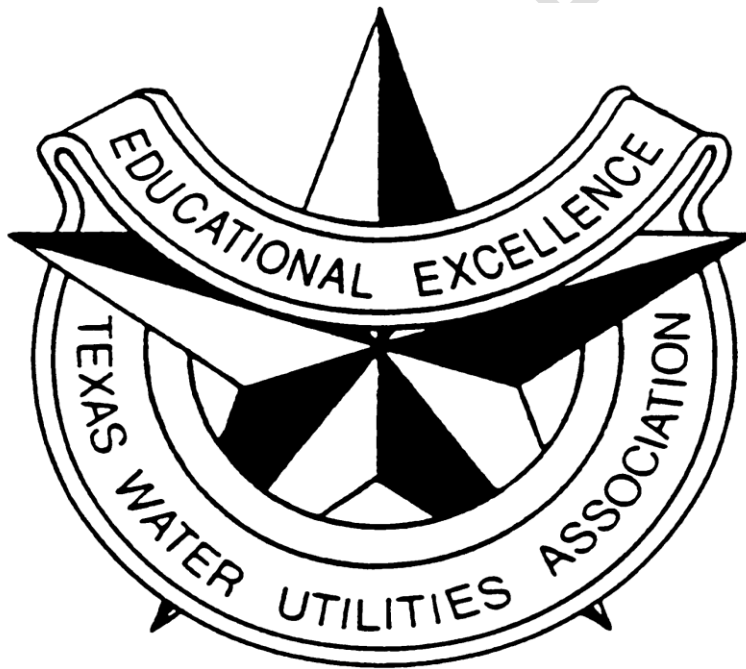


Collections Operator

Study Material

Collections



The following study questions were developed to assist the operator in the preparation process for taking a state licensing exam.

While we feel the questions provide a broad sample of the type of questions one might expect on the state exam. TWUA and staff in no way implies, guarantees, or suggests that an operator who uses, studies, or knows the following material will pass the state exam. The following is only intended to offer an additional study tool.

While TWUA and staff have proofed the questions and answers. It is possible however that some of the answers could be found in conflict with written materials. If you doubt or question the answer key PLEASE refer to written materials and use the answer that YOU feel best fits the question.

We hope that you will find this study guide useful and we wish you the best of luck on your state exam.

Collections Review Questions

1. Wastewater is typically generated from
 - a. Homes
 - b. Businesses
 - c. Industry, hospitals, & sometimes commercial (factories)
 - d. All the above
 - e. A & C only
2. The primary purpose of the sewer collection system is –
 - a. Collect & Quickly transport from origin to treatment
 - b. Transport waste to landfill
 - c. Transport waste to toxic waste disposal center
 - d. Collect & Hold waste until transfer can be arranged
 - e. Treat & transfer potentially toxic wastes
3. Septic sewage will -
 - a. Contain high concentrations of dissolved oxygen
 - b. Contain high concentrations of industrial waste
 - c. Contain low BOD
 - d. Contain no dissolved oxygen
 - e. All the above
4. The amount(s) of wastewater discharged or collected depends on –
 - a. Economic status, water rates, climate, I & I, & Industrial
 - b. Geographical location, precipitation, I & I, Number of Transfer Stations
 - c. Age of system, I & I, Number of connections, Cost of potable water
 - d. Elevation, type of pumps, gravity or pressure mains, operator
 - e. None of the above
5. The average person will contribute _____ to the Collection System –
 - a. 70 Gallons Water Per Day
 - b. 80 Gallons Water Per Day
 - c. 90 Gallons Water Per Day
 - d. 100 Gallons Water Per Day
 - e. 120 Gallons Water Per Day
6. Wastewater characteristics are divided into four categories –
 - a. Chemical, bacteriological, radiological, nuclear
 - b. Physical, bacteriological, radiological, nuclear
 - c. Physical, chemical, bacteriological, trace elements
 - d. Physical, chemical, bacteriological, radiological
 - e. Chemical, bacteriological, trace, nuclear

7. Fresh "Domestic" sewage is characterized by –
- Dishwater gray color & slight odor
 - Charcoal gray color & pungent odor
 - Dark black color & no odor
 - Dark black color & pungent odor
 - Dishwater gray color & pungent odