PRACTICE EXAM 19: HAZMAT & TANKER SIMULATION (50 QUESTIONS)

HAZMAT SECTION (Questions 1–30)

1. A driver transporting 3,000 pounds of Class 8 Corrosive in a cargo tank pulls into a truck stop for a break. While parked, the driver notices a strong chemical odor near the rear discharge piping. Upon closer inspection, the driver sees a thin stream of liquid dripping from a pipe fitting below the tank. The liquid is clear but produces a burning sensation when a drop contacts the driver's hand. What should the driver do first?

A. Flush the affected skin with large amounts of water immediately, then move upwind from the leak and contact the carrier — the burning confirms the liquid is the corrosive cargo, not condensation

B. Tighten the leaking pipe fitting by hand to stop the drip, then continue to the delivery destination where maintenance is available

C. Taste a small amount of the liquid to confirm whether it is the corrosive cargo or just water condensation from the air conditioning

D. Cover the drip with a rag tied around the fitting and continue driving, since the leak rate is too slow to constitute a reportable incident

2. Under the Hazardous Materials Regulations, what document must a driver have immediately accessible in the cab at all times during transport of hazardous materials, in addition to the shipping papers?

A. A copy of the carrier's USDOT operating authority certificate showing the carrier is registered for HazMat transport

B. A duplicate set of shipping papers stored in a sealed waterproof envelope in the sleeper berth for emergency backup

C. Emergency response information specific to the material being transported — either included with or attached to the shipping papers

D. A notarized copy of the driver's TSA security threat assessment approval letter showing the driver passed the background check

3. A driver is loading packages of Division 4.1 Flammable Solid onto a trailer. The dock worker hands the driver a package that feels unusually warm to the touch — significantly warmer than the other packages of the same material. The shipping papers do not indicate the material is temperaturecontrolled. Should the driver accept this package?

A. Yes, because Division 4.1 materials are selfreactive and a warm temperature is their normal state during storage

B. No, an unusually warm package of flammable solid could indicate the material has begun selfheating or reacting — the driver should refuse the package and alert the shipper to investigate the abnormal temperature

C. Yes, because the absence of a temperature control notation on the shipping papers means the material's temperature is irrelevant

D. No, but only because warm packages will melt the adhesive on the hazard warning labels, causing them to fall off during transport

4. A vehicle is carrying 400 pounds of Division 2.3 Poison Gas (Table 1), 300 pounds of Division 4.3 Dangerous When Wet (Table 1), and 500 pounds of Class 3 Flammable Liquid (Table 2). What placards must be displayed?

A. DANGEROUS placards only, because the vehicle carries three different hazard classes and the universal placard covers all combinations

B. POISON GAS and FLAMMABLE placards only, because Division 2.3 and Class 3 are the most dangerous materials on the vehicle

C. All three classspecific placards, because any vehicle carrying three or more hazard classes requires individual placarding

D. POISON GAS and DANGEROUS WHEN WET placards for the two Table 1 materials at any quantity — the Class 3 at 500 pounds does not independently reach the 1,001pound Table 2 threshold

5. A driver is transporting hazardous materials when a tire on the drive axle begins smoking. The driver can see smoke in the mirrors and smell burning rubber. The vehicle is carrying Class 3 Flammable Liquid in drums. What is the most critical concern and the correct response?

A. A smoking tire near Class 3 Flammable Liquid creates an immediate fire risk — the driver must pull over immediately, and if safe to do so, attempt to address the tire situation before it ignites flammable vapors

B. The smoking tire will selfextinguish because the vehicle's forward motion creates cooling airflow that prevents sustained combustion

C. The driver should increase speed to generate more cooling airflow over the tire, which will reduce the smoke and prevent a fire

D. The smoking tire is only a concern for tank vehicles carrying bulk liquids — packaged drums in a dry van are not affected by external tire heat

6. A shipper offers a driver a load of hazardous materials with shipping papers that list the emergency response telephone number as "911." Is this acceptable?

A. Yes, because 911 is the universal emergency number and provides the broadest possible response capability

B. Yes, as long as the shipper also provides a backup number for a local hospital emergency room

C. No, the emergency response number must connect to a person knowledgeable about the specific hazardous material — 911 dispatchers are not materialspecific experts and cannot provide the technical guidance responders need

D. No, but only because 911 is a threedigit number and the regulations require a minimum of seven digits

7. A driver transporting Division 1.1 Explosives is involved in a highway accident. The vehicle has overturned and the driver is injured but conscious. Emergency responders arrive and ask the driver what is on the truck. The shipping papers are trapped in the overturned cab and cannot be accessed. How can the driver help identify the cargo?

A. Direct responders to check the vehicle's registration to determine the carrier's name, then call the carrier's office for cargo details

B. Tell responders about the placards on the vehicle — EXPLOSIVES 1.1 placards and any identification numbers displayed — and provide whatever details the driver remembers about the material name, quantity, and destination

C. Ask responders to right the vehicle first so the shipping papers can be retrieved from the cab before any other response action

D. Refuse to provide any information because federal security regulations prohibit drivers from verbally disclosing explosives cargo details

8. A driver reviews shipping papers for a load containing a material listed as "Elevated temperature material, liquid, n.o.s., 9, UN3257, PG III, HOT, 7,500 gal." The word "HOT" appears before the proper shipping name. What specific hazard does the "HOT" designation communicate?

A. The material is commercially valuable ("hot commodity") and requires armored vehicle transport with an armed escort

B. The material has a high theft risk and must be tracked by GPS throughout the entire transportation chain

C. The material has been recently manufactured ("hot off the line") and requires a 48hour cooling period before highway transport

D. The material is being transported at a temperature high enough to cause severe burns on contact — at or above 212°F for liquids — and all personnel near the vehicle must be aware of this thermal burn hazard

9. A vehicle is carrying 1,100 pounds of Division 5.1 Oxidizer and 1,100 pounds of Class 8 Corrosive. Both are Table 2 materials. Both independently exceed the 1,001pound threshold. What placards must be displayed?

A. Both OXIDIZER and CORROSIVE placards on all four sides — when individual Table 2 materials each independently exceed 1,001 pounds, each requires its own classspecific placard

B. DANGEROUS placards, because the DANGEROUS placard can substitute for individual class placards whenever two or more Table 2 classes are present

C. Only OXIDIZER placards, because Division 5.1 is listed first in the Hazardous Materials Table and takes alphabetical priority

D. Only CORROSIVE placards, because Class 8 has a higher hazard class number and highernumbered classes always take placarding priority

10. A driver transporting placarded hazardous materials is driving on a highway at night. The driver's headlights illuminate a person standing in the travel lane waving their arms. There is no disabled vehicle visible and no apparent emergency. The road is otherwise empty. What should the HazMat driver do?

A. Stop immediately and approach the person on foot to determine what assistance is needed

B. Swerve to the left lane to pass the person without stopping, because stopping a HazMat vehicle for unknown persons creates a security risk

C. Flash the high beams and continue at full speed, expecting the person to move out of the lane

D. Slow down, move to the adjacent lane if safe to do so, and proceed cautiously — stopping a placarded vehicle in a remote area for an unknown person at night could be a security risk, but the driver should also be prepared to call 911 if the person appears to genuinely need help

11. A driver is reviewing shipping papers and notices that one entry includes the notation "Limited Quantity" and the packages bear the limited quantity marking (diamond with black upper and lower corners). The shipper says no placards are needed. However, the total weight of this material alone is 2,500 pounds. Does the weight affect the limited quantity exemption?

A. Yes, the limited quantity exemption has a maximum total weight of 1,001 pounds — above that, full placarding and endorsement requirements apply

B. Yes, the exemption applies only to quantities under 100 pounds per shipment, and 2,500 pounds vastly exceeds this threshold

C. No, the limited quantity exemption is based on the quantity per package (inner container), not the total weight of all packages combined — if each package meets the limited quantity perpackage limits, the exemption applies regardless of total shipment weight

D. No, but only because the limited quantity exemption requires a minimum total weight of 500 pounds to activate

12. A driver is assigned to pick up a load of hazardous materials from a military installation. The shipment is accompanied by military shipping papers rather than standard commercial shipping papers. The military papers include all the same information — proper shipping name, hazard class, ID number, packing group, quantity, and emergency response information. Are military shipping papers acceptable for highway transport?

A. Yes, military shipping papers that contain all required regulatory information elements are acceptable for highway transport of hazardous materials

B. No, military shipping papers must be transcribed onto standard commercial bill of lading forms before the driver can accept the shipment

C. Yes, but only if the shipment is traveling between military installations — deliveries to civilian facilities require commercial papers

D. No, because military shipping papers use a different classification system that is incompatible with DOT hazard class designations

13. A driver is transporting a placarded load of hazardous materials on a highway. The vehicle ahead is a farm tractor moving at 15 mph. The highway has a double yellow center line (no passing zone). Traffic is building behind the HazMat vehicle. The driver is concerned about the growing line of vehicles following closely. What should the driver do?

A. Pass the farm tractor using the opposing lane despite the double yellow line, because the growing traffic line creates a rearend collision risk

B. Activate hazard flashers and stop the vehicle until the farm tractor gains enough distance to eliminate the slowtraffic situation

C. Maintain speed behind the farm tractor and flash headlights repeatedly to pressure the tractor operator to pull over

D. Follow the farm tractor at a safe distance, maintaining patience — crossing a double yellow line to pass is illegal regardless of traffic buildup, and a headon collision while passing with a HazMat load would be catastrophic

14. Under the Hazardous Materials Regulations, what information must be included in a carrier's written security plan for HazMat operations?

A. The names, home addresses, and social security numbers of all drivers who hold HazMat endorsements within the carrier's organization

B. Personnel security measures, unauthorized access prevention procedures, and en route security protocols to address the risk of theft, sabotage, or misuse of hazardous materials during transportation

C. The GPS coordinates of every truck stop, rest area, and fueling station the carrier's drivers are authorized to use during HazMat trips

D. The daily passwords used by the carrier's dispatch system that must be verified before each HazMat load assignment

15. A driver transporting Class 3 Flammable Liquid discovers during an enroute inspection that one of the securing straps holding the drums in place has broken. The drums have shifted approximately 6 inches but none have fallen or been damaged. No leaks are visible. What should the driver do?

A. Continue to the destination because a 6inch shift is within the normal tolerance for cargo movement during transport

B. Remove the broken strap and continue without it, because the remaining straps provide adequate securement for the load

C. Resecure the shifted drums using replacement straps or other available securement devices before continuing — shifted cargo can continue to move and potentially fall or rupture during subsequent braking or cornering

D. Call the carrier and wait for a maintenance crew to arrive and resecure the load, because drivers are not permitted to adjust cargo securement

16. A driver picks up a load of hazardous materials. The shipping papers list four hazardous material entries. Three entries are highlighted in yellow. The fourth entry is not highlighted. What does the highlighting pattern indicate?

A. The three highlighted entries are hazardous materials and the unhighlighted entry is nonhazardous freight — the highlighting is used to distinguish HazMat entries from nonHazMat entries on the same document

B. The three highlighted entries are priority deliveries that must be made before the unhighlighted entry can be delivered

C. The yellow highlighting indicates materials that are temperaturesensitive and require monitoring during transport

D. The highlighting pattern is a colorcoding system used by the shipper to match packages to specific delivery locations

17. A driver is hauling a placarded load of hazardous materials through a dense urban area during rush hour. Traffic is extremely congested and the driver has been sitting in stopandgo traffic for 45 minutes. The engine temperature is normal. What is the driver's primary HazMatspecific concern in this situation?

A. The urban area's building heights are blocking the GPS signal, preventing the vehicle's tracking system from reporting its position

B. The exhaust fumes from surrounding vehicles will penetrate the trailer and react with the hazardous materials packages

C. The congested traffic prevents emergency vehicles from reaching the HazMat vehicle quickly if an incident occurs

D. Extended idle time in congested traffic increases the risk of overheating, but more importantly, the stopandgo driving creates repeated surge cycles in any liquid cargo and the dense urban environment amplifies the consequences of any HazMat incident

18. A driver is at a rest area with a placarded vehicle. The driver needs to use the restroom facilities located inside the rest area building. The building entrance is approximately 80 feet from the parking space. The driver can see the vehicle from the building entrance but not from inside the restroom. Will the driver's absence from the vehicle for a restroom visit violate the attendance requirement?

A. Yes, because the driver cannot see the vehicle from inside the restroom, the vehicle is unattended during any time spent in the restroom

B. Brief restroom stops are a practical necessity — while the driver technically cannot see the vehicle from inside the restroom, the brief duration and operational necessity of restroom visits are generally accommodated under the attendance requirement

C. Yes, and the driver must hire a security guard to watch the vehicle during all restroom breaks lasting longer than 2 minutes

D. No, because restroom facilities at rest areas are federally designated "safe zones" that automatically extend the attendance distance to 200 feet

19. A driver transporting a mixed load of hazardous materials receives a call from the dispatcher instructing the driver to pick up an additional load of Division 6.2 Infectious Substance at a hospital laboratory. The driver's current load includes foodgrade packaging materials (nonhazardous) destined for a food processing plant. What concern does this combination raise?

