l. Compressors
    m. Injectors
    n. Pressure Indicating Devices & Gauges
    o. Compressor control circuit
    p. Pressure vessel tank
        (1) Fill cap
    q. Foam pump
    r. Air control circuit
    s. Compressor Hydraulic Circuit
    t. Valves
    u. Coolers

4. **Maintenance and Testing**: The Fire Apparatus Technician should understand the proper maintenance and testing procedures
    a. Maintenance
        (1) Air Compressor Systems
            (a) Frequency
            (b) Filters/Strainers
            (c) Fluids
            (d) Adjustments
            (e) Compressor Drives
        (2) Proportioning System
            (a) Flushing
            (b) Calibration
            (c) Strainers
            (d) Frequency
            (e) Hydraulic Drive
    b. Testing
        (1) Air Compressor Systems
            (a) Air Flow
            (b) Pressure Balance
            (c) Frequency
            (d) Methods
        (2) Proportioning Systems
            (a) Test Methods
            (b) Concentration Flows
                (i) accuracy
            (c) Flow Meters
        (3) Gauges
        (4) Performance Test
            (a) Engine Driven Accessories
    c. Troubleshooting Guides
        (1) Air compressor systems
        (2) Proportioning systems
        (3) Foam Solutions
        (4) Contaminated Foam
    d. Repairs
        (1) Air compressor drives
        (2) Proportioning systems
        (3) Out of service criteria