E-4 Ambulance Cab, Chassis and Powertrain September 2026

Reference Materials: Note: This exam may contain some "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 **(NFPA 1917 Chapters)** 2024 edition (800) 344-3555 or www.nfpa.org
NFPA 1910: Standard for the Inspection, Maintenance, Refurbishment, Testing and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels **(NFPA 1911 Chapters)** 2024 edition (800) 344-3555 or www.nfpa.org
Selective Catalytic Reduction http://www.dieselforum.org/about-clean-diesel/what-is-scr

General shop manuals, such as: Ford 1-ton chassis, Freightliner Medium Duty, International/Navistar Medium Duty,
Allison Transmission E books 1000 & 200 series
Any service manual for OBD-2, Class 1 Diagnostic Service Codes

LEARNING OBJECTIVES

1. **Physical Characteristics of an ambulance** - Identify the design requirements as stated in NFPA 1917:
   - a. Height, width, wheel base & length
   - b. Ambulance types
   - c. Ambulance class & configurations
   - d. Weight distribution
     - (1) GVWR
   - e. Rearview mirrors
   - f. Cab construction

2. **Cab and Body -** Identify components and location. Describe maintenance and repair of the following:
   - a. Doors, latches & hardware
   - b. Oxygen Systems
     - (1) Maximum leakage
     - (2) Hose requirements
   - c. Dissimilar metals
   - d. Handrails
   - e. Warning light system
     - (1) Do not move light
     - (2) Low voltage
     - (iii) Optical devices
   - f. Patient compartment
     - (1) Seat belts warning signal
     - (2) Reflective material
     - (3) Line Voltage
     - (4) Body Sealing
   - g. Back up alarm
     - (i) Control
     - (2) Decibels
   - h. Audible warning devices
   - i. Rear bumper
   - j. Rear visibility

3. **Chassis** - Describe principles fo operation, maintenance, and repair of the following:
   - a. Brakes
     - (1) Hydraulic brake systems & fluid types
       - (a) Fluid level
     - (2) Parking brakes and cables
     - (3) Anti-lock systems
       - (a) Wiring
       - (b) Bleeding
       - (c) Driveline retarder
     - (4) Brake assemblies
       - (a) Rotors
       - (b) Rotor measurements
       - (c) Rotor run out
       - (d) Electronic Stability Control (ESC)
     - (5) Brake retarder installation
   - b. Suspension
     - (1) Tires & wheels
       - (a) Tire balance
       - (b) Tire size
       - (c) Tire air pressure/monitoring system
       - (d) Tire replacement
       - (e) Mud Flaps
     - (2) Wheel nuts/torque
     - (3) Air ride height adjustment
     - (4) Approach and departure angles
   - c. Frame
     - (1) Body & cab mounts
   - d. Steering
     - (1) Symptoms
     - (2) Alignment

4. **Powertrain** - describe principles of operation, maintenance and repair of the following
   - a. Power train control module
   - b. Engine
     - (1) Effects of water in fuel
     - (2) Coolant additives
     - (3) Common rail diesel fuel systems
     - (4) Diesel exhaust service
       - (a) After treatment
       - (b) DEF
       - (c) DPF
     - (5) Engine speed control device
   - c. Automatic transmissions
     - (1) Torque convertor
       - (a) Components
       - (b) Function
       - (c) Installation
     - (2) Towing vehicle with automatic transmission
     - (3) Manual downshifting
     - (4) Rocking vehicle with automatic transmission
     - (5) Inspection
       - (a) Gauges and indicators
       - (b) Exterior
       - (c) Diagnostic codes
     - (6) Maintenance
       - (a) Service intervals
       - (b) Required procedures after overhaul or replacement
       - (c) Fluid change
     - (7) Fluid
       - (a) Purpose
       - (b) Level
       - (c) Types
       - (d) Change intervals
       - (e) Effects of coolant contamination
     - (8) Electronic controls

(a) Shift point after calibration
(b) Main ECU power and ground wiring
(c) Cleaning connectors
(d) Effects of electromagnetic interference (EMI)
(e) Effects of radio transmitter interference
(f) Tow/Haul
(g) Reference voltage

d. Drive line
(1) Inspection
(2) Driveline angle
(3) Driveline phasing
(4) Slip joints & U-joints
(5) Vibration causes
(6) RPM test
(7) Full floating
(8) Semi floating
e. Differentials
(1) Vibration
f. Road speed test

5. Troubleshooting & Diagnostics -Understand accepted practices of the following:

a. Retrieving and interpreting diagnostic codes
(1) Breakout box
(2) Diagnostic Trouble Codes (DTC)
b. Interpret diagnostic charts and service manuals
(1) Idle Validation Switch wiring
c. Understanding schematic drawings
d. Using diagnostic equipment
(1) Multi-meter uses
e. Road testing for driveability problems
f. Transmission
(1) Fluid
(a) Levels
(b) Contamination
(c) Effects of coolant contamination
(d) Fluid level too high
(e) Metal contaminated fluid
(2) Effects of a clogged breather
(3) Adjustments
(a) Linkage
(b) Shift points
(4)
(5) Electronic controls
(a) Multiple fault code
(b) Troubleshooting steps
(c) Cause of not shifting into gear
(d) Effect of poor battery connections
(e) Effects of water in connectors
(f) Historical code use
(6) Output shaft seal and yoke
(7) Stall test
(8) Troubleshooting procedure
(a) basic
(b) no code troubleshooting
(9) Leak diagnoses
(10) causes of overheating

g. Welding precautions
h. Driveline
(1) Vibration
(2) Driveline test
i. Engine
(1) Leaks diagnoses
(2) Slow cranking
(3) Glow plug diagnostics
(4) Effects of clogged air filter
(5) Cause of pressure buildup in radiator
(6) Effect of incorrect muffler installation
j. Differential
(1) Chattering noise
k. Troubleshooting steps
l. Brakes
(1) ABS braking systems
(2) Brake testing
(3) Boosters

6. Safety - Identify and describe the following:

a. Safety procedures
(1) Use of wheel chocks
(2) Proper lifting & support equipment
(3) Right to know law
b. Out of Service criteria
(1) Hydraulic brakes
(2) Engine oil leaks
(3) Automatic transmission
(4) Identifying out of service vehicle or component
(5) body mounts
(6) windshield wipers
c. Equipment Storage and Mounting
d. Alarms