Petroleum Inspector Certification Program

Test Questions(Americas Version)

6th Edition, August 2010

International Federation of Inspection Agencies

Petroleum Inspector Certification Program

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[6th Edition, August 2010]

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Table of Contents

6th Edition, August 2010

SECTION 1 - CALCULATIONS

1.1 As the density of a material increases, the API Gravity?

a. becomes higher
b. becomes lower
c. is not changed
d. none of the above

1.2 Density of any substance is the ratio of its mass to its volume, usually at a specified temperature. *Relative Density* is the ratio of the density of a substance at a specified temperature to an equal volume of?

a. Pure ethanol at a specified temperature
b. Acetone at a specified temperature
c. Pure water at a specified temperature
d. Vegetable oil at a specified temperature

1.3 When a capacity table indicates a reference API Gravity and an API Gravity correction per barrel variance for a shore tank, the following data must be available to calculate a floating roof correction?

a. Weight of the roof only
b. API Gravity of the contents at 60□F; API Gravity for which the capacity table was calculated; Barrels of correction for each degree of difference in API Gravity
c. Observed API Gravity of the contents; Weight of the roof; Barrels of corrections for each degree of difference in API Gravity
d. Observed API Gravity of the contents; API Gravity for which the capacity table was calculated; Barrels of correction for each degree of difference in API Gravity

1.4 When calculating the Gross Standard Volume (GSV) in a shore tank, the term "CTL" means the same as?

a. Vessel Experience Factor (VEF)
b. Volume Correction Factor (VCF)
c. Weight Correction Factor (WCF)
d. Voyage Analysis Report (VAR)

1.5 If a cargo does not contain S&W, the Gross Standard Volume and the Net Standard Volume are the same.

a. True
b. False

1.6 For a crude oil cargo, what information does the formula GOV x VCF give?

a. GSV (Gross Standard Volume)
b. NSV (Net Standard Volume)
c. TCV (Total Calculated Volume)
d. VCF (Volume Correction Factor)

1.7 The Total Calculated Volume is equal to the Gross Standard Volume plus?
a. Free water
b. S&W
c. Roof Correction
d. Free Water and S&W

1.8 For a trim correction to apply, which of the following conditions must exist?
a. Vessel must be down by the stern
b. Liquid may not contact the forward bulkhead
c. Liquid must touch all four bulkheads
d. All of the above

1.9 Roof corrections must be based on?
a. The observed API Gravity of the oil in the tank
b. The API Gravity at 60°F of the oil in the tank
c. The barrels per inch calculated from the tank capacity table
d. The critical zone

1.10 Barge tanks do not require trim corrections because they are too small for a correction to make a significant difference.
a. True
b. False

1.11 When a properly-functioning automatic in-line sampler is used during the discharge of a crude oil vessel, the resulting sample will include?
a. Oil and S&W
b. Oil, S&W and sludge
c. Oil, S&W & Free Water
d. S&W and Free Water only

1.12 A tank has a measured gauge height of 45' (13.72m) and is filled to a 40' (12.19m) innage with no free water. Cont'd
To take a middle spot sample, you must lower the sampler into the tank?
a. 20' (6.10m) below the reference gauge point

b. 22.5' (6.86m) below the reference gauge point
c. 25' (7.62m) below the reference gauge point
d. 25' (7.62m) from the tank bottom

1.13 A tank has a measured gauge height of 45' (13.72m) and is filled to a 30' (9.14m) innage with no free water. To take a lower spot sample, you must lower the sampler into the tank?

a. 10' (3.05m) below the reference gauge point
b. 15' (4.57m) above the tank bottom
c. 30' (9.14m) below the reference gauge point
d. 40' (12.19) below the reference gauge point

1.14 A tank has a measured gauge height of 45' (13.72m) and is filled to a 36' (10.97m) innage with no free water. To take an upper spot sample, you must lower the sampler into the tank?

a. 12 (3.66m) feet above the tank bottom
b. 15 (4.57m) feet below the reference gauge point
c. 21 (6.40m) feet below the reference gauge point
d. 15 (4.57m) feet above the tank bottom

1.15 A tank has a measured gauge height of 45' (13.72m) and is filled to a 40' (12.19m) innage with no free water. To take a top spot sample you must lower the sampler into the tank?

a. 5’ 00” (1.52m) below the reference gauge point
b. 5’ 06” (1.68m) below the reference gauge point
c. 11’ 08” (3.56m) below the reference gauge point
d. 12’ 06” (3.81m) below the reference gauge point

1.16 The API gravity of water at 60°F is?

a. 6
b. 10
c. 15
d. 1.0

1.17 The term *specific gravity* has been replaced by the term?

a. API gravity
b. Density in vacuum
c. Relative density
d. Density in air

1.18 When a vessel’s capacity tables are not calculated to 1/8", 0.01', or 3 mm, you should interpolate to calculate the volume at the gauged level in the tank.

a. True
b. False

1.19 When the API gravity at observed temperature of a crude oil is known, what table would you use to find the API gravity at 60°F?
a. Table 5A
b. Table 5B
c. Table 24A
d. Table 24B

1.20 In what units is a metric tape graduated?
a. Millimeters
b. Milliliters
c. Hundredths of a foot
d. Percentages

1.21 How many centimeters equals one inch?
a. 3.16
b. 2.75
c. 2.54
d. None of the above

1.22 What is another name for relative density?
a. Density in vacuum
b. Density in air
c. Specific Gravity
d. Gravity by pycnometer

1.23 What is the equivalent of 0°Celsius on the Fahrenheit scale?
a. 0° F
b. 12° F
c. 50° F
d. 32° F

1.24 A product has an API gravity at standard temperature of 21.3. What table would be used to find the equivalent density at 15 degrees Celsius?
a. Table 8
b. Table 11
c. Table 3
d. Table 6B

1.25 What table should be used to convert barrels at 60°F to long tons?

a. Table 8
b. Table 11
c. Table 13
d. Table 6B

1.26 A list correction is most similar to which of the following calculations?
a. A wedge formula
b. A vessel experience factor
c. A voyage ratio
d. A trim correction

1.27 The correction for the effect of temperature on the shell of a shore tank does not need to be calculated if the contents of the tank are at 60°F.
a. True
b. False

1.28 It is necessary to know the Vessel Experience Factor of a ship before you can accurately determine whether there has been a transit loss or gain of cargo.
a. True
b. False

1.29 Which API MPMS Chapter contains guidelines for the Calculation of Petroleum Quantities?
a. Chapter 3
b. Chapter 8
c. Chapter 12
d. Chapter 17

1.30 Who decides whether to apply a line displacement difference to a shore figure?
a. Terminal personnel
b. Inspection company personnel
c. The Buyer and Seller
d. U. S. Customs

SECTION 2 - DEFINITIONS

2.1 API Gravity is a scale that indicates?

a. Density
b. Weight
c. Thickness
d. Ratio of weight to density

2.2 A hydrometer is?

a. A device to measure viscosity
b. A device to measure hydration
c. A device to measure density
d. A device to measure the effect of a meter

2.3 Ballast is?

a. Water in the tanks of a vessel used for laundry and other sanitation purposes
b. Any water on board a vessel in any tank
c. Water that is used to clean cargo tanks
d. Water that allows the vessel to maintain stability and control stress and trim

2.4 A permanent ballast tank is?

a. A tank that contains ballast at all times
b. A tank that is designated to contain only ballast
c. A tank that is used only to maintain a permanent list condition
d. None of the above

2.5 The abbreviation S&W stands for?

a. Sand and Water
b. Sediment and Waste
c. Scale and Water
d. Sediment and Water

2.6 A US barrel is a volume of?

a. 55 U.S. gallons
b. 1 cubic meter
c. 5 liters
d. 42 U.S. gallons

2.7 A Bill Of Lading is?

a. A bill is issued by the vessel against which freight charges are paid
b. A document describing the quantity and material accepted by a vessel

c. A document issued by the terminal showing what was loaded
d. A bill issued by the receiver to the shipper

2.8 Clingage is?

a. The wedge shaped volume of oil remaining in a tank after discharge
b. The non-liquid wedge-shaped volume of oil remaining in a tank after discharge
c. The cargo that adheres to the internal vertical surfaces of a tank after it has been emptied.
d. The ability of a liquid to cling to the inside surface of a container

2.9 A datum plate is?

a. A level metal plate located directly under the reference gauge point to provide a fixed contact surface from which liquid depth measurement can be made
b. A metal plate located next to the gauging point on a tank indicating the reference gauge height
c. A metal plate located close to the gauging point on a tank listing all the relevant tank data
d. A level metal plate located at the top of a gauge hatch on a tank from which the gauge height is measured

2.10 Deadwood is?

a. A wooden cup-case thermometer cases that are no longer fit for use
b. Any piece of gauging equipment made of wood (i.e. wooden handles of gauge tapes, cup-case thermometer cases) that have been exposed to chemicals and have been damaged as a result
c. Any tank fitting or structural member inside a tank that affects the capacity of the tank
d. None of the above

2.11 Density is?

a. The ratio of length to width
b. The ratio of volume to temperature
c. The ratio of mass to volume
d. The ratio of mass to specific gravity

2.12 The density of a liquid will change as its temperature changes.

a. True
b. False

2.13 An emulsion is?

a. A heavy viscous liquid
b. A heavy viscous liquid containing a large amount of entrained sediment
c. An oil & water mixture that does not readily separate
d. A layer of free water located above a heavy viscous petroleum product

2.14 Total Observed Volume (TOV) is?

a. The total measured volume of all petroleum liquids, sediment and water, and free water at observed temperature
b. The total measured volume of all petroleum liquids, sediment and water but excluding free water, at observed temperature
c. The total volume of all petroleum liquids and sediment and water, corrected by the appropriate volume correction factor, for the observed temperature and API Gravity, to a standard temperature
d. The total measured volume of all petroleum liquids excluding water and sediment, at observed temperature

2.15 Gross Observed Volume (GOV) is?

a. The total measured volume of all petroleum liquids, sediment and water, and water at observed temperature
b. The total volume of all petroleum liquids and sediment and water, excluding free water, at observed temperature
c. The total volume of all petroleum liquids excluding sediment and water and free water, at observed temperature
d. The total volume of all petroleum liquids and sediment and water, excluding free water, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature

2.16 Gross Standard Volume (GSV) is?

a. The total volume of all petroleum liquids excluding free water, water and sediment, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature
b. The total volume of al petroleum liquids including free water, water and sediment, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature

c. The total volume of all petroleum liquids and sediment and water, excluding free water, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature
d. The total volume of all petroleum liquids including free water but excluding sediment and water, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature

2.17 Net Standard Volume (NSV) is?

a. The total volume of all petroleum liquids, excluding sediment and water and free water, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature
b. The total volume of all petroleum liquids, excluding sediment and water, but including free water, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature
c. The total volume of all petroleum liquids and free water, excluding sediment and water, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature
d. The total volume of all petroleum liquids and sediment and water and free water, corrected by the appropriate volume correction factor for the observed temperature and API Gravity, to a standard temperature

2.18 Total Calculated Volume (TCV) is?

a. GSV plus free water
b. NSV plus free water
c. GSV less sediment and water
d. NSV plus sediment and water

2.19 An all levels sample is obtained by?

a. Submerging an unstoppered beaker or bottle to a point near the tank draw-off (suction) level and then raising it, all at a uniform rate, so that it is no more than 50% full on emerging from the liquid
b. Blending upper, middle and lower samples from the same tank
c. Submerging a stoppered beaker or bottle to a point as near as possible to the draw-off (suction) level, then opening the container and raising it at a rate such that it is 70% to 85% full as it emerges from the liquid

d. Submerge a stoppered beaker or bottle to the mid point of the product in a tank, then opening the sampler and raising and lowering it at a uniform rate until the sampler is full.