A. No concern exists because the foodgrade materials are nonhazardous and no segregation rules apply to nonhazardous cargo

B. The concern is that the hospital laboratory may not have a loading dock suitable for commercial vehicles

C. Division 6.2 Infectious Substances must not be loaded in the same vehicle with foodstuffs or materials intended for use in food preparation or service — even though the packaging materials are nonhazardous, they are destined for food use

D. The only concern is whether the hospital's shipping papers will be compatible with the existing commercial shipping papers already in the cab

20. A driver reviews a shipping paper entry that reads: "Hydrochloric acid, 8, UN1789, PG II, 3,000 lbs." The driver knows that PG II indicates medium danger within Class 8. What does this packing group tell the driver about the hydrochloric acid compared to the same acid at PG I or PG III?

A. PG II represents a moderate corrosive strength — more aggressive than PG III but less concentrated or less destructive to tissue than PG I, with packaging and handling requirements scaled accordingly

B. PG II indicates the acid was manufactured during the second quarter of the calendar year and has a shelf life expiring in six months

C. PG II means the acid requires packaging made from Group II plastics rather than Group I metals or Group III glass containers

D. PG II indicates the acid must be transported at a temperature between 50°F and 80°F, while PG I requires refrigeration and PG III allows ambient

21. A vehicle carries 300 pounds of Division 2.3 Poison Gas (Table 1) as the only hazardous material on the vehicle. Must the driver hold a HazMat endorsement?

A. No, because 300 pounds is below the minimum weight threshold that triggers the endorsement requirement for Division 2.3 materials

B. Yes, any driver transporting any amount of a placarded hazardous material must hold a valid HazMat endorsement — Division 2.3 is Table 1 requiring placards at any quantity, which triggers the endorsement requirement

C. No, because Division 2.3 materials in quantities below 500 pounds qualify for the smallquantity exemption from endorsement

D. Yes, but only if the driver will cross a state line during the trip — intrastate transport of small quantities does not require the endorsement

22. A driver transporting hazardous materials is driving through a mountainous region when the vehicle's engine loses power and stalls. The vehicle is on a steep upgrade. The driver applies the parking brake, and the vehicle stops on the grade. What are the driver's immediate priorities?

A. Attempt to restart the engine immediately, and if unsuccessful, coast backward down the grade to the nearest level area

B. Exit the vehicle and hitchhike to the nearest town to arrange for a tow truck while leaving the HazMat vehicle unattended

C. Place the transmission in neutral and coast forward down the mountain using gravity, steering to the nearest pulloff area

D. Chock the wheels to prevent the vehicle from rolling, set out reflective triangles, activate hazard flashers, and call for assistance — the vehicle must be secured on the grade before any other action

23. A shipper presents shipping papers for a material described as "Flammable liquid, corrosive, n.o.s. (ethanol, sulfuric acid), 3, UN2924, PG II." The entry shows Class 3 as the primary hazard with a subsidiary hazard of Class 8. Column 6 of the Hazardous Materials Table confirms both FLAMMABLE LIQUID and CORROSIVE labels are required. If the total weight is 2,000 pounds, what placards must be displayed?

A. Both FLAMMABLE and CORROSIVE placards on all four sides — the primary Class 3 exceeds the 1,001pound threshold and the subsidiary Class 8 hazard generates a corresponding subsidiary placard requirement

B. Only FLAMMABLE placards, because the primary hazard class determines the sole placard and subsidiary hazards are communicated only through package labels

C. DANGEROUS placards, because the material presents two different hazard classes and the DANGEROUS placard covers all multihazard loads

D. Only CORROSIVE placards, because the corrosive subsidiary hazard is more dangerous to human tissue than the flammable primary

24. A driver is transporting a placarded load when the vehicle's dashboard "check engine" light, "low oil pressure" warning, and "high engine temperature" warning all illuminate simultaneously. The engine is still running but the driver feels a slight vibration that was not present before. What should the driver do?

A. Continue driving because dashboard warning lights frequently malfunction and illuminate without indicating actual problems

B. Increase speed to reach the next service facility faster, before the engine fails completely on the open highway

C. Pull over immediately to a safe location and shut off the engine — multiple simultaneous warnings with unusual vibration indicate a serious mechanical failure that could result in engine seizure, fire, or loss of vehicle control

D. Shut off the dashboard warning system to prevent the lights from distracting the driver and continue to the destination

25. A driver transporting hazardous materials parks at a truck stop and walks inside to purchase food. While inside, the driver overhears two strangers discussing how to siphon fuel from parked trucks. The driver's vehicle is placarded and contains hazardous materials. What should the driver do?

A. Ignore the conversation because fuel theft is a common occurrence at truck stops and does not specifically target HazMat vehicles

B. Report the overheard conversation to the truck stop management or law enforcement and return to the vehicle promptly — any unauthorized access to a placarded HazMat vehicle, even for fuel theft, creates a safety and security risk

C. Confront the two strangers directly and demand that they leave the truck stop premises before they attempt any theft

D. Call the carrier's dispatcher and ask whether the overheard conversation constitutes a reportable security incident

26. A driver is assigned a load of Class 3 Flammable Liquid in a dry van trailer. Before loading, the driver inspects the trailer interior and discovers that the previous load left behind several loose wooden pallets and some plastic shrink wrap. The debris is scattered across the floor. Should the driver load the HazMat cargo over this debris?

A. Yes, because wooden pallets and plastic wrap are inert materials that pose no risk to packaged flammable liquids

B. Yes, as long as the driver places the HazMat packages on top of the pallets rather than directly on the trailer floor

C. No, but only because the pallets and wrap will shift during transport and may damage the HazMat labels on the packages

D. No, the trailer should be cleaned before loading — loose debris can cause packages to shift or become unstable during transport, and wood and plastic near flammable liquids represent additional fuel in case of a fire

27. A driver is transporting Division 2.1 Flammable Gas cylinders on a flatbed trailer. During transport, one cylinder's protective valve cap loosens and falls off. The driver discovers this during an enroute stop. The valve itself appears intact and no gas is escaping. Can the driver continue without the valve cap?

A. Yes, because the valve cap is a cosmetic accessory that has no safety function for compressed gas cylinders during transport

B. Yes, because the intact valve is the primary containment device and the cap is simply an additional layer of protection

C. No, the valve cap must be replaced or securely reattached before continuing — the cap protects the valve from damage during transport, and an exposed valve is vulnerable to impact that could shear the valve off, causing rapid uncontrolled gas release

D. No, but only because the missing cap constitutes a marking violation that will be cited during a roadside inspection

28. Under the Hazardous Materials Regulations, what is the proper procedure for a driver who discovers an undeclared hazardous material in a shipment? For example, the driver is transporting what the shipper described as "nonhazardous cleaning supplies" but the driver identifies one of the packages as bearing hazard warning labels for Class 8 Corrosive.

A. The driver should stop transporting the load, contact the carrier, and report the undeclared hazardous material — transporting undeclared HazMat creates serious safety risks because proper placarding, documentation, and handling procedures cannot be applied to materials the driver doesn't know about

B. Continue transporting the load because the shipper is solely responsible for accurate material descriptions and the driver has no obligation to verify

C. Remove the Class 8 labels from the package to bring the shipment into conformance with the shipper's "nonhazardous" declaration

D. Add CORROSIVE placards to the vehicle and pencil the Class 8 entry onto the existing shipping papers while continuing to the destination

29. A driver picks up a hazardous materials shipment at a facility that operates 24 hours a day. The shipper provides an emergency response telephone number. The driver asks the shipper what happens if someone calls the number at 3:00 AM on a Sunday morning. The shipper responds, "Oh, that number goes to our receptionist's desk — she works Monday through Friday, 8 to 5." Is this number compliant?

A. Yes, because a facility that operates 24 hours will always have someone available to answer the receptionist's phone regardless of schedule

B. Yes, because the regulations only require the number to be answered during the shipper's published business hours

C. No, but the shipper can satisfy the requirement by adding the notation "24HOUR" next to the number on the shipping papers

D. No, the number must connect to a knowledgeable person 24 hours a day, 7 days a week — a receptionist's desk that is unattended on nights and weekends does not satisfy this requirement

30. A driver transporting placarded hazardous materials is parked at a delivery location when a delivery van parks directly behind the trailer, blocking the placards on the rear of the HazMat vehicle. The delivery van driver says they will only be 5 minutes. Should the HazMat driver be concerned?

A. No, because 5 minutes is too brief to constitute a meaningful obstruction of the rear placards

B. Yes, the rear placards must remain visible at all times — the HazMat driver should ask the delivery van to move or reposition one of the vehicles so emergency responders can see the placards from the rear approach

C. No, because delivery locations are private property where placard visibility requirements do not apply

D. Yes, but only if the HazMat vehicle is carrying Table 1 materials — Table 2 materials have relaxed visibility requirements at delivery sites

TANKER SECTION (Questions 31–50)

31. A tank vehicle driver is making a fuel delivery to a gas station. Before connecting the delivery hose, the driver establishes the grounding connection from the cargo tank to the facility's designated grounding point. The driver then connects the bonding cable between the cargo tank and the fill pipe. Why must grounding be completed before bonding?

A. The grounding cable is heavier and must be connected first to prevent the lighter bonding cable from being pulled out by its weight

B. Grounding provides a visual reference point for the bonding cable connection, and connecting in the wrong order makes it difficult to find the fill pipe

C. The regulations specify the order alphabetically — "grounding" comes before "bonding" — and any deviation constitutes a procedural violation

D. Grounding establishes the safe electrical path to earth first — if bonding were connected before grounding and a static charge existed between the tank and the fill pipe, the bonding connection itself could produce a spark at the moment of contact

32. A loaded tank vehicle approaches a railroad crossing that has no warning signals, gates, or crossbucks — just the tracks crossing the road. The vehicle is placarded. Must the driver stop?

A. No, the absence of any warning devices means this crossing has been deactivated and trains no longer use these tracks

B. Yes, drivers of placarded vehicles must stop at all railroad grade crossings regardless of the type of warning devices present or absent — within 50 feet but not closer than 15 feet from the nearest rail

C. No, the mandatory stop applies only at crossings equipped with active warning devices such as flashing lights or automatic gates

D. Yes, but only if the driver can physically see train tracks — if the tracks are obscured by pavement, the crossing is considered inactive

33. A tank vehicle carrying a lowviscosity liquid in a smooth bore tank at 75 percent capacity is traveling at 50 mph on a straight highway. The driver needs to change lanes to pass a slower vehicle. What is the correct technique for this lane change?

A. Signal and jerk the wheel sharply to complete the lane change in less than one second, minimizing the total time spent between lanes

B. Brake to 30 mph before beginning the lane change, then accelerate back to 50 mph once in the new lane

C. Signal early, check mirrors, and move the steering wheel gradually over several seconds to allow the lowviscosity liquid to shift slowly rather than surge violently — abrupt steering produces aggressive lateral surge in a smooth bore tank

D. Downshift two gears before the lane change to reduce speed through engine braking, then upshift after completing the maneuver

34. A cargo tank driver performing a pretrip inspection opens the manhole cover on compartment 1 and notices condensation (water droplets) on the interior walls and ceiling of the empty compartment. The compartment is supposed to be clean and dry. Should the driver be concerned?

A. Yes, water contamination in a petroleum cargo tank can affect product quality and, for certain chemicals, can cause dangerous reactions — the driver should report the condensation and have the compartment properly dried before loading

B. No, condensation is a natural result of temperature differences between the tank's interior and exterior and has no effect on any product

C. Yes, but only because the water droplets will drip into the product during loading and increase the total delivered volume, causing billing discrepancies

D. No, because the loading process will flush any condensation out through the discharge valve before the product reaches the customer

35. A loaded tank vehicle is traveling at highway speed when the driver feels the steering wheel begin to vibrate rhythmically. The vibration intensifies as speed increases and diminishes when the driver slows down. What is the most likely cause?

A. The liquid cargo is creating a standing wave pattern that resonates with the steering system at specific frequencies

B. The tank's internal baffles have loosened and are vibrating against the tank shell at a frequency that transfers through the frame to the steering column

C. The vehicle's power steering pump is failing, causing intermittent pressure fluctuations that manifest as steering wheel vibration

D. A front tire has developed a balance problem, flat spot, or tread separation — the driver should reduce speed and safely pull over to inspect the tires before a complete failure occurs

36. A driver is preparing to unload a cargo tank at a customer's facility. The customer's designated receiving area has a concrete containment berm around it, designed to capture any spills. The berm is in good condition with no visible cracks. Why is the containment berm important for the driver's unloading operation?

A. The berm provides a flat, level surface for the driver to position the vehicle during the unloading process

B. The berm contains any spilled product within a defined area, preventing it from spreading into drains, waterways, or neighboring properties — this limits environmental damage and simplifies cleanup if a leak or spill occurs during the delivery

C. The berm provides structural support for the heavy delivery hose during the transfer operation

D. The berm is required only for aesthetic purposes to maintain a clean appearance at the delivery facility

37. A tank vehicle driver has just loaded a full cargo of gasoline at a petroleum terminal. Before departing, the driver checks the outage in the last compartment loaded and finds it appears adequate. However, the ambient temperature is 55°F and the product temperature matches ambient. The weather forecast predicts the route will pass through areas reaching 100°F. What should the driver consider about this temperature differential?

A. The 45°F temperature increase will cause the gasoline to expand significantly — the driver should verify that the outage is sufficient for this level of thermal expansion, because outage calculated for 55°F may not accommodate expansion at 100°F

B. Temperature changes have no effect on gasoline because petroleum products are thermally stable at all ambient temperatures

C. The warmer temperatures will cause the gasoline to evaporate faster, reducing the liquid level and actually increasing the outage during the trip

D. The outage is fixed at the time of loading and cannot be adjusted — whatever space exists at 55°F will remain unchanged regardless of temperature

38. A driver operating a loaded MC 331 propane tank truck is making residential deliveries. Between deliveries, the driver is driving on local streets at speeds of 2535 mph. What surge characteristic should the driver expect during this lowspeed urban driving with frequent stops?

A. No surge occurs at speeds below 40 mph because the liquid does not have sufficient kinetic energy to overcome static friction with the tank walls

B. The MC 331 tank's high operating pressure compresses the liquid propane so densely that it behaves like a solid and does not surge at any speed

C. At low speeds, surge forces are weaker than at highway speeds but still present — the frequent stopping for traffic lights, stop signs, and turns creates repeated lowintensity surge cycles that the driver must manage with gentle inputs

D. Surge at low speeds in an MC 331 tank is identical in force to surge at highway speeds because the pressurized liquid amplifies all movement regardless of velocity

39. A tank vehicle driver is delivering fuel to a customer's underground tank through a fill pipe. During the delivery, the driver monitors the product level through the cargo tank's sight glass. Suddenly, the product level in the sight glass drops rapidly — much faster than the normal pump flow rate would produce. What might this indicate?

A. The pump has developed a suction leak, drawing air into the system and reducing the actual product flow to the customer

B. The sight glass has cracked, allowing product to bypass the measuring chamber and creating a false lowlevel reading

C. The fill pipe has separated from the underground tank, and product is flowing into the ground rather than into the receiving tank — the driver should stop pumping immediately and investigate

D. The product is being displaced upward through the underground tank's vent pipe due to thermal expansion in the warmer underground environment

40. A cargo tank equipped with rollover protection valves (ROVs) is involved in a minor sideimpact collision at low speed. The tank does not overturn. After the collision, the driver discovers that product is no longer flowing through one of the discharge valves, even though the valve handle shows the open position. What might have happened?

A. The collision impact may have triggered the rolloveractuated shutoff valve on that discharge line — even without a rollover, a strong lateral impact can activate ROVs, which close the internal valve automatically to prevent product release

B. The collision shifted the cargo tank's position on the trailer, misaligning the discharge piping with the fixed ground connection

C. The product has congealed inside the valve from the impact shock, creating a solid plug that blocks flow

D. The valve handle has broken internally while appearing to be in the open position from the outside

41. A tank vehicle driver arrives at a delivery site and discovers that the customer has placed heavy equipment directly over the underground tank's fill pipe manhole. The equipment would need to be moved before the delivery can begin. The customer says moving the equipment will take approximately 45 minutes. What should the driver do?

A. Wait for the equipment to be moved — the driver should not attempt to deliver through any alternative connection or bypass the designated fill pipe, because using unauthorized connections risks crosscontaminating products or overfilling the wrong tank

B. Deliver the product through the underground tank's vent pipe instead, since both pipes connect to the same tank

C. Leave the product at the customer's gate and depart, with the customer assuming responsibility for pumping it into their tank later

D. Use the vehicle's hose to pump the product onto the ground near the fill pipe, where it will seep through the soil and eventually reach the underground tank

42. A loaded tank vehicle is traveling on a highway when heavy rain begins. The driver reduces speed appropriately for the wet road conditions. After several minutes of rain, the driver approaches a highway curve. What specific concern does the wet surface create for a tank vehicle taking this curve?

A. The wet road will cause the placards to become unreadable, creating a compliance violation during the curve

B. The rain will increase the weight of the liquid cargo through moisture absorption, raising the center of gravity

C. Wet pavement reduces tire traction — in a tank vehicle, reduced traction means the tires have less ability to resist the lateral force from centrifugal acceleration and liquid surge during the curve, lowering the speed at which rollover becomes possible

D. Rain has no effect on a tank vehicle's curvetaking ability because the vehicle's weight provides adequate traction under all weather conditions

43. A driver is performing a pretrip inspection on a cargo tank. The driver checks the tank's external piping underneath the vehicle. One of the discharge pipe runs has a noticeable sag — the pipe droops approximately 2 inches between its support brackets rather than running straight. Is this a concern?

A. No, a 2inch sag between support brackets is within normal tolerance and indicates the pipe has settled into its natural position

B. Yes, a sagging pipe indicates a failed or missing support bracket — the unsupported pipe section can vibrate excessively during highway driving, potentially fatiguing the pipe wall or cracking at connection joints, leading to a leak

C. No, because discharge pipes are designed with intentional low points to ensure complete drainage of product during deliveries

D. Yes, but only if the sag is on the driver's side of the vehicle — passengerside piping sags are acceptable because they are less visible

44. A tank vehicle equipped with a smooth bore tank is loaded to 90 percent capacity with a highviscosity liquid (thick, like syrup). Compared to carrying a lowviscosity liquid (thin, like water) at the same fill level, how does the high viscosity affect surge behavior?

A. High viscosity eliminates all surge because the thick liquid cannot move inside the tank regardless of vehicle speed or maneuver

B. High viscosity amplifies surge because the thick liquid has more mass per unit volume and therefore generates greater force

C. Viscosity has no effect on surge behavior — all liquids produce identical surge forces regardless of how thick or thin they are

D. High viscosity dampens surge — the thick liquid moves more slowly inside the tank, generates less speed during surge events, and hits the tank walls with less force, though it does not eliminate surge entirely

45. A loaded tank vehicle approaches a toll booth on a highway. Several lanes are open. One lane has a sign reading "HAZMAT — USE THIS LANE ONLY." What should the driver do?

A. Use the designated HazMat lane as directed — toll facilities often designate specific lanes for HazMat vehicles to route them through areas with additional clearance, ventilation, or emergency equipment

B. Use any open lane because toll booth lane designations are advisory only and HazMat vehicles have priority access to all lanes

C. Stop before the toll booth and call the facility operator to verify the sign before proceeding through any lane

D. Use the lane farthest from the toll booth attendant to minimize the attendant's exposure to the hazardous materials

46. A driver operating a partially loaded (40%) baffled tank vehicle approaches a Tintersection where the driver must make a left turn. The turn requires the driver to stop, then accelerate through a 90degree left turn onto the cross street. What surge effects should the driver anticipate during this stopandturn combination?

A. No surge occurs during turns at Tintersections because the 90degree angle cancels all lateral forces through geometric equilibrium

B. The baffles will redirect all surge energy downward during the left turn, compressing the liquid into the bottom of the tank

C. The liquid will surge forward when the driver stops, then surge to the right (outside of the left turn) as the driver accelerates through the turn — the 40% fill level provides extensive room for both surges

D. The liquid will surge to the left (inside of the turn) during the left turn, lowering the center of gravity and stabilizing the vehicle

47. A tank vehicle driver completes a delivery and the tank is now empty. While stowing equipment, the driver notices a small crack in the delivery hose approximately 6 inches from one of the coupling ends. The crack does not go completely through the hose wall — it appears to be a surface crack only. Can the driver continue using this hose for the next delivery?

A. Yes, because surface cracks are cosmetic and only throughwall cracks affect hose integrity during pressurized product transfer

B. Yes, as long as the driver wraps the cracked area with hose repair tape before the next delivery to reinforce the weakened section

C. No, but the driver can cut the hose 12 inches from the coupling and reattach the coupling to the shortened hose

D. No, the surface crack indicates the hose material is deteriorating and could fail under pump pressure during the next delivery — the hose should be removed from service and replaced

48. A driver operating a loaded tank vehicle feels the vehicle pull to the right during braking. The pull occurs only during brake application, not during normal driving. The driver is carrying a nonhazardous liquid. What is the most likely cause and what should the driver do?

A. The liquid cargo has permanently shifted to the right side of the tank, creating a weight imbalance that manifests only during braking

B. A brake on the right side is grabbing harder than the left, creating asymmetric braking force — the driver should have the brakes inspected because uneven braking in a tank vehicle can cause directional control problems during emergency stops

C. The road surface is crowned (higher in the center), and the crown becomes more noticeable during braking as the vehicle's weight shifts forward

D. The pull is caused by the liquid surging to the right during braking, which is a normal surge characteristic of all tank vehicles

49. A tank vehicle driver has been assigned a new route that includes a section of highway with a steep 9 percent downgrade lasting 4 miles. The driver has experience with 6 percent grades but has never driven a 9 percent grade with a loaded tank vehicle. What should the driver know about the difference between a 6 percent and 9 percent grade?

A. A 9 percent grade is 50 percent steeper than a 6 percent grade — the liquid's forward gravitational component is significantly greater, requiring a lower gear selection, earlier speed reduction, and more disciplined use of engine braking and controlled service brake applications to prevent speed buildup

B. The difference between 6 percent and 9 percent grades is negligible for loaded tank vehicles because the liquid cargo's weight provides enhanced braking through tiretoroad friction

C. A 9 percent grade requires the driver to shift to neutral and rely exclusively on the service brakes for the entire 4mile descent

D. The 3percentagepoint difference between 6 and 9 percent has no practical effect on driving technique or vehicle handling for an experienced tank vehicle operator

50. A loaded tank vehicle has been sitting in direct sunlight at a delivery site for three hours on a day when the ambient temperature is 105°F. Before departing, the driver checks the pressure gauge on the cargo tank and finds the reading is higher than it was at the terminal this morning. The pressure is still below the MAWP. Should the driver be concerned?

A. Yes, any pressure increase during the day indicates a malfunction in the tank's venting system that requires immediate repair

B. Yes, because the pressure will continue rising indefinitely as the day progresses, eventually exceeding the MAWP and rupturing the tank

C. No, the pressure increase is a normal thermal effect — as the liquid absorbs heat, it expands and produces more vapor, raising headspace pressure — as long as the reading remains below the MAWP, the tank is operating within design limits

D. No, because the pressure gauge is unreliable in high temperatures and the reading should be disregarded until the vehicle returns to a shaded area

Practice Exam 19: Answer Key and Explanations

1. A — The burning sensation confirms the dripping liquid is the corrosive cargo, not water. The driver's immediate first priority is personal safety — flushing the affected skin with large amounts of water to remove the corrosive and prevent deeper tissue damage. After addressing the skin exposure, the driver should move upwind from the leak and contact the carrier for guidance on the leaking fitting.

2. C — Emergency response information specific to the hazardous material being transported must be immediately accessible in the cab at all times during transport. This information must be included with or attached to the shipping papers so that anyone accessing the papers also finds the emergency response data. It provides material-specific hazard information, protective actions, and first aid instructions.

3. B — Division 4.1 Flammable Solid materials that are unusually warm may be undergoing self-heating or an internal reaction. An abnormally warm package indicates something has changed in the material's condition that could progress to ignition. The driver should refuse the package and alert the shipper to investigate the cause of the elevated temperature immediately.

4. D — Both Division 2.3 Poison Gas and Division 4.3 Dangerous When Wet are Table 1 materials requiring their specific placards at any quantity — 400 pounds and 300 pounds respectively trigger both automatically. The Class 3 Flammable Liquid at 500 pounds does not independently reach the 1,001-pound Table 2 threshold, so no FLAMMABLE placard is required.

5. A — A smoking tire near Class 3 Flammable Liquid drums creates an immediate fire risk. Tire friction generates intense heat that could ignite flammable vapors, and a full tire fire near flammable cargo could be catastrophic. The driver must pull over immediately and assess whether the tire situation can be safely addressed before it escalates to open flame.

6. C — The emergency response telephone number must connect to a person knowledgeable about the specific hazardous material being transported, or to a person with immediate access to such expertise. While 911 dispatchers are trained for general emergencies, they cannot provide the material-specific technical guidance that HazMat responders need during the critical first minutes of an incident.