2.20 A running sample is?

a. Obtained by lowering an unstoppered beaker or bottle from the top of the oil to the level of the outlet (Suction) and returning it to the top of the oil at a uniform rate so that the beaker or bottle is 70% to 85% full when withdrawn from the oil
b. Obtained by lowering a stoppered beaker or bottle to the level of the outlet, then opening the sampler and raising it at a uniform rate so that it is about 50% full when withdrawn from the oil
c. Obtained by lowering a stoppered beaker to the mid point of the tank contents, then opening the sampler and raising and lowering it at a uniform rate until it is full
d. Obtained by lowering an unstoppered beaker or bottle to the mid point of the tank contents, then raising and lowering it at a uniform rate until it is full

2.21 A floating roof tank is?

a. A tank that floats on its roof
b. A tank in which the roof floats freely on the surface of the liquid contents except at low levels when the weight of the roof is supported by its legs
c. A tank in which the roof, supported by guide wires, can be adjusted to the required height for safe filling of the tank
d. None of the above

2.22 The total volume of everything in a tank at the observed temperature is called?

a. Total Calculated Volume (TCV)
b. Total Observed Volume (TOV)
c. On Board Quantity (OBQ)
d. Gross Observed Volume (GOV)

2.23 The volume of all material in a tank at the observed temperature less the free water is called?

a. Total Observed Volume (TOV)
b. Gross Standard Volume (GSV)
c. Gross Observed Volume (GOV)
d. Remaining On Board (ROB)

2.24 The volume of all material in a tank, less the free water, corrected by the volume correction factor is called?

a. Gross Standard Volume (GSV)
b. Gross Observed Volume (GOV)
c. Total Calculated Volume (TCV)
d. Net Standard Volume (NSV)

2.25 The Net Standard Volume (NSV) is the Gross Standard Volume (GSV) less?

a. Total Calculated Volume (TCV)
b. Total Observed Volume (TOV)
c. Gross Standard Volume (GSV)
d. Sediment and Water (S&W)

2.26 The reference gauge height of a tank is the distance from the?

a. Tank top to the tank bottom
b. Ullage hatch to the datum plate
c. Reference gauge point to the tank bottom or datum plate as documented.
d. Tank bottom to the ullage hatch

2.27 A vessel with the forward draft greater than the aft draft is said to be?

a. Down by the stern
b. Down by the head
c. Up at the bow
d. Listing dangerously

2.28 An innage gauge measures?

a. The depth of the empty space above the liquid in a tank
b. The depth of the sediment in a tank
c. The length of an innage tape
d. The depth of the liquid in a tank

2.29 An ullage gauge measures?

a. The depth of the empty space above the liquid in a tank
b. The height of the free water in a tank
c. The length of an ullage tape
d. The depth of the liquid in a tank

2.30 The amount specified to be paid by the Charterer if a vessel is delayed beyond the terms allowed in the Charter Party is called?

a. Dispatch money
b. Demurrage

c. Disbursement
d. Penalty money

2.31 A document which is given as an official receipt for the cargo on board a vessel is called?
a. Certificate of Quantity
b. Manifest
c. Bill of Lading
d. Charter party

2.32 The name given to the factor calculated by comparing the ratio of historical Total Calculated Volumes (TCV) of a vessel (less OBQ/ROB) with the corresponding historical Total Calculated Volumes (TCV) of shore delivered volumes is?
a. Voyage Analysis Factor
b. Tank Correction Factor
c. Vessel Experience Factor
d. Ullage Correction Factor

2.33 The mixture of oil, tank washings, water and sediment found in a designated ship's tank is called?
a. Polluted oil
b. Merchantable oil
c. Slops
d. Hazardous waste

2.34 The Total Observed Volume (TOV) is defined by API MPMS Chapter 17.1 as?
a. The volume read from the strapping table
b. The total measured volume of all petroleum liquids, sediment and water, and free water at observed temperature and pressure
c. The volume read from the strapping table corrected for roof displacement
d. The volume used to calculate a Vessel Experience Factor (VEF)

2.35 The Gross Observed Volume (GOV) is defined by API MPMS Chapter 17.1 is?
a. The volume read from the strapping table
b. The total volume of all petroleum liquids and sediment and water, excluding free water, at observed temperature and pressure
c. The volume read from the strapping table corrected for roof displacement

d. The volume used to calculate vessel ratios

2.36 Draft is defined as?

a. The distance from the surface of the water to the keel of the ship.
b. The distance from the deck of the ship to the surface of the water
c. The distance from the Plimsoll mark to the bottom of the ship
d. The distance from the Plimsoll mark to the deck

2.37 Trim is defined as?

a. The same as the draft
b. The difference between the forward and aft draft
c. The average of the forward draft, the amidships draft, and the aft draft
d. The leaning of the vessel to one side

2.38 List is defined as?

a. The difference between the starboard draft and the port freeboard
b. The leaning or inclination of a vessel expressed in degrees to port or starboard
c. The average of the starboard draft and the port draft expressed in degrees port or starboard
d. The difference between the forward and aft draft

2.39 The definition of free water is?

a. The volume of water present in the tank that is not suspended in the oil
b. Any water found on the bob with water paste
c. Any water found using the M.M.C.
d. Any water that is trim corrected

2.40 The term innage has the same meaning as?

a. Ullage
b. Sounding
c. Outage
d. None of the above

2.41 The term 'Load on Top" is?

a. The shipboard practice of collecting water and settling water and oil mixtures resulting from ballasting and tank cleaning operations (usually in a slop tank) and subsequently loading cargo on top of and pumping the mixture ashore at the discharge port

b. Loading oil on to the deck of the vessel
c. Both of the above
d. Neither of the above

2.42 A Wall Wash test is?

a. The activity of rinsing a tank wall with a solvent to determine its compatibility with the product to be placed into the tank
b. The activity of rinsing a tank with clear, fresh water following tank cleaning to ensure its compatibility with the product to be placed into the tank
c. The activity of washing the walls of a tank to remove all traces of the product previously contained in the tank
d. All of the above

SECTION 3 - LOSS CONTROL

3.1 If a cargo contains excessive amounts of free water, the parties may want to know where the excess water originated. Which API MPMS chapter provides guidelines for identifying the source of free water?

a. Chapter 3
b. Chapter 7
c. Chapter 8
d. Chapter 17

3.2 For the purpose of voyage analysis, a *simple voyage* is?

a. A voyage from one load port to one discharge port with one cargo
b. A voyage from one load port to one discharge port with any number of cargoes
c. A voyage where all measurements were taken with automatic equipment only
d. A voyage that relied on carefully calibrated meters at both the load port and the discharge port

3.3 After deducting the OBQ or ROB, the volume used to calculate a vessel experience factors [VEF] is?

a. TCV (Total Calculated Volume)
b. TOV (Total Observed Volume)
c. GSV (Gross Standard Volume)
d. GOV (Gross Observed Volume)

3.4 The *Voyage Analysis Report (VAR)* form has the primary function of?

a. Providing a method for adjusting vessel figures for the Vessel Experience Factor (VEF)
b. Systematically placing all data required for voyage analysis on one page
c. Convincing shippers that the Bill of Lading is overstated
d. Convincing receivers that there was a problem in the terminal that caused part of the cargo to be incorrectly measured

3.5 Which of the following steps is *not included* in the basic voyage analysis process?

a. Comparing Bill of Lading figures to outturn figures
b. Comparing vessel sailing figures to vessel arrival figures
c. Comparing ROB to OBQ
d. Comparing line fill at load port to line fill at discharge port

3.6 A Letter of Protest is issued to a terminal or vessel for the following purpose?

a. To inform them that you did not think they ran their operation correctly
b. To allow the terminal or vessel to respond to a complaint
c. To officially note that a problem situation has occurred, and that further action may be taken
d. To give the terminal and vessel time to improve their operations before the next cargo movement

3.7 The difference between shore quantity and vessel quantity corrected by the VEF can indicate the likelihood of an inaccurate shore or vessel quantity.

a. True
b. False

3.8 A comparison of a vessel's departure Total Calculated Volume (TCV) and its arrival Total Calculated Volume (TCV) will give an indication of?

a. Discharge performance
b. VEF accuracy
c. Transit cargo variation
d. Condition of dirty ballast

3.9 Volumetric shrinkage occurs when crude oils of different densities are mixed. The API MPMS chapter that covers the subject of volumetric shrinkage is?

a. Chapter 3
b. Chapter 7
c. Chapter 8
d. Chapter 12

3.10 A shore pipeline is partially full before discharge and completely full after discharge. This will result in?

a. A gain of product as measured in the shore tank
b. A loss of product as measured in the shore tank
c. A loss of product as measured on the vessel
d. It will have no impact on the outturn.

3.11 Volumetric shrinkage is least when there is a large density difference between the two crude oils that are mixed.

a. True
b. False

3.12 Factors that contribute to high evaporative losses are?

a. High vapor pressure of the cargo

b. Excessive agitation of cargo during voyage
c. Gauge hatches left open
d. All of the above

3.13 Metered quantities are acceptable even if the meters are not proven.
a. True
b. False

3.14 Whether a terminal's shoreline is full, partially full or empty can affect accurate measurements of oil volumes transferred. Which API MPMS Chapter provides guidelines for determining the fullness of pipelines between vessels and shire?
a. Chapter 17
b. Chapter 3
c. Chapter 7
d. Chapter 8

3.15 A Transit (or in-transit) Difference is?
a. The difference between the vessel measured volume at the loading port and the vessel measured volume at the discharge port
b. The difference between the vessel measured volume at the loading port and the shore measured volume at the loading port
c. The difference between the shore measured volume at the loading port and the shore measured volume at the discharge port
d. The difference between the shore line agreed tolerance and the loading port and the shore line agreed tolerance at the discharge port

SECTION 4 - MARINE MEASUREMENT

4.1 If the vessel incurs a transit loss of product and a transit gain in water, you should?

a. Obtain samples of the free water
b. Check the vessel's bunkers and bunker consumption during the voyage
c. Verify the condition of seals on the sea suction and overboard discharge valves
d. All of the above

4.2 If the vessel has official wedge tables, they should be used instead of calculating the wedge volume yourself.

a. True
b. False

4.3 According to API MPMS Chapter 17.4 is it permissible to apply the wedge formula to non-liquid ROB or OBQ?

a. Yes, but only if the trim of the vessel was known at the time the material solidified
b. Yes, but only if a sample can be obtained
c. No it is not allowed
d. None of the above

4.4 If a vessel is out of trim and product in a tank is touching all four bulkheads, should you use the wedge formula to calculate the volume?

a. Yes
b. No

4.5 Can a free water volume be calculated using a wedge formula, if it is determined that the water does not touch the forward bulkhead?

a. Yes
b. No

4.6 The preferred device for taking temperatures in a marine custody transfer is?

a. A mercury-in-glass thermometer in a cupcase assembly
b. An in-line temperature probe
c. An on board S.A.A.B. System
d. A portable electronic thermometer

4.7 What is the first thing you must do when you board a marine vessel?

a. Report to the person in charge
b. Have the tanks open, ready to gauge and sample
c. Always take samples first
d. Always take gauges first

4.8 The vessel's master states that he will load 80,000 Bbls of a product. Your instructions state that a maximum of 60,000 Bbls should be loaded. What will be your course of action?

a. Assume the vessel's master has more up to date information
b. Contact your supervisor for instructions
c. Help to calculate the stop gauge to be certain the ship is not overloaded
d. Leave the decision to the terminal

4.9 API MPMS Chapter 17.1 states that the preferred method for taking cargo measurements on board ships and barges is?

a. By automatic gauging systems as long as the sensor is mounted at the center of each cargo tank/compartment
b. Only with electronic gauging tapes (portable measurement units/PMUs)
c. By an independent inspector
d. Using manual measurement methods whenever possible

4.10 When you are on board a marine vessel, the responsibility for the use of proper safety procedures, appropriate measurement equipment and the correct sample equipment rests with?

a. The inspector
b. The company that the inspector works for
c. The vessel
d. The inspector's manager, dispatcher or scheduler

4.11 In API MPMS Chapter 17.1, the term "simultaneous ballasting or deballasting" means?

a. The vessel is transferring ballast from one ballast tank to another
b. The vessel is taking on or pumping off ballast in more than one tank at a time
c. The vessel is transferring ballast while cargo is being pumped
d. The Chief Officer has been authorized to pump ballast ashore

4.12 Once sea valves are sealed by an independent inspector, the vessel staff should not operate those valves during custody transfer without consulting with the inspector.

a. True
b. False

4.13 Measurement of free water on board marine vessels is important because?

a. Free water volumes determined from vessel measurements are often deducted from shore receipt volumes after discharge
b. U. S. Customs Service requires it on imported cargoes
c. An accurate Voyage Analysis Report cannot be completed without accurate vessel free water measurements
d. All of the above

4.14 When you board a vessel, what is the first thing you do?

a. Start sampling
b. Check to see if the inert gas system is on
c. Report to the person-in-charge
d. Start taking temperatures

4.15 Ballast is used for the purpose of?

a. Keeping the cargo warm
b. Segregation of the cargo
c. Reducing the ship's fuel consumption
d. Maintaining the vessel's stability, trim, and controlling vessel stress

4.16 A bunker inspection should be performed?

a. Only with fuel oil
b. With every product except gasoline
c. When requested by the vessel
d. Before and after loading or discharging

4.17 When measuring ROB and OBQ it is important to remember that?

a. Liquid material is usually ullaged
b. Solid material must be innaged
c. Vessel trim will have an effect on liquid quantities
d. None of the above

4.18 An OBQ inspection is performed?

a. Before loading a clean product
b. Before any cargo is loaded

c. Before any chemical is loaded
d. Before loading a clean product after a dirty one

4.19 You have determined that ROB material is non-liquid, but you were only able to measure it from one gauge point. In order to calculate the volume of ROB, you should assume that it is lying evenly across the bottom of the tank.
a. True
b. False

4.20 Why may multipoint gauging be required when performing an OBQ/ROB survey?
a. To help determine if a wedge condition exists
b. To help determine the nature [liquid or non-liquid] and quantity of the OBQ/ROB
c. Only if the vessel is on even keel
d. a and b

4.21 If the ROB is non-liquid in nature what is the preferred measurement method?
a. A single innage
b. An average of multiple innages
c. By ullage
d. Using trim corrections

4.22 If a series of innage gauges indicates that the R.O.B. / OBQ lies evenly across the bottom, you should determine the volume by?
a. Use of trim corrections
b. Applying the wedge formula
c. By using an average of the innage gauges.
d. By using the innage at the official gauge point

4.23 Is it correct to apply a wedge calculation to an OBQ/ROB volume if the material is touching all four tank bulkheads?
a. No
b. Yes

4.24 If you are only able to gauge the vessel's tanks from one location; and, the ROB is non-liquid, what should you use to obtain a volume?
a. A wedge table or formula
b. A trim corrected innage
c. An uncorrected innage
d. A trim corrected ullage

4.25 On a heavy crude oil cargo, the On Board Quantity (OBQ) measured at a loading port will usually be greater than the remaining on board (ROB) measured at the previous discharge port.

a. True
b. False

4.26 When non-liquid ROB is measured, it is considered to be evenly distributed across the tank bottom except?

a. When the vessel is listing
b. When the cargo was heated
c. When multiple gauges in the tank prove otherwise
d. When ROB is more than 4" deep

4.27 OBQ may include?

a. Free water
b. A layer of non-liquid material
c. Liquid material
d. Any combination of the above

4.28 Cargo that adheres to the vertical bulkheads of a tank is referred to as?

a. Slops
b. Clingage
c. Coatage
d. Klingons

4.29 The amount of material found in a tank prior to loading is known as?

a. Slops
b. On Board Quantity [OBQ]
c. Bunkers
d. Remaining On Board [ROB]

4.30 The amount of material found in a tank after discharge is known as?

a. Slops
b. On Board Quantity [OBQ]
c. Bunkers
d. Remaining On Board [ROB]

4.31 If you are instructed to take manual vessel measurements but the Captain refuses to allow this, what course of action should you take?

a. Contact your supervisor immediately

b. Issue a letter of protest to the vessel
c. Comply with the Captain's wishes
d. a and b

4.32 Should you seal a vessel's sea-valves prior to loading?
a. No
b. Yes

4.33 When portable electronic gauging equipment is used on board a marine vessel, which of the following considerations needs to be addressed?
a. The equipment used must securely fit the vapor control valve
b. The vessel's tank capacity tables must have been adjusted to accommodate the vapor control valve location and reference height
c. The equipment should be grounded
d. All of the above

4.34 If there is spotting of the water paste what would you use to calculate the volume?
a. The very top of the spotting
b. The clear cut but note the spotting in the remarks
c. There is no mention of spotting in API MPMS standards
d. None of above

4.35 If you are required to gauge a vessel in a heavy swell the minimum amount of gauges per tank should be?
a. One
b. Until you get two identical readings
c. Three and use the average
d. At least five, taken in minimal time, recorded and then averaged

4.36 If the vessel is at an exposed berth and rolling such that the cargo in the tank is moving more than 1/8 of an inch, the minimum number of gauges to be taken is?
a. One
b. Two
c. Three
d. Five

4.37 API standards include guidelines for vessel inspection in adverse weather.
a. True

b. False

4.38 Measuring cargo through two or more openings in a tank is referred to as?

a. Repetitive motion gauging
b. Duplicate gauging
c. Multi-point gauging
d. Hatch survey

4.39 A Charter Party is?

a. A traditional event hosted by the owner of a vessel celebrating the vessel being hired
b. A document specifying the dimensions of a vessel so it can get into the docks to load and unload its cargo
c. A document outlining the terms and conditions that will apply to the owner and the Charterer while a vessel is on hire
d. A statement of the demurrage to be charged to the Charterer

4.40 The Reference Gauge Height of a vessel tank is?

a. The overall height of the expansion trunk, referred to in the drawings
b. The distance from the tank bottom to the reference gauge point as specified on the tank's capacity table
c. The measured distance from the tank bottom to the reference gauge point
d. The place inside the tank where automatic measurement floats are installed

4.41 How many liquid level measurements must be taken in a vessel's tanks when the vessel is in motion (rolling)?

a. 2
b. 3
c. 4
d. 5

4.42 Is the holding of a key meeting required to comply with API MPMS Chapter 17.1?

a. Yes
b. No

4.43 According to API MPMS Chapter 17.1, is the petroleum inspector required to be present at the key meeting?

a. Yes
b. No

4.44 A vessel may be ullaged using an innage tape and bob instead of an ullage tape and bob.

a. True
b. False

4.45 When a ship is trimmed by the head?

a. The aft draft reading is greater that the forward draft reading
b. The forward draft reading is greater than the aft draft reading
c. The ship has water in the forepeak tank
d. Trim corrections will always be added to the measured gauge

4.46 When a ship is trimmed by the stern?

a. The aft draft reading is greater that the forward draft reading
b. The forward draft reading is greater than the aft draft reading
c. The ship has water in the aft peak tank
d. Trim corrections will always be subtracted from the measured gauge

4.47 The main reason for taking draft readings on fully-loaded vessels at the loading port is?

a. To be used at the discharge port in case of a cargo variance
b. To enable calculation of trim or list corrections if needed
c. To compare with draft readings at the discharge port
d. To ensure adequate cargo drainage

4.48 Trim corrections are applicable to:

a. Only the ROB quantity
b. Only the OBQ quantity
c. Any non-liquid material
d. Any liquid material that is touching all four tank bulkheads

4.49 The most accurate way of measuring a vessel's list is?

a. Ask the Chief Mate
b. Reading the inclinometer
c. By comparing the port and starboard amidships draft marks
d. By comparing the fore and aft drafts

4.50 When a vessel is not on an even keel, tank gauges must be corrected by the use of?

a. Volume correction tables or volume correction calculations
b. Trim correction tables or trim calculations
c. Weight correction tables or weight correction calculations
d. Draft correction tables or draft correction calculations

4.51 The trim of a vessel will have no effect on the detection of free water.

a. True
b. False

4.52 A wedge condition will exist if the liquid in a tank?

a. Covers the bottom of the tank.
b. Touches three of the four bulkheads
c. Accumulates beneath the gauge hatch
d. All of the above

4.53 Which of the following conditions must be present for trim corrections to apply?

a. Tank contents must touch all four bulkheads
b. Tank contents must be non liquid
c. Tank contents must not contact the forward bulkhead
d. a and b

4.54 List is defined as?

a. A piece of paper showing the names of all on board personnel
b. The inclination or leaning of the vessel away from the upright
c. The correction required when the vessel is not on even keel
d. The position of the tank contents when the vessel is down by the head

4.55 A wedge formula calculation on a vessel trimmed by the stern may be used when?

a. Liquid material does not contact the forward bulkhead
b. Solid material is gauged at a single gauge point
c. Free water completely covers the tank bottom
d. All of the above

4.56 Independent Inspectors are not expected to trim-correct barge-tank gauges because most barges do not have trim tables.

a True
b. False

4.57 Typically, four parties receive samples at the loading port when a marine tank vessel is loaded. Three of those parties are (1) the independent inspector, (2) the vessel for delivery to the discharging terminal, (3) The vessel for retain. Who is the fourth party?

a. The cargo owner
b. The vessel for retain
c. The vessel's agent
d. The load port terminal

4.58 Samples from each vessel tank must be composited?

a. On board as long as every cargo tank contains the same cargo
b. On board, using equal volumes from each tank
c. In a laboratory, in proportion to the volume in each tank
d. In a laboratory when S&W and API Gravity are the only tests needed

4.59 Freeboard on a vessel is?

a. The distance from the waterline to the vessel's deck level
b. The distance from the waterline to the vessel's keel
c. The time when U. S. Customs Service permits others to board the vessel
d. The time of day that lay time begins according to the Charter Party

4.60 Using the "English" system of measurement; how tall are draft mark numbers:

a. 12 inches
b. 9 inches
c. 6 inches
d. 3 inches

4.61 Using the "English" system of measurement, how far apart are draft mark numbers

a. 12 inches
b. 9 inches
c. 6 inches
d. 3 inches

4.62 Draft readings can be used to obtain the following information?

a. The depth of the vessel in the water
b. The trim of the vessel
c. The list of the vessel
d. All of the above

4.63 When reading the draft in metric units, how high is each number?

a. 6 inches
b. 6 centimeters
c. 12 centimeters
d. 10 centimeters

4.64 When taking a draft reading, which is in metric units, the distance between each number is:

a. 6 inches
b. 5 centimeters
c. 12 centimeters
d. 10 centimeters

4.65 A wall wash test is?

a. A procedure involving high pressure automated washing of the walls of a tank to remove any cargo residue
b. A procedure for washing selected areas of a tank surface with an appropriate wash liquid, and subsequent testing of the wash liquid for the presence of contaminants
c. A procedure in which tank is washed with caustic solution to remove surface build-up
d. None of the above

4.66 A wipe test is?

a. The procedure of wiping sample containers to ensure they are clean before being submitted to the laboratory
b. The procedure of physically wiping a tanks interior surface with absorbent white rags to test for possible color contamination
c. A specialized laboratory test for the presence of water, iron, polymers and emulsion
d. None of the above

4.67 The number of areas in a cargo tank to be wall washed should be based on?

a. The last cargo
b. The tank capacity
c. The amount of wall wash medium you have

d. he age of the vessel

4.68 When carrying out a wall wash test of a vessel's cargo tank you note a number of discolored areas on the tank surface. If the discolored areas are less than 20% of the tanks surface area, can you sample (wall wash) these areas and include it in your tank sample?

a. Yes
b. No

4.69 When carrying out a wall wash test of a vessel's cargo tank you note some discolored areas, tank coating breaks and exposed sections on the tank surface. These areas exceed 20% of the tank surface area. Should you?

a. Wall wash these areas and include the wall washings with those from the rest of the tank
b. Note these areas on your inspection report and refrain from wall washing them
c. Wall wash these areas and keep the wall washings from these areas in a separate bottle
d. Only wall wash the area that has no coating breakdown

4.70 Should a wall wash be performed on a wet tank surface?

a. Yes
b. No

4.71 A pre-loading tank inspection key meeting between vessel personnel, shore personnel and inspection personnel should determine?

a. Tank Number, tank capacity, intended cargo volume
b. The last three cargoes and method of tank cleaning
c. The contents of adjacent tanks
d. All of the above

4.72 A Deck Level Inspection is the most effective form of tank inspection?

a. True
b. False

4.73 During a tank entry inspection, which of the following is incorrect?

a. Since more than one person will be entering the tank, it is not necessary to have a standby person at the hatch
b. All pipelines should be drained and verified empty
c. The tank atmosphere should be tested for safe entry

d. All surface areas should be checked for possible contamination, tank coating condition and loose rust

4.74 It is not necessary to prepare a blank of the wall wash liquid if it supplied by a certified Laboratory.

a. True
b. False

4.75 Pre-loading tank inspection may be limited to gauging OBQ.

a. True
b. False

4.76 Who is *responsible* for determining that cargo on a vessel is loaded only into tanks with surfaces or coatings compatible with the cargo?

a. The independent Inspector
b. The shipper of the cargo
c. Vessel personnel
d. Terminal personnel

4.77 Which of the following is most likely to require a tank-entry inspection?

a. Petrochemicals
b. Crude Oil
c. Diesel fuel
d. No. 6 Fuel Oil

4.78 Why should you never break blisters in a tank coating, or never disturb piles of debris on a tank floor when performing a tank entry inspection?

a. The tank atmosphere may be adversely affected
b. The Inspector may come into contact with potentially dangerous, unknown material
c. It is the responsibility of vessel personnel to remove debris and prepare the tank surface before the tank is loaded
d. All of the above

4.79 When reading the draft marks on a barge or vessel, which part of the number indicates the actual zero point (start) of the number in question?

a. The lower edge of the number
b. The upper edge of the number
c. The mid point of the number
d. None of the above

4.80 A sea valve should be sealed to?

a. The pumpman's wheel wrench
b. An adjacent static object such as another valve or railing
c. The main body of the sea valve
d. The nameplate on the valve wheel

4.81 According to API MPMS Chapter 17, during a shore inspection:

a. The Terminal is to tell the Inspector the condition of the line
b. A line fullness verification procedure should be requested to verify line condition
c. Unless instructed otherwise, the Inspector is to assume the line is full before and after transfer of product
d. All of the above

4.82 You are inspecting a vessel discharging a cargo imported from a foreign country and you find that it is equipped with vapor control valves (VCVs). The VCVs are unique in design and your set of PMU [Portable Measurement Units] adapters does not include an adapter for the unique VCVs. In your opinion, you will be forced to use the ship's PMU to measure the liquid levels and temperatures on the vessel. Which of the following must be performed?

a. The vessel's measuring equipment (PMU) is to be verified according to API Chapters 3 and 17
b. The terminal operator is to be notified
c. The U.S. Customs boarding officer, if on board, is to be notified
d. All of the above

4.83 When asked to sign a Dry Certificate you should:

a. Sign it if you're reasonably sure the tanks are dry;
b. Sign it if the ships crew assures you that the tanks are dry;
c. Refuse to sign as per IFIA guidelines.
d. None of the above

4.84 It is acceptable for an inspector to sign Dry Certificates, Vessel Cleanliness certificates showing that cargo tanks are suitable for the intended cargo, ROB certificates with pumpability statements, and pumping logs.

a. True
b. False

4.85 "The best way to prove the liquid/non liquid nature of ROB/OBQ is to have a sample" What is the best description of this statement.

a. True
b. False

4.86 API MPMS Chapter 17.9 pertains to:

a. Temperature
b. Sampling
c. Vessel Experience Factors
d. Gauging

4.87 When compartments on a vessel are not used or are partially loaded, a partial cargo VEF or compartmental VEF can be established;

a. True
b. False

4.88 When calculating a VEF which of the following data should be excluded?

a. Vessel to vessel Transfers
b. First voyage following dry dock
c. Voyages where vessel figures are known to be inaccurate
d. All of the above

4.89 When calculating a VEF, the most recent twenty voyages should be used:

a. True
b. False
c.

4.90 A valid VEF is one that results from at least five qualifying voyages:

a. True
b. False

SECTION 5 - SAFETY

5.1 You are instructed to sample a tank of methyl *tert* butyl ether [MTBE] which is a new product for you. Where should your first line of information be?
a. The Tankerman's Handbook
b. The Petroleum Handbook
c. The material safety data sheet [MSDS] for that product
d. API Chapter 8

5.2 Regardless of the product, sample containers MUST NOT be filled in excess of?
a. 50%
b. 85%
c. 60%
d. 100%

5.3 The minimum personal protective equipment required when sampling is?
a. Gloves, respirator, hard hat and SCBA
b. Gloves, goggles, hard-hat, uniform & work shoes
c. Gloves, face-shield and sun glasses
d. Gloves, uniform and SCBA

5.4 When gauging a tank that is emitting vapors, you should position yourself?
a. Up-wind of the gauge hatch
b. The wind at your left or right side
c. The wind in your face
d. a or b

5.5 When lifting anything heavy, which muscles should take most of the weight?
a. Upper arm muscles
b. Leg muscles
c. Back muscles
d. All of the above, equally to distribute the load

5.6 Inspectors are permitted to operate valves on board vessels when?
a. Accompanied by an authorized person on board
b. No one else is around to do it
c. The vessel staff is too busy to do it themselves
d. None of the above

5.7 Your first reaction to any injury accident should be?

a. To remove the injured person, if possible, from exposure to further injury
b. To call for help
c. To render First Aid
d. To report immediately to the person's supervisor

5.8 The responsibility for an inspector knowing the safety regulations in any terminal belongs to?
a. The terminal staff
b. The terminal's safety director
c. The inspector
d. The inspector's dispatcher

5.9 P.P.E. stands for?
a. Private Pension Estimate
b. Personal Protective Equipment
c. Private Protection Equipment
d. It has no meaning in terms of safety

5.10 All portable electronic equipment must be _____ before use?
a. Checked
b. Cleaned
c. Calibrated
d. Grounded

5.11 On the NFPA diamond-shaped warning symbol, the color Red stands for?
a. Reactivity hazard level
b. Fire hazard level
c. Corrosive hazard level
d. Health hazard (toxicity) level

5.12 On the NFPA diamond-shaped warning symbol which number represents the highest danger level?
a. 1
b. 4
c. 3
d. None of the above

5.13 What is a "CAS Number"?
a. A communication and shipping number assigned to a product by the manufacturer
b. A chemical formula number used to identify the product
c. A unique identifying number assigned to a product by the Chemical Abstract Service

d. An identifying number used by manufacturers to assign categories of chemicals for sale

5.14 On which of the following documents would you find a "CAS" Number?

a. A material safety data sheet [MSDS]
b. A Bill of Lading
c. A Certificate of Analysis
d. A Chemical compatibility list

5.15 Which of the following is defined as a corrosive liquid?

a. An acid solution
b. A caustic solution
c .Neither of the above
d. Both a and b

5.16 Corrosive liquids can directly injure the body tissue on contact.

a. True
b. False

5.17 A chemical has a strong odor, this is?

a. An indication that a hazard exists
b. Indicates low vapor concentration
c. Indicates high vapor concentration
d. An unreliable source of specific information regarding the chemical

5.18 A hard hat's most important part is its suspension, which must keep the shell a minimum of 1¼ inches above the head.

a. True
b. False

5.19 What does the symbol H_2S stand for?

a. Water
b. Hydrogen Disulfide
c. Hydrogen Sulfide
d. Dihydrosodium

5.20 To find out if a material is hazardous, you should consult the MSDS.

a. True
b. False

5.21 Before taking a gauge, static electricity can be discharged from your body by?

a. Using a tank gauge meter
b. Touching a grounded structure such as a tank railing, with bare hands
c. Use of natural fiber sampling cords
d. Touching a grounded structure such as a tank railing, while wearing rubber gloves

5.22 When using a metal tape to take a gauge, the tape should always stay in contact with the gauge hatch.

a. True
b. False

5.23 While sampling a crude ship, a small fire breaks out in the pump room you should?

a. Grab a type C fire extinguisher and enter the pump room
b. Close the hatch and call for the launch
c. Continue sampling because the crew will take care of the fire
d. Immediately secure your area and report to a responsible ship's officer

5.24 As you start down the side of a fire wall to sample a No. 6 fuel oil tank, you begin to feel dizzy. You should?

a. Get out of the fire-wall area immediately
b. Take a deep breath and run for the tank ladder
c. Lie down because there is more oxygen closer to the ground
d. Immediately put on your respirator with organic cartridges

5.25 The opportunity for a build up of a static electricity charge can be reduced by?

a. Wearing rubber gloves
b. Not allowing your hands to slide on the hand rail
c. Grounding yourself and your sampling equipment before opening the gauge/sample hatch
d. Use of stainless steel equipment

5.26 A portable electronic thermometer should always be grounded <u>after</u> the probe has been lowered into the liquid?

a. True
b. False

5.27 To help prevent a build up of static electricity?

a. Always use a sampling cord made of synthetic fiber
b. Always tie the end of the sampling cord to the railing of the tank
c. Use a sampling cord that contains no synthetic fiber
d. Hold the sample cord against the gauge hatch while pulling up the sample

5.28 The most important reason for wearing the correct type of gloves while sampling is so that?
a. The sample is not contaminated
b. Your hands do not get dirty
c. Hazardous chemicals are not absorbed through your skin
d. None of the above

5.29 To avoid the buildup of static electricity when using a portable electronic thermoprobe (PET)?
a. Hold on to the railing or other metal part of the tank while using the PET
b. Attach the ground wire of the PET to the tank before opening the gauge hatch then slowly lower the probe assembly into the oil
c. Since the probe is plastic and does not conduct electricity, no static electricity can form
d. Any of the above

5.30 The main component of inert gas is?
a. Carbon sulfide
b. Carbon dioxide
c. Nitrogen
d. Hydrogen

5.31 Why should pumping be suspended when first-in or one-foot samples are taken?
a. To allow any gas to dissipate
b. To allow static electricity to dissipate
c. So the vapors don't blow in your face
d. To give time for analysis results

5.32 The best source of information about the hazards of any product being inspected is?
a. The inspector's dispatcher
b. A knowledgeable chemist
c. The inspector's previous experience
d. Material Safety Data Sheets

5.33 The most informative source of information about the hazards of a product or chemical is?

a. The job sheet
b. The Bill of Lading
c. The Material Safety Data Sheet
d. The dispatcher

5.34 What do the initials "MSDS" stand for?

a. Material Storage and Distribution System
b. Material Safety and Distribution Sheet
c. Material Storage and Data System
d. Material Safety Data Sheet

5.35 Who should supply a MSDS?

a. The manufacturer of the material
b. The owner of the material
c. The distributor of the material
d. Either or all of the above

5.36 A MSDS will list what type of protective equipment is required when working with a particular material.

a. True
b. False

5.37 A tank with an external floating roof is considered a confined space?

a. When the roof is located anywhere under the top ring or course of the tank plates
b. Only when the tank is empty
c. Only when the roof is resting on its legs
d. None of the above

5.38 Which of the following are considered to be confined spaces?

a. A cofferdam
b. An external floating roof tank
c. A ship's pump room
d. All of the above

5.39 What is the safe oxygen content range in a confined space?

a. Between 19.5% and 23.5%
b. Between 18.6% and 20%
c. Between 19% and 25%
d. None of the above

5.40 Products have defined limits of combustion. These are?

a. The Permissible Exposure Limit and the Threshold Limit Value
b. The Lower Explosive Limit, Upper Explosive Limit and the Flash Point
c. The Flash Point and the Threshold Limit Value
d. The Permissible Exposure Limit and the Lower Explosive Limit

5.41 A confined space is one that?
a. Has limited means of access and exit
b. Is not designed for continuous occupation
c. Has limited natural ventilation
d. All of the above

5.42 Before entering a confined space which of the following tests are required?
a. Oxygen content
b. Lower explosive limit
c. Toxic vapor testing
d. All of the above

5.43 Examples of a confined space are?
a. Cargo tank
b. Grain silo
c. Pump room on a ship
d. All of the above

5.44 Someone must always stand watch at the entrance to the confined space while you are in it.
a. True
b. False

5.45 What do the initials "LEL" stand for?
a. Low explosion location
b. Low environmental levels
c. Lower environmental level
d. Lower explosive limit

5.46 If the atmosphere in a cargo tank is stated to be "below the LEL" what does this mean?
a. There is too much oxygen in the tank to support combustion
b. There are not enough hydrocarbon vapors in the tank to permit combustion
c. Neither of the above
d. Both a and b are correct

5.47 What do the initials "UEL" stand for?

a. Upper environmental level
b. Unknown environmental level
c. Upper explosive limit
d. Unknown explosive levels

5.48 What does an explosion meter measure?

a. The amount of oxygen in a space
b. Whether a space is safe for entry
c. Whether or not there is an explosive mixture in a space, capable of supporting combustion
d. The flash point of a gas mixture

5.49 An explosimeter measuring LEL% is utilized to sample the atmosphere within a cargo tank and a reading of 15% is observed. What does the reading mean?

a. The atmosphere in the tank contains 15% oxygen
b. The atmosphere in the tank is 15% towards an explosive mixture of air and hydrocarbon vapors
c. The atmosphere in the tank is 15% hydrocarbon vapors
d. The atmosphere in the tank is a 15% mixture of air and hydrocarbon vapors

5.50 What does an oxygen meter measure?

a. The percentage of oxygen below the LEL of a hydrocarbon/air mixture
b. The amount of oxygen needed to make a confined space safe for entry
c. The percentage of oxygen contained in the atmosphere being sampled
d. None of the above

5.51 What is the normal percentage content of oxygen in the air?

a. 15.1%
b. 19.1%
c. 20.9%
d. 25.9%

5.52 Which of the following conditions can cause false readings on an explosion meter?

a. Low hydrocarbon vapor content
b. High moisture content
c. Low oxygen content
d. Both b and c

5.53 The permissible exposure limit for benzene is an 8-hour time weighted average of?

a. 10 ppm
b. 1 ppm
c. 5 ppm
d. 0.5 ppm

5.54 Benzene is a known health hazard. Which of the following are likely to contain benzene?

a. Crude Oil
b. Gasoline
c. Ethylbenzene
d. All of the above

5.55 The appearance and characteristic odor of benzene is?

a. Clear colorless liquid with a sweet odor
b. Clear colorless liquid with a sour odor
c. Light brown liquid with no distinguishable odor
d. Light brown liquid with a strong pungent odor

5.56 How can benzene enter your body?

a. By inhalation
b. By absorption through the skin
c. By Ingestion
d. All of the above

5.57 The minimum required respirator for working in a benzene environment that is greater than the permitted exposure limit is?

a. Self contained breathing apparatus
b. Full face respirator with an organic vapor cartridge
c. Half-mask respirator with an organic vapor cartridge
d. Half-mask respirator with an acid gas cartridge

5.58 When working with benzene, in addition to a respirator, what other personnel protective equipment is required?

a. Safety glasses, hard hat and leather gloves
b. Long-sleeve coveralls and leather boots
c. Rubber gloves, goggles, rain suit and hard hat
d. Personal Protective Equipment is not required

5.59 Which of the following maximum benzene concentration limits are correct, when using a respirator?

a. 50 ppm maximum exposure when using a full-face respirator

b. 10 ppm maximum exposure when using a half-mask respirator
c. A self contained breathing apparatus must be used if the exposure exceeds 50 ppm
d. All of the above

5.60 Can gasoline contain benzene?
a. Yes! Up to 5% maximum
b. Yes! Up to 50% maximum
c. Yes, but only in very minute quantities
d. By law, gasoline must not contain any benzene

5.61 Workers who are exposed to benzene at or above the action level for at least 30 days per year must have a medical examination?
a. Every six months
b. Only if they exhibit signs of exposure
c. Only if the exposure exceeds ten times the permissible exposure limit
d. Once a year

5.62 Benzene vapors are?
a. Lighter than air
b. Heavier than air
c. Same as air
d. None of the above

5.63 Hydrogen sulfide may be present in all petroleum products, crude oil and many types of petrochemicals.
a. True
b. False

5.64 The effects of acute exposure [short term] to benzene are?
a. Shortness of breath, irritability, headache, nausea, dizziness, intoxication
b. Irritation of the eyes, nose and respiratory tract
c. Convulsions and loss of consciousness
d. All of the above

5.65 If you need to know specific safety or exposure information about benzene you should consult?
a. Your doctor or pharmacist
b. Your Safety Manual
c. Material Safety Data Sheet
d. DOT Emergency Response Guide

5.66 The most hazardous component of sour crude oil is?

a. The smell
b. Low flash point
c. Toxicity
d. Hydrogen sulfide

5.67 When working in an environment containing over 10ppm of H_2S the only effective protection is?

a. Full face respirator
b. Half mask respirator
c. Self-contained breathing apparatus (SCBA)
d. All of the above

5.68 The permissible exposure level of H_2S is?

a. 10 ppm
b. 1 ppm
c. 5 ppm
d. 0.1 ppm

5.69 Organic filter respirators are adequate for use in hydrogen sulfide atmospheres.

a. True
b. False

5.70 Hydrogen sulfide is the most dangerous gas commonly encountered in the petroleum industry?

a. True
b. False

5.71 Hydrogen sulfide can be recognized by the following characteristics?

a. Pale yellow gas with a sweetish taste and strong pungent odor
b. Pale yellow gas with the unpleasant odor of “Rotten Eggs”
c. Colorless gas with a sweetish taste and the unpleasant odor of “Rotten Eggs”
d. Colorless gas with little or no odor

5.72 The permissible exposure level of hydrogen sulfide is?

a. 10 ppm
b. 15 ppm
c. 25 ppm

d. 50 ppm

5.73 Which of the following exposure limits for H_2S [for use with respirators] are correct?

a. 500 ppm maximum exposure when using a full face respirator
b. 100 ppm maximum exposure when using a half-mask respirator
c. A self contained breathing apparatus must be used if the exposure exceeds 500 ppm
d. Only a self-contained breathing apparatus is permissible for any exposure above the permissible exposure limit

5.74 Refineries are not the only sources of industrial hydrogen sulfide [H_2S]. Other sources are?

a. Pulp Mills
b. Any agricultural facility where decay of organic matter may occur
c. Drilling Rigs
d. All of the above

5.75 The sense of smell is not reliable for detecting hydrogen sulfide because?

a. It is difficult to detect by sense of smell
b. The level at which you can smell it is above the permissible exposure limit
c. At 100 ppm a person's sense of smell is deadened within minutes, thereby giving that person a false sense of security
d. You might have a cold and be unable to breath through your nose

5.76 What type of respirator filter cartridges should you use for protection against hydrogen sulfide?

a. Acid Gas
b. None. Only a self contained breathing apparatus is acceptable
c. Organic Vapor
d. Radionuclides, highly toxic dusts, mists and fumes

5.77 When working you must always wear a H2S monitor.

a. True
b. False

5.78 The principal limitation of a filter or cartridge respirator is?

a. It does not supply oxygen
b. The face piece tends to fog up
c. The expense to replace the cartridges
d. Keeping the face piece from sweating up

5.79 IFIA has published a Technical Bulletin regarding Safe Access. Within this Bulletin several items are identified as potential Hazards when boarding vessels. These include:

a. Equipment must be in good repair
b. Proper tie-off points for fall protection if no handrails
c. Physical obstructions to access
d. All of the above

5.80 IFIA has published a Technical Bulletin regarding Safe Access. Within this Bulletin several items are identified as potential Hazards re: Shore tank roofs. These include:

a. Internal/external tanks and Confined Spaces
b. Damaged/Weak areas of the roof
c. Lack of guardrails
d. All of the above

5.81 IFIA has published a Technical Bulletin regarding Safe Access. Within this Bulletin several items are identified as potential Hazards. This Bulletin also specifically prohibits the use of ladders, planks, and scaffold boards as walkways (i.e. between barges etc.) Cont'd

a. True
b. False
c. Only when in exposed seaway conditions
d. Only when no sky-hooks are available

5.82 May an inspector board a vessel by means of using a "Pilot's" ladder?

a. True
b. False

SECTION 6 - SAMPLING

6.1 Which API MPMS Chapter describes the procedures for sampling of petroleum and Petroleum Products?

a. Chapter 3
b. Chapter 8
c. Chapter 7
d. Chapter 1

6.2 Which of the following types of sample container should be used to obtain a first foot sample?

a. Clear glass bottle
b. Amber glass bottle
c. Plastic bottle
d. Epoxy lined metal can

6.3 Which of the following types of container closure devices should not be used with glass bottles?

a. Plastic screw caps
b. Rubber stoppers
c. Metal screw caps
d. Cork stoppers

6.4 Extraordinary care is required when selecting a container for?

a. Gasoline samples
b. Fuel oil samples
c. Benzene samples
d. Jet fuel samples

6.5 A guide for selecting sample containers can be found in?

a. API/MPMS Chapter 3
b. API/MPMS Chapter 7
c. API/MPMS Chapter 8
d. API/MPMS Chapter 12

6.6 Rinsing the container with the liquid to be sampled before drawing the sample is recommended for?

a. Jet fuel samples
b. Petrochemical samples
c. Vapor pressure samples
d. All of the above

6.7 What equipment is preferred by the API to lower a sample bottle to the required level?

a. Ullage tape
b. Cotton cord or non-sparking chain marked to indicate when the correct level has been reached
c. Innage tape
d. Brass sampling cage

6.8 Free water in a crude oil tank is best sampled using a?
a. Zone sampler
b. Bacon bomb or tube-type sampler
c. Bottle and sample cage
d. Weighted bottle and cord

6.9 A sampling cage and bottle is generally better than a weighted sampling beaker for sampling volatile liquids because?
a. The equipment is easier to handle
b. A beaker sample is probably less representative
c. Loss of light ends is likely when the sample is transferred from the beaker
d. Sample bottles are readily available

6.10 A "Bacon-Bomb" sampler is used to take?
a. Tank bottom samples
b. Running samples
c. LPG samples
d. All of the above

6.11 When would you take a free water sample?
a. When requested by the customer
b. They are not necessary
c. Immediately after every loading, except chemicals
d. Whenever there is a sufficient quantity to sample

6.12 Free water samples are important for?
a. Checking for contaminated water under gasoline
b. Determining the likely source of the free water
c. Determining the influence of free water on the API gravity of a crude oil cargo
d. None of the above

6.13 A representative sample is a portion extracted from the total volume that contains its constituents in the same proportions as those present in the total volume.
a. True
b. False

6.14 API MPMS Chapter 8.1 recommends that a vapor space be left at the top of each sample container to?

a. Permit the surface of the liquid to be visible in the laboratory
b. Allow space to test the vapor content of the sample
c. To allow space for safe expansion of the liquid
d. To avoid the loss of light components

6.15 A sample obtained by lowering a stoppered container to the draw-off level of a tank, removing the stopper and withdrawing the container at a steady rate is called a?

a. Spot sample
b. Running sample
c. All-levels sample
d. Composite sample

6.16 A sample obtained by lowering an unstoppered container to the draw-off level of a tank and withdrawing the container without stopping is called a?

a. Multi-level sample
b. Running sample
c. All-levels sample
d. Composite sample

6.17 Before sampling oil in a tank, it is necessary to locate the oil/water interface.

a. True
b. False

6.18 Before sampling a clean product or petrochemical, the container should always be rinsed with the product when possible.

a. True
b. False

6.19 Samples containers may be 100% full when the RVP of the product sampled is less than 10 psi.

a. True
b. False

6.20 After taking a spot sample of gasoline the container is 100% full. You must pour off some of the product to allow room in the container for expansion.

a. True
b. False

6.21 When sampling heavy fuel oils or crude petroleum products in a tank with sludge or sediment deposits on the bottom, manual samples may not be representative because?

a. The material may be non-homogeneous
b. The concentration of entrained water is higher near the bottom
c. The interface between the oil and water is difficult to measure accurately
d. All of the above

6.22 After obtaining a tank running sample, the inspector notices that the sampling bottle is full on withdrawing it from the tank. The inspector should?

a. Pour some of the sample into a second container
b. Pour some of the sample out of the bottle
c. Empty the sampling bottle completely and obtain a new sample
d. Any of the above

6.23 A storage tank is manually gauged and found to contain 8 feet of product. How many spot samples should be obtained from this tank?

a. 2 [Upper and lower]
b. 3 [Upper, middle and lower]
c. 1 [Middle]
d. None

6.24 When you are instructed not allow the sampling cord to fall on the deck, the main concern is?

a. The chance of contamination
b. Making a mess that could cause a slip hazard
c. Wearing out the cord
d. Both a and b

6.25 A running sample, when taken correctly, must?

a. Be at least half full
b. Taken with a zone sampler
c. Be taken with a brass beaker
d. Be approximately 70% to 85% full

6.26 When sampling a shore tank with an observed API gravity of -2°, and the main concern is water. Where would the water most likely be?

a. 6" off the bottom
b. Stratified between the lower and middle levels

c. Floating on top of the cargo
d. No water can be found in negative API oils

6.27 The danger of static electricity can be reduced by?
a. Wearing rubber gloves
b. Not allowing your hands to slide on the tank hand-rail
c. By grounding yourself and your equipment before opening hatch cover
d. Using stainless steel equipment

6.28 The reason a running sample brought up full is not allowed is?
a. There is no way to tell when the bottle filled up
b. There would be too much oil to test the gravity
c. There is a chance of contamination from the bottle cap
d. As the bottle warms up, it could shatter

6.29 Since the volume of material in the tank plays no part in the lab analysis, tanks that are sampled do not need to be gauged.
a. True
b. False

6.30 The correct procedure for taking a jet fuel sample is?
a. First take a sample in a clear bottle to examine for color and sediment. Then take the official sample an amber bottle
b. Use an amber bottle
c. Use only a clean zone sampler
d. Sample just below the surface as to keep from getting any free water in it

6.31 What is the principal disadvantage of using a beaker sampler to sample a marine vessel?
a. They are too heavy to hoist up and down
b. If one tank is contaminated, subsequent samples could also become contaminated
c. There is no cap that fits them
d. They are too expensive and might be lost in the tank

6.32 What is the principal reason for taking 3" and 6" bottom samples in No. 6 Fuel Oil?
a. To determine the gauge height
b. To obtain a sample for sulfur & viscosity determination
c. To locate any free water not identified by water paste

d. Bacon-bomb samples should never be taken of No. 6 Residual Fuel Oil

6.33 When attempting to take a running sample, your sample bottle comes up full. You should?

a. Pour out 20% - 25% of the sample, then cap and label the sample
b. Cap and label sample then place it in an ice chest
c. Make a special notation on the sampling report
d. Discard the sample and re-sample the tank so that the bottle is 70-85% full

6.34 When taking a running sample of a clear product such as jet fuel or a water-white chemical you should?

a. Rinse the inside of the sample bottle with product prior to taking the sample
b. Take the sample in a clear bottle to visually check the color before transferring it to an amber bottle
c. Ensure that product running down the sample cord cannot contaminate the product
d. All of the above

6.35 Samples should not be taken from an unslotted standpipe?

a. True
b. False

6.36 A sample can or bottle should never be capped if it is more than 85% full.

a. True
b. False

6.37 During preliminary sampling of a shore tank that will be used to load a vessel, you should also obtain a tape or side gauge reading.

a. True
b. False

6.38 A bottom or dead-bottom sample is taken at what point?

a. Six inches below the outlet
b. Four inches below the outlet
c. At the lowest point in the tank
d. Immediately above the free water level

6.39 A sample taken at a specific location in a tank is called?

a. An official sample

b. A tank-side sample
c. A spot sample
d. A single-tank composite sample

6.40 At what point in the product is a top sample taken?
a. Middle of the upper third of the liquid
b. Middle of the product
c. Middle of the lower third of the tank
d. Six inches below the surface of the liquid

6.41 Since a bottom sample may not always be taken at the very bottom of a tank, it is recommended to?
a. Specify the exact location where the sample was taken, for example, 6" from the bottom
b. Always take a bottom sample 2" off the actual bottom because that is where the neck of the bottle will rest when the bottle is on its side
c. Use a Bacon Bomb Sampler to draw bottom samples
d. Use a Tulsa Thief to draw bottom samples

6.42 A top sample is taken from?
a. The surface of the liquid
b. 6" below the surface
c. The mid-point of the upper third of the liquid
d. Anywhere in the top portion of the tank

6.43 A lower sample is taken from?
a. The bottom of the tank
b. Just above the water level
c. The mid-point of the bottom third of the liquid
d. Any of the above

6.44 A storage tank was manually gauged and found to have a product innage of 38 feet 6 inches (11.73m). The tank gauge height is 48 feet 10 inches (14.88m). At what innage level should the lower spot sample be obtained?
a. 3 (0.91m) feet from the tank bottom
b. At the outlet (suction) level
c. 6 feet 5 inches (1.96m) from the tank bottom
d. 12 feet 10 (3.92m) inches from the tank bottom

6.45 A storage tank was manually gauged and found to have a product innage of 38 feet 6 inches (11.73m). The tank gauge height is 48 feet 10 inches (14.88m). At what innage level should the middle product spot sample be obtained?

a. 12 feet 10 inches(3.92m) from the tank bottom
b. 19 feet 3 inches (5.87m) from the tank bottom
c. 24 feet 5 inches (7.44m) from the tank bottom
d. 6 feet 5 inches (1.96m) below the surface of the product

6.46 A storage tank was manually gauged and found to have a product innage of 38 feet 6 inches (11.73m). The tank gauge height is 48 feet 10 inches (14.88m). At what innage level should the upper product spot sample be obtained?

a. 32 feet 1 inch (9.78m) from the tank bottom
b. 5 feet 5 inches (1.65m) below the surface of the product
c. 40 feet 9 inches (12.42m) from the tank bottom
d. 6 inches (0.15m) below the surface of the product

6.47 An Upper sample is taken from?

a. The surface of the liquid
b. 6" (0.15m) below the surface
c. The mid-point of the upper third of the liquid
d. Anywhere in the top portion of the tank

6.48 Upper, middle, and lower samples?

a. can be taken in any order
b. must be taken in the order lower, middle, upper
c. must be taken in the order upper, middle, lower
d. are less reliable than an all-levels sample, no matter how they are taken

6.49 When upper-middle-lower samples are taken from a tank, the lower sample is taken at a point?

a. 1/3 of the liquid height from the tank bottom
b. At the middle of the tank outlet fitting
c. 1/6 of the liquid height from the tank bottom
d. 6" (0.15m) off the tank bottom

6.50 When drawing upper-middle-lower samples from any tank, which sample should be taken first?

a. Lower
b. Middle
c. Upper
d. It doesn't matter

6.51 When upper-middle-lower samples are taken from a tank, the upper sample is taken at a point?

a. 1/3 of the liquid height from the tank bottom
b. At the middle of the tank outlet fitting
c. Middle of the upper third of the tank contents
d. 6" (0.15m) off the tank bottom

6.52 When drawing upper-middle-lower samples from any tank, which sample should be taken last?

a. Lower
b. Middle
c. Upper
d. It doesn't matter

6.53 When drawing upper-middle-lower samples from any tank, which sample should be taken second?

a. Lower
b. Middle
c. Upper
d. It doesn't matter

6.54 At what vertical location in the liquid is an upper sample taken?

a. Middle of the upper third of the liquid
b. One inch below the surface of the liquid
c. Six inches (0.15m) below the surface of the liquid
d. Middle of the lower third of the tank

6.55 Both free water and entrained water are found in the sample taken by an automatic in-line sampling system.

a. True
b. False

6.56 Automatic samplers can be either time proportional or flow proportional.

a. True
b. False

6.57 An automatic sampling system consists of?

a. Probe
b. Receiver
c. Controller
d. All of the above

6.58 Before each use the sample receiver of an automatic sampling system must be inspected to ensure that it is clean and dry.

a. True
b. False

6.59 Before dividing for testing, the product in the receiver of an automatic sampler must be thoroughly mixed.

a. True
b. False

6.60 The controller on an automatic sampler is a device that governs the operation of the sample extractor.

a. True
b. False

6.61 Both free water and entrained water are found in the sample taken by an automatic in-line sampling system.

a. True
b. False

6.62 A sample that is to be tested for Reid vapor pressure [RVP] should be taken with?

a. A zone sampler
b. A glass bottle with suitable cage or weight
c. A bomb sampler
d. A Tulsa Thief

6.63 When taking samples for RVP testing, samples <u>may not</u> be composited.

a. True
b. False

6.64 When drawing a running sample for RVP, the sample bottle should be pulled from the liquid?

a. 50% full
b. 70-85% full
c. 90-95% full
d. 100% full

6.65 Samples should be labeled?

a. In the laboratory
b. Immediately after the sample is obtained
c. Before transportation to the laboratory
d. Immediately upon arrival in the laboratory

6.66 When should a sample be labeled?

a. When you return to our office
b. After removing them from your sample transportation box.
c. Just before you leave the facility
d. Immediately after is obtained

6.67 A first foot sample is taken to?

a. Determine the quality of the product in the shore tank
b, Confirm that the vessel/barge tanks and pipelines are clean
c. Confirm that the product in the shore pipeline is on spec.
d. Confirm that the product is on spec after loading

SECTION 7 - TANK GAUGING

7.1 The *critical zone* in a shore tank defines that part of the tank where?

a. The flexing bottom of a tank is at its highest point
b. The point where the tank will overflow if more liquid is added
c. The floating roof is no longer resting on its legs
d. The vertical section of a tank identified on the capacity table where the floating roof is only partially afloat and the table may be inaccurate

7.2 A Tank Capacity Table is also referred to as a Tank Strapping Table.

a. True
b. False

7.3 A Master Tape is?

a. The only tape that may be used to take custody transfer measurements
b. A tape belonging to the Captain of the vessel
c. A tape to be used only for tank calibration
d. A reference tape, traceable to a recognized international standard, which is to be used only for verifying the calibration of tapes used in the field

7.4 An innage gauge measures?

a. The distance from the surface of the liquid in the tank to the reference gauge point of the tank
b. The distance between the point where the floating roof of the tank is floating freely and the point where it is resting fully on its supports
c. The level of liquid in a tank measured form the datum plate or tank bottom to the surface of the liquid
d. The distance from the tank datum plate or bottom to the tank reference gauge point

7.5 An outage gauge measures?

a. The distance from the tank datum plate or bottom to the tank reference point
b. The distance from the surface of a liquid in a tank to the reference gauge point of the tank
c. The amount of product transferred out from a tank
d. The level of liquid in a tank measured from the tank bottom to the surface of the liquid

7.6 Water indicating paste is used to?

a. Determine the S&W of the product in the tank
b Detect the presence of suspended water within the product in the tank
c. To indicate the product / free water interface within the tank
d. None of the above

7.7 An innage gauge bob is pointed to aid in penetration of tank bottom sediment, and it's zero point is at the?

a. Top of the eye
b. Bottom of the eye
c. Tip of the bob
d. Inside of the tape swivel

7.8 The observed reference height of a tank is?

a. The distance from the reference point to the bottom of the tank or the datum plate as measured during the gauging operation
b. The distance from the reference point to the bottom of the tank or the datum plate as shown on the tank capacity tables
c. The distance from the ullage pipe to the liquid level
d. Usually written somewhere on the ullage pipe

7.9 Innage is best described by?

a. The distance from the datum plate or the tank bottom to the surface of the product
b. The measurement from the tank bottom to reference point
c. The cut found on the bob
d. The distance from the reference point to surface of the product

7.10 An outage (or ullage) gauging bob is designed to be used with?

a. An outage (or ullage) gauging tape
b. An innage tape
c. Can be used with either
d. A sounding rod

7.11 The zero point of an outage gauging bob is located at the?

a. The tip of the bob
b. The mid point of the bob
c. The inside top of the eye of the bob

d. The top of the tape swivel

7.12 An extension outage (or ullage) bob is designed to be used with?

a. An outage (or ullage) gauging tape
b. An innage tape
c. Can be used with either
d. A sounding rod

7.13 The distance between the point where the floating roof begins to rest on its normal supports and the point where it begins to float freely, is known as?

a. The floating level
b. The lower leg level
c. The critical zone
d. The displacement level

7.14 On a shore tank, what is the distance between the Reference Gauge Point and the Datum Point, as measured at the time of gauging, called?

a. Observed reference point
b. Reference gauge height
c. Total gauge height
d. Observed gauge height

7.15 A tank datum plate is?

a. The position on a tank where the gauge height is noted
b. The point marked on the gauge hatch of a tank to indicate the position from which the tank is to be gauged
c. The plate on the tank shell that lists the tank general data such as roof weight, height of tank, etc.
d. A plate placed in the tank and directly under the reference gauge point to provide a fixed contact surface

7.16 When rainwater or snow accumulates on the roof of an external floating roof tank, the product level in the tank will?

a. Decrease
b. Remain the same
c. Increase
d. None of the above

7.17 An innage tape and bob may be used to take an outage gauge.

a. True
b. False

7.18 An ullage gauge is the same thing as an outage gauge.
a. True
b. False

7.19 According to API MPMS Chapter 3.1a, gauge tapes must be verified for accuracy?
a. Before initial use and once per year
b. Once per month
c. Before each use
d. Once every three months

7.20 Some closed/restricted measurement systems are gas-tight and others are only liquid-tight permitting some vapor to escape around the PMU when tanks are under positive pressure.
a. True
b. False

7.21 Which gauge measures the distance from the datum plate or tank bottom to the surface of the liquid?
a. Innage
b. Ullage

7.22 Which gauge measures the distance from the surface of the liquid to the tank reference gauge point?
a. Innage
b. Ullage

7.23 The measured distance from the datum plate or tank bottom to the reference gauge point is called the?
a. Observed gauge height
b. Innage gauge height
c. Reference gauge height
d. Ullage gauge height

7.24 The distance from the datum plate or tank bottom to the reference gauge point, as shown on the tank capacity table is called the?
a. Observed gauge height
b. Innage gauge height
c. Reference gauge height
d. Ullage gauge height

7.25 Gauge tape readings must be recorded to the nearest?
a. 1/2 inch (1cm)

b. 1/4 inch (5mm)
c. 1/8 inch (3mm)
d. 3/4 inch (7mm)

7.26 The accuracy of tank's capacity table can be affected if?
a. The tank bottom flexes with the transfer of contents
b. Expansion at the vertical middle (barreling) occurs during filling
c. The tank shell has accumulated deposits of previous contents
d. All of the above

7.27 If an electronic gauging tape (PMU) is used to measure free water, which of the following procedures should be followed?
a. Rely on the PMU alone for free water level measurement because that is the same instrument used to measure the oil level
b. Apply water-finding paste to the bob of the PMU and compare the water level indicated by the paste to the water level indicated by the PMU
c. Rely on water-finding paste alone
d. Recommend to the terminal that the free water received and measured ashore be applied to the vessel figures

7.28 To determine the ullage of the liquid in a tank using an innage tape and bob assembly, you should?
a. Read the immersion depth of the tape at the reference gauge point and subtract the oil cut reading on the bob
b. Read the immersion depth of the tape at the reference gauge point and add the oil cut reading on the bob
c. Subtract the oil cut on the bob from the tank reference gauge height indicated on the tank capacity table
d. Subtract the oil cut on the bob from the measured tank reference gauge height

7.29 Which API MPMS Chapter describes the procedures for the gauging of petroleum or petroleum products?
a. 7
b. 8
c. 3
d. 1

7.30 When gauging light products, it is permissible to use chalk or talcum powder to facilitate reading the cut on the tape.

a. True
b. False

7.31 When using water indicating paste in light products, how long should the gauging bar be left in position?
a. A minimum of 5 seconds
b. A minimum of 10 seconds
c. A minimum of 30 seconds
d. A minimum of 45 seconds

7.32 When using water indicating paste in heavy oils, which of the following actions should you take to enable the paste to be read more easily?
a. Gently blowing on the gauging bar to remove the heavy oil
b. Use a soft cotton rag or towel to remove the excess oil
c. Use a suitable solvent to gently wash to surface of the paste
d. Immerse the gauging bar in a container full of light product such as gasoline

7.33 To try to ensure gauging accuracy in shore tanks, the minimum number of gauges recommended is?
a. 1 gauge
b. 2 identical gauges out of a maximum of three
c. 3 identical gauges out of 4
d. 4 gauges averaged

7.34 A quantity of free water (water bottoms) may be maintained within a store tank for which of the following reasons?
a. To permit easy determination of the shore tank free water quantity
b. So that a certain percentage of free water can be pumped with each movement in order to aid in S&W blending of cargoes
c. To negate any effect that diaphragming (bottom flexing) of the tank bottom would have on tank measured quantities
d. To aid in detection of any product seepage from the tank

7.35 Gauging standpipes on floating roof tanks should be?
a. At least 8 inches (20.3cm) in diameter
b. Extend to within 12 (30.5cm) inches of the tank bottom
c. Have two rows of overlapping slots located on opposite sides of the pipe

d. All of the above

7.36 The use of unslotted standpipes is not recommended for custody transfer measurements.

a. True
b. False

7.37 When gauging a terminal storage tank prior to loading a barge, an inspector notes that his observed gauge height does not match the reference gauge height. On gauging the same tank on completion of loading the barge he again observes the same difference in observed and reference gauge heights, such that both opening and closing observed gauge height readings are identical. Can the gauges obtained be used for determining the loaded volume?

a. Yes
b. No

7.38 When gauging a tank by the innage method, a comparison between the observed and reference gauge height is made to ensure which of the following?

a. The gauge tape and bob are suspended in a vertical position within the tank
b. The gauge bob is in contact with the tank bottom or datum plate
c. The tape has not been lowered too far into the tank
d. All of the above

7.39 Per API, when gauging a shore tank you read your tape to the nearest 1/16 of an inch (1mm)?

a. True
b. False

7.40 Can you obtain an accurate volume if you gauge a tank while the roof is in the critical zone?

a. Yes, when the tank legs are on low setting
b. Yes, when the tank legs are on high setting
c. No, it cannot be done
d. No, unless it is an internal floating roof

7.41 When inspecting # 6 F.O. are you required to check for free water?

a. Yes
b. No

7.42 If the density of a product within a tank is greater than the density of water, where would you expect to find any free water located in this tank?

a. You would not find it as it would not settle out of this product but would remain in suspension
b. On top of the product
c. Below the product
d. None of the above

7.43 How often must a working gauging tape be checked for accuracy by comparison against a traceable master tape?

a. Prior to each use
b. Every six months
c. Prior to initial use and at least annually
d. At least once per week

7.44 How often should a working gauge tape be inspected for 'wear and tear'?

a. Daily or prior to each use
b. Once per week
c. Once per month
d. Once per year

7.45 Reference heights should be?

a. Recorded from the calibration tables, before you start the tank inspection
b. Checked against the observed reference height
c. Included in the inspection report
d. All of the above

7.46 Free water measurements may be taken by?

a. The innage method
b. The ullage method
c. The Heimlich method
d. Both a and b

7.47 When would you check for water on the top of a cargo?

a. If the observed API Gravity is greater than 10.0
b. If the observed API Gravity is less than 10.0
c. You never check for the presence of water on top of a cargo
d. When you are in the Southern Hemisphere

7.48 Which of the following is acceptable for the determination of free water for marine vessel custody transfer measurements?

a. A Tulsa thief
b. A portable electronic gauge tape (PMU)
c. A bob with water-finding paste
d. Both b and c

7.49 Is it permitted to use an ullage tape & bob to take innages?

a. Yes
b. No

7.50 If during an inspection the water cut falls on the clip of the gauge tape, what must be done?

a. Repeat the water cut using a 12" (30cm) or 18" (45cm) water bar
b. Repeat the water cut taking an ullage of the water
c. Interpolate the cut
d. Both a and b

7.51 What is the minimum amount of time the bob must stay in position while water cutting a heavy crude oil?

a. 10 seconds
b. 30 seconds
c. 60 seconds
d. There is no set time

7.52 An "insurance gauge" is a liquid level measurement taken prior to the "official gauge", when?

a. The "official gauge" will not be taken for a significant period time after completion of cargo operations
b. It is required by your employer's insurance company
c. It is required by the Charter Party
d. All of the above

7.53 The precision of liquid level measurement in tank cars is?

a. 1/16" (1mm)
b. 1/8" (3mm)
c. 1/4" (5mm)
d. ½" (1cm)

7.54 The liquid outage level must be measured in all tank cars?

a. True

b. False

7.55 What U. S. Government agency audits inspection companies to determine that API and ASTM standards are being followed?

a. U.S. Coast Guard
b. EPA
c. U.S. Customs
d. Department of the Navy

7.56 The floating roof of a shore tank displaces a certain volume of liquid when it is in the free floating position. The weight of the volume of liquid displaced is?

a. Equal to the weight of the roof and the attached deadwood
b. Greater than the weight of the roof and the attached deadwood
c. Less than the weight of the roof and the attached deadwood
d. None of the above

7.57 What is the purpose of a floating roof adjustment in a shore tank calculation?

a. To account for the compression on the liquid due to the weight of the roof
b. To account for the volume of liquid displaced as a result of the weight of the roof
c. The temperature of the roof affects the temperature of the petroleum liquid in the tank
d. The roof thickness changes with the API of the petroleum liquid

7.58 If you use an *ullage bob* attached to an *innage tape*, what will be the result?

a. You will need to *add* the level of the cut on the bob to the tape reading at the reference gauge point
b. You will get an incorrect reading as you cannot use an innage tape with an ullage bob
c. You will need to *subtract* the level of the cut on the bob to the tape reading at the reference gauge point
d. You will need to deduct 6" (0.15m) from the reading at the reference gauge point.

7.59 When requested to set a stop gauge, you:

a. Refuse, it's not your responsibility

b. Follow your company's procedure and use the proper form with current disclaimers
c. Set the stop gauge and take full responsibility
d. Tell the vessel/terminal personnel to set the stop and you will check it for accuracy

7.60 When setting a min/max stop gauge one must:

a. Make calculations and provide the gauge closest to the requested volume
b. Inspector's don't set stop gauges
c. Tell the terminal to set the stop and you will check it for accuracy
d. Make calculations and provide the gauge closest to the requested volume without exceeding the volume to be transferred

SECTION 8 - TEMPERATURE

8.1 API MPMS Chapter 7 pertains to what type of thermometers?

a. Mercury-in-glass
b. Alcohol-in-glass
c. Portable electronic thermometers
d. All of the above

8.2 Does API MPMS Chapter 7 make any references to the construction of portable electronic thermometers?

a. Yes
b. No

8.3 Is a portable electronic thermometer required to have a low voltage indicator?

a. Yes
b. No

8.4 Why do portable electronic thermometers have low-voltage indicators?

a. So that it will not fail half way through the inspection
b. The unit could give false readings if the battery is low
c. If the voltage drops, the night light will not work
d. Most portable electronic thermometers do not have an indicator

8.5 On a portable electronic thermometer, what should be checked at least once per month?

a. The junction between the cable and the probe should be checked for mechanical damage
b. The cable insulation should be checked for cuts, breaks, or abrasion.
c. Two or more temperatures near the ends of the range of the probe
d. All of the above

8.6 According to API MPMS Chapter 7, when calibrating a portable electronic thermometer with a range of 0 to 200 °F. (-17.8°C to 93.3°C), it must be restandardized if it is in error by more than?

a. ± 0.2°F (0.1°C)
b. ± 0.5°F (0.3°C)
c. ± 1.0°F (0.6°C)
d. None of above - it must be exact.

8.7 Temperatures obtained using portable electronic thermometers should be read and recorded to the nearest?

a. 0.1 °F or °C
b. 0.5 °F or °C
c. 1.0 °F or °C
d. 1.5 °F or °C

8.8 The display of a portable electronic thermometer shall be capable of reading to the nearest?

a. 0.5 °F or °C
b. 0.1 °F or °C
c. 1.0 °F or °C
d. 0.25 °F or °C

8.9 The grounding of a portable electronic thermometer is addressed in which API MPMS chapter?

a. Chapter 7
b. Chapter 3
c. Chapter 8
d. Chapter 1

8.10 If a portable electronic thermometer has a range of 0 - 200 °F (-17.8°C to 93.3°C), what is the required accuracy?

a. ± 1°F (0.6°C)
b. ± 0.5°F (0.3°C)
c. ± 0.2°F (0.1°C)
d. None of above

8.11 If a mercury-in-glass ASTM 59F-80 thermometer has a range of 0F to 180F, what is the required accuracy?

a. +/- 1F
b. +/- 5F
c. +/- 0.2F
d. +/- 0.5F

8.12 Upright cylindrical storage tanks have capacity tables based on a specific tank shell temperature. If the observed tank shell temperature differs from the capacity table tank temperature, the volumes extracted from Cont'd
the capacity table will need to be corrected for this temperature difference?

a. True
b. False

8.13 If a tank has more than ten feet of liquid, what is the minimum number of temperature readings that must be taken?

a. 5
b. 3
c. 1
d. One every 2 feet (0.61m)

8.14 If only one temperature is required where should this temperature be taken from?

a. The middle of the upper third
b. The middle of the liquid
c. The middle of the lower third
d. Use a side readout thermometer

8.15 The quickest way to stabilize the reading from a thermometer is to?

a. Allow the probe to stay in the product for twice the required time
b. Move the probe up and down at least one foot above and below the spot the temperatures is to be taken

c. Use fresh batteries
d. There is no way to speed up the temperature process

8.16 What is the minimum amount of product needed for a temperature to be taken?

a. Whenever there is sufficient material present to immerse the probe
b. One foot (0.30m)
c. Ten feet (3.05m)
d. Only when the roof is free floating

8.17 A portable electronic thermometer should be read and recorded to the nearest?

a. Half degree
b. One degree
c. One tenth of a degree
d. None of above

8.18 According to API MPMS Chapter 7, when should the field verification of a portable electronic thermometer be performed?

a. Daily comparison to another portable electronic thermometer
b. By comparing it to a mercury-in-glass thermometer, before each use or once per day (which ever is less frequent)
c. By checking the unit weekly, for accuracy
d. Calibrate against an ANSI traceable thermometer at prescribed intervals

8.19 Mercury-in-glass thermometers are suitable for use in obtaining cargo product temperatures in marine vessels required to operate with closed or restricted systems?

a. True
b. False

8.20 The minimum amount of time that an "in motion" probe should stay in a product with an API gravity of less than 20 is?

a. 80 minutes
b. 30 minutes
c. 75 seconds
d. 10 seconds

8.21 If a tank has 9' 11" (3.02m) of product or is less than 5000 Bbls in capacity, what is the minimum number of temperatures you are required to take?

a. One
b. Two
c. Three
d. None

8.22 When using a portable electronic thermometer, in addition to the immersion time required, what else is an indication of temperature stabilization?

a. The side temperature on the tank
b. Using the cupcase for comparison
c. Last recorded temperature by the terminal
d. Readout doesn't vary by more than 0.2°F (0.1°C) for 30 seconds

8.23 What is the minimum number of temperatures to be taken on a marine vessel with tanks containing more than 5000 Bbls?

a. Three per tank
b. One per tank
c. Weighted average per tank
d. None of above

8.24 API MPMS Chapter 7 describes a "large temperature difference" between upper, middle and lower readings as?

a. Greater than 0.5°F (0.3°C)
b. Greater than 1.0°F (0.6°C)
c. Greater than 2.0°F (1.4°C)
d. Greater than 100°F (37.8°C)

8.25 The reading on a portable electronic thermometer may be considered to have reached stability if the readout, over a 30 second period, varies by no more than?

a. 0.5 °F (0.3°C)
b. 0.1 °F (0.05°C)
c. No variance is permitted
d. 0.2 °F (0.1°C)

8.26 When using a portable electronic thermometer, what is the minimum amount of time the probe must stay in a product of API gravity 40.7, if the probe is moving?

a. 30 seconds

b. 10 minutes
c. 60 minutes
d. 80 minutes

8.27 A thermowell used to measure temperature must be filled with a suitable heat-transfer liquid.
a. True
b. False

8.28 A mercury-in-glass thermometer with a range between 60°F and 180°F (15.56°C and 82.2°C) and must be accurate to within?
a. ± 1.0 °F (0.6°C)
b. ± 0.5 °F (0.3°C)
c. ± 0.1 °F (0.05°C)
d. ± 0.25 °F (0.2°C)

8.29 Which API MPMS Chapter covers temperature determination?
a. Chapter 3
b. Chapter 7
c. Chapter 8
d. Chapter 17

8.30 Scale graduation marks on a mercury-in-glass thermometer?
a. Must be etched permanently on the stem of the thermometer
b. Must be etched permanently on the cup-case assembly
c. Must be on a metal plate attached to either the thermometer or the cup case assembly
d. Any of the above

8.31 The mercury-glass tank thermometer ASTM 59F-80 has a scale range of 0 °F to 180 °F. The graduations on this thermometer are?
a. 0.1° F
b. 0.25° F
c. 0.5° F
d. 1.0° F

8.32 When first received from the manufacturer or equipment supplier, a new mercury-glass ASTM tank thermometer?
a. Can be used immediately because the manufacturer calibrates the thermometer before it is shipped

b. Must be checked to see that the mercury column is intact, then it may be used since the manufacturer will have calibrated the thermometer
c. Must be checked to see that the glass stem is not cracked or broken, then it may be used since the manufacturer will have calibrated the thermometer
d. Must be compared against a thermometer certified by NIST or an equivalent thermometer of traceable accuracy

8.33 According to API MPMS Chapter 7, a mercury-in-glass thermometer in a cupcase assembly must be verified against a NIST certified thermometer when new and at intervals thereafter of least?

a. 3 months
b. 6 months
c. 1 year
d. 5 years

8.34 "In motion" is defined as continuously raising and lowering the probe above and below the desired temperature measurement depth, by approximately how much?

a. Six inches (0.15m)
b. One inch (0.25m)
c. One foot (0.30m)
d. Three feet (0.91m)

8.35 The term "horizontal temperature stratification" means?

a. The temperature in a tank is different near the tank center than at the gauge hatch
b. Any difference in temperature measured at different levels in a tank
c. Only if the difference measured at any two levels in a tank exceeds 5°F (3°C)
d. All of the above

8.36 What is the minimum number of temperatures to be taken in a tank containing more than 10 feet (3.05m) of product?

a. 1
b. 3
c. 5
d. 2

8.37 When taking the temperature of a product in a tank and there is more than 2 °F (1°C) variance between upper,

middle and lower temperatures, what steps should be taken?

a. Retake the temperatures since there must be an error
b. Use the middle temperature only for the entire tank contents
c. Average the upper, middle and lower temperatures
d. Take temperatures at more frequent, equally-spaced vertical increments

8.38 When taking temperatures, *in motion* means to move the temperature measurement device approximately 1 ft. (0.3m) above and 1 ft (0.3m) below the desired measurement location?

a. True
b. False

8.39 What temperature is to be used during an ROB survey if there is only 2 inches (5cm) of liquid in the bottom of the tank?

a. The measured temperature at the middle of the liquid
b. 60°F (15°C)
c. The average temperature of the product in the tank before it was discharged
d. The temperature stated by the vessel's representative

8.40 A 25,000 barrel capacity storage tank has a depth of product of 12 feet (3.66m) in the tank. What is the minimum number of temperature measurements that should be obtained on this tank?

a. One
b. Two
c. Three
d. Four

8.41 The immersion time for a cup-case assembly is minimized by continually raising and lowering the assembly 1 foot (0.3m) above and below the desired temperature measurement point.

a. True
b. False

8.42 The procedure to field check a mercury-in-glass thermometer in a cupcase assembly is?

a. To check it against a portable electronic thermometer
b. To check it against the ship's thermometer
c. To check that the mercury column is unbroken, the scale is readable, and that the thermometer is clean and not cracked

d. To place it in a 100°F (37.8°C) water bath with a NIST certified thermometer for 45 minutes and compare the readings. They must be accurate within 0.1°F (0.05°C)

8.43 In a barge compartment containing less than 5,000 barrels, what is the minimum number of cargo temperature readings that will suffice?

a. Three – an upper, middle and lower temperature
b. Two – an upper and lower temperature
c. One – a middle temperature
d. You don't have to obtain a temperature; you can use the product temperature from the shore tank

8.44 What is the purpose of keeping the probe of a portable electronic thermometer (PET) in motion?

a. To ensure the unit is calibrated
b. To stir the product
c. To minimize temperature stabilization time
d. To prevent the probe becoming 'caught up' in the tank ladder

8.45 According to API MPMS Chapter 17.1, the preferred instrument for taking temperatures is?

a. A mercury-in-glass thermometer
b. A portable electronic thermometer
c. An in-line temperature probe
d. A preferred instrument is not specified

SECTION 9 - ETHICS

9.1 Which of the following statements represents an ethical problem for an Inspector?

a. Correcting the temperature of a shore tank when the PET has been found to be inaccurate
b. Changing the VCF after finding an error in the API gravity of the cargo
c. Changing the temperature of the cargo in a ship's tank because it is too far off the shore tank temperature
d. All of the above

9.2. The liquid level gauge of a shore tank is changed in the raw data book after it is found to be wrong upon re-gauging. The original data is covered with white-out fluid and the correct information is written over the blanked-out data. Is this a permissible way to handle raw data corrections?

a. Yes
b. No

9.3 The key person involved in managing ethics concerns in an inspection company would usually be the Compliance Officer.

a. True
b. False

9.4 When inspecting a petroleum or chemical cargo, which of the following represents sound ethical business conduct for an Inspector?

a. Making sure that my company's lab results match the results required by the customer
b. Making sure that the job is done according to API/ASTM standards
c. Making sure that U. S. Customs Service gets their sample on time
d. All of the above

9.5 Which procedure is acceptable when raw data, such as gauges or temperatures, must be corrected?

a. White out the original measurements and write the correct measurements clearly over the blanked-out area
b. Draw a single line through the original measurements so they can be read, and rewrite the correct measurements on the next line

c. Tear the original page out of the raw data book or pad and start over
d. None of the above

9.6 The Compliance Program established by your Company requires that you comply with regulations issued by:

a. The U.S. Customs Service
b. The Department of transportation
c. The Occupational Safety and Health Administration
d. All of the above

9.7 Federal reformulated gasoline sampling and testing regulations are written by:

a. The Department of Energy
b. The Department of Health
c. The Environmental Protection Agency
d. The Department of the Treasury

9.8 "Zero Tolerance" means that any and all infractions of your Company's Regulatory Compliance Program are subject to disciplinary action.

a. True
b. False

9.9 IFIA Member Companies strictly prohibit any form of retaliation against any person who, in good faith, files a complaint under their Regulatory Compliance Program, or assists in a Program violation investigation.

a. True
b. False

9.10 Changes to raw data cannot be made without a sound technical justification or re-measurement.

a. True
b. False

9.11 Reported data must be backed by, and be identical to its recorded data.

a. True
b. False

9.12 It is acceptable to alter analytical results based solely upon repeatability provided that the new result falls within the precision limits of the test method.

a. True
b. False

9.13 It is acceptable to ignore a potential violation of your Company's Regulatory Compliance Program if the violation does not directly involve you.

a. True
b. False

9.14 On finishing the closing inspection on a shore tank, following the completion of a marine vessel discharge operation, a representative who is witnessing your actions requests that you change the observed tank product temperature reading obtained as he feels that it is incorrect. Should you?

a. Comply with his wishes
b. Use the observed temperature of the product on the vessel prior to discharge
c. Inform him that you will re-check the product temperature if he requires but that you will record and use the product temperature that you have observed
d. Use the tank auto temperature reading instead

9.15 You are working on a job and a loss control representative repeatedly attempts to have you record gauges as being slightly more than you are finding i.e. 10' 6 ¼" rather than 10' 6 1/8". You should:

a. Comply with his request since he is working for your client
b. Point blank refuse to change any gauges
c. Report his behavior to your office, and to US Customs
d. Both b and c

9.16 When loss control is witnessing gauges he/she has the authority to ask you to make judgment calls in their favor?

a. True
b. False

9.17 While gauging ROB's on deck with the vessel's officer and loss control witnessing your gauges you call 2.5cm, the vessel's officer argues it should be 2cm and the Cont'd loss control representative is saying its 3 cm what should be done immediately on deck?

a. Argue with them both and state it's your call, you're the inspector of record and they should both be quiet and write what you call
b. Inform them that you are the inspector of record and write your gauge as you called it and proceed to the next tank

c. Use your cell phone and call your supervisor, you're there to gauge not referee
d. None of the above

9.18 While sampling you lose a bottle from your sample device and it's now somewhere in the tank, you:

a. Look around and make sure no one else saw anything and promptly get another bottle and say nothing to no one (That was close)
b. Explain to the representative of the tank/vessel what happened during normal operating procedures and notify your supervisor
c. Explain to the representative of the tank/vessel what happened during normal operating procedures and notify your supervisor then sign anything the representative asks you to sign
d. Try and fish the bottle out of the tank, you can use the break