7. B — When shipping papers are inaccessible, the placards visible on the overturned vehicle become the primary identification tool. The driver should tell responders about the EXPLOSIVES 1.1 placards, any identification numbers displayed, and whatever details the driver remembers — material name, quantity, number of packages. This information allows responders to begin appropriate response procedures.

8. D — The "HOT" designation before the proper shipping name indicates the material is being transported at a temperature high enough to cause severe burns on contact — at or above 212°F for liquids and 464°F for solids. This thermal burn hazard exists in addition to any chemical hazard the material presents and requires all personnel near the vehicle to exercise extreme caution.

9. A — When individual Table 2 materials each independently exceed the 1,001-pound threshold, each requires its own class-specific placard. DANGEROUS placards may only substitute when no single class independently reaches 1,001 pounds. Since both Division 5.1 and Class 8 independently exceed the threshold at 1,100 pounds each, both OXIDIZER and CORROSIVE placards must be displayed.

10. D — A person standing in the travel lane on an otherwise empty road at night creates an ambiguous situation. The driver should slow down and move to an adjacent lane if safe, proceeding cautiously rather than stopping in a remote location with a placarded vehicle. The driver should be prepared to call 911 if the person appears to genuinely need assistance, while maintaining awareness of potential security threats.

11. C — The limited quantity exemption is based on the quantity per inner container within each package, not on the total weight of all packages in the shipment. If each individual package meets the per-container quantity limits specified in the regulations, the exemption applies regardless of how many packages are in the total shipment. The 2,500-pound total weight does not void the exemption.

12. A — Military shipping papers that contain all required regulatory information elements — proper shipping name, hazard class, identification number, packing group, quantity, emergency response information, and certification — are acceptable for highway transport. The regulations specify what information must be present, not what specific form or template must be used.

13. D — The driver must follow the farm tractor at a safe distance and remain patient. Crossing a double yellow line to pass is illegal regardless of the traffic buildup behind. For a HazMat vehicle, a head-on collision in the opposing lane while attempting to pass would produce catastrophically amplified consequences — fire, explosion, toxic release, or environmental contamination.

14. B — A carrier's HazMat security plan must address three core areas: personnel security measures (background checks, training, access controls), unauthorized access prevention (securing vehicles and cargo during stops and storage), and en route security protocols (route planning, stop selection, and procedures to reduce vulnerability to theft, sabotage, or diversion during transport).

15. C — Shifted cargo can continue to shift during subsequent braking, cornering, or rough road conditions. The 6-inch shift indicates the securement system has partially failed, and the remaining

straps may not hold if the cargo shifts further. The driver must re-secure the drums using replacement straps or other available devices before continuing.

16. A — Highlighting hazardous material entries in a contrasting color (yellow) is one of the accepted methods for distinguishing HazMat entries from non-hazardous entries on the same shipping paper. The three highlighted entries are hazardous materials; the unhighlighted fourth entry is non-hazardous freight. The highlighting enables immediate visual identification.

17. D — Extended time in dense urban traffic creates multiple HazMat-specific concerns. Stop-and-go driving produces repeated surge cycles in liquid cargo. The dense urban environment amplifies the consequences of any incident — more people exposed, more property at risk, and more difficulty for emergency response. The congestion also limits the driver's ability to move the vehicle in an emergency.

18. B — The attendance requirement creates a practical tension with the driver's basic needs. While the driver technically cannot see the vehicle from inside the restroom, brief restroom stops are an operational necessity. The driver should minimize time away, return promptly, and consider the specific risks of the cargo and location when deciding how to manage brief absences.

19. C — Division 6.2 Infectious Substances must not be loaded in the same vehicle with foodstuffs or materials intended for use in food preparation, processing, or serving. Even though the packaging materials are non-hazardous, their destination at a food processing plant means they are materials intended for food use. The combination is prohibited regardless of packaging integrity.

20. A — Packing Group II represents moderate corrosive strength within Class 8. PG I materials are the most aggressive corrosives — causing visible tissue destruction within very short exposure times. PG III materials are the mildest. PG II falls between, with packaging, handling, and quantity thresholds scaled to match this intermediate danger level.

21. B — Any driver transporting any quantity of a placarded hazardous material must hold a valid HazMat endorsement. Division 2.3 Poison Gas is Table 1, requiring POISON GAS placards at any quantity — even 300 pounds. Since the material requires placards, the driver must have the endorsement. There is no minimum weight exemption for Table 1 materials.

22. D — The immediate priority is securing the vehicle on the steep grade to prevent it from rolling. The driver should chock the wheels, set out reflective triangles to warn approaching traffic, activate hazard flashers, and call for assistance. A loaded HazMat vehicle rolling uncontrolled on a steep grade could cause a catastrophic incident. Engine restart attempts come after the vehicle is secured.

23. A — When Column 6 of the Hazardous Materials Table requires both a primary and subsidiary label, the vehicle must display both corresponding placards. The FLAMMABLE placard communicates the primary Class 3 hazard and the CORROSIVE placard communicates the subsidiary Class 8 hazard. Both are required on all four sides at 2,000 pounds (exceeding the 1,001-pound threshold).

24. C — Multiple simultaneous warning lights with new vibration indicate a serious mechanical failure in progress. Continuing to drive risks engine seizure (sudden loss of power and steering assist), engine fire (from oil or coolant on hot surfaces), or complete loss of vehicle control. The driver must pull over immediately and shut off the engine before the situation escalates.

25. B — Any potential threat to the security of a placarded HazMat vehicle — including overheard plans for unauthorized access to parked trucks — should be reported to truck stop management or law enforcement. Even though the strangers may be targeting fuel rather than cargo, unauthorized access to a HazMat vehicle creates both safety and security risks that warrant reporting.

26. D — The trailer should be cleaned of all debris before loading hazardous materials. Loose wooden pallets and plastic wrap can cause packages to shift, slide, or become unstable during transport. Additionally, wood and plastic near Class 3 Flammable Liquid represent additional fuel in case of a fire, potentially intensifying any fire that occurs.

27. C — The protective valve cap shields the valve from impact damage during transport. An exposed valve is vulnerable to strikes from road debris, shifting cargo, or contact during handling. If the valve stem is sheared off by impact, the cylinder's entire contents will release rapidly and uncontrollably. The cap must be replaced or securely reattached before continuing.

28. A — Undeclared hazardous material is a serious safety problem. Without proper documentation, the correct placards are not displayed, emergency responders would not know the material is present in an accident, and the driver cannot follow the correct handling procedures. The driver should stop transporting the load and report the situation to the carrier immediately.

29. D — The emergency response telephone number must connect to a knowledgeable person 24 hours a day, 7 days a week. A receptionist's desk attended only Monday through Friday, 8 to 5, leaves nights, weekends, and holidays uncovered. HazMat incidents occur at all hours, and emergency responders need immediate access to material-specific technical guidance regardless of the time or day.

30. B — Placards must remain visible from all four approach directions at all times, including when the vehicle is parked. A delivery van blocking the rear placards prevents emergency responders approaching from behind from identifying the hazardous cargo. The HazMat driver should ask the van to move or reposition one of the vehicles to maintain four-sided visibility.

31. D — Grounding must be established first to create the safe electrical path from the vehicle to earth. If the bonding cable were connected first and a static charge existed between the cargo tank and the fill pipe, the act of connecting the bonding cable could produce a spark at the metal-to-metal contact point. With grounding already in place, the bonding connection is made safely.

32. B — Drivers of placarded HazMat vehicles must stop at all railroad grade crossings regardless of the type or presence of warning devices. Even a crossing with no signs, no signals, and no gates requires a full stop within 50 feet but not closer than 15 feet from the nearest rail. The driver must look and listen before proceeding.

33. C — A lane change in a smooth bore tank carrying low-viscosity liquid at 75 percent capacity must be executed gradually. Abrupt steering generates aggressive lateral surge because the thin liquid flows freely and builds speed quickly. Gradual steering over several seconds allows the liquid to shift slowly and predictably, maintaining vehicle stability throughout the maneuver.

34. A — Water contamination in a cargo tank can cause product quality problems for petroleum products and dangerous chemical reactions for certain chemicals. The condensation indicates the compartment was not properly dried after cleaning, or moisture has entered through a seal or vent. The driver should report the finding and have the compartment dried before loading.

35. D — Rhythmic steering wheel vibration that increases with speed is a classic symptom of a front tire problem — imbalance, flat spot, or tread separation. In a loaded tank vehicle, a front tire failure at highway speed can cause sudden loss of steering control with catastrophic consequences. The driver should reduce speed and safely pull over to inspect the tires immediately.

36. B — A containment berm around the delivery area captures any spilled product within a defined boundary. This prevents the product from flowing into storm drains, waterways, soil, or neighboring properties. If a hose connection fails, a fitting leaks, or an overfill occurs during delivery, the berm contains the released product and simplifies cleanup.

37. A — A 45°F temperature increase from 55°F to 100°F will cause the gasoline to expand significantly. The outage calculated at 55°F may not provide enough space for the expanded volume at 100°F. If the liquid expands beyond the available outage, the tank becomes hydraulically full and dangerous overpressure develops. The driver should verify outage adequacy for the expected temperature range.

38. C — Surge occurs at all speeds, including the low speeds typical of urban residential deliveries. While the forces are weaker at 25-35 mph than at highway speeds, the frequent stopping for traffic lights, stop signs, turns, and customer driveways creates repeated surge cycles. The driver must manage these with gentle brake and throttle inputs throughout the urban delivery route.

39. C — A rapid, unexpected drop in the cargo tank's product level far exceeding the normal pump flow rate suggests the product is going somewhere other than the receiving tank. The most likely cause is a separation or failure in the underground piping or fill connection, allowing product to flow into the ground. The driver must stop pumping immediately and investigate.

40. A — Rollover-actuated shutoff valves (ROVs) can be activated by strong lateral impact forces even without a full rollover. The ROV senses the abnormal force and closes the internal valve automatically to prevent product release. The valve will not reopen from the external handle because the ROV's internal mechanism has locked the valve closed. The system requires professional resetting.

41. A — The driver should wait for the customer to move the equipment and deliver through the designated fill pipe. Using alternative connections, vent pipes, or unauthorized access points risks cross-contaminating products, overfilling the wrong tank, or creating delivery errors. The designated fill pipe is the only authorized delivery point.

42. C — Wet pavement reduces tire traction, which directly affects the maximum speed at which a tank vehicle can safely navigate a curve. With reduced traction, the tires have less ability to resist the lateral force from centrifugal acceleration and liquid surge. The speed at which rollover or skidding becomes possible is lower on wet roads than on dry roads.

43. B — A sagging pipe between support brackets indicates a failed, missing, or weakened bracket. The unsupported pipe section vibrates freely during highway driving, and this vibration concentrates stress at the connection points where the pipe meets fittings or other piping. Over time, this cyclic stress can cause metal fatigue, cracking, and eventually a product leak.

44. D — High-viscosity liquids move more slowly inside the tank than low-viscosity liquids. They build momentum more gradually, travel less distance during a surge event, and arrive at the tank walls with less speed and force. This dampening effect reduces — but does not eliminate — surge forces compared to thin liquids like water or gasoline at the same fill level.

45. A — The driver should use the designated HazMat lane as directed. Toll facilities often designate specific lanes for HazMat vehicles to route them through areas with additional safety features — wider clearance, enhanced ventilation, proximity to emergency equipment, or separation from toll booth attendants and electronic payment systems.

46. C — The stop-and-turn combination at a T-intersection creates two sequential surge events. First, the liquid surges forward when the driver stops. Then, as the driver accelerates through the 90-degree left turn, the liquid surges to the right (outside of the left turn). At 40 percent capacity, the liquid has extensive room for both forward and lateral movement.

47. D — A surface crack in a delivery hose indicates the hose material is deteriorating. Under pump pressure during the next delivery, the weakened area could fail suddenly — splitting open or blowing out and releasing product under force. Surface cracks that appear minor can propagate rapidly under pressure. The hose should be removed from service and replaced.

48. B — A vehicle that pulls to one side only during braking indicates asymmetric brake force — one side is grabbing harder than the other. In a tank vehicle, this asymmetric braking creates a rotational moment that can cause directional control problems during hard braking. The driver should have the brakes inspected and corrected to ensure even braking on both sides.

49. A — A 9 percent grade is 50 percent steeper than a 6 percent grade, and the difference in gravitational force pulling the vehicle downhill is significant. The liquid's forward gravitational component is substantially greater, requiring a lower gear selection for engine braking, earlier speed reduction before the descent begins, and more disciplined brake management throughout the 4-mile downgrade.

50. C — The pressure increase is a normal thermal effect of the liquid absorbing heat from three hours of direct sunlight at 105°F. As the liquid warms, it expands and produces more vapor, raising the headspace pressure. As long as the reading remains below the MAWP, the tank is operating within its design limits and the pressure relief system provides protection if conditions change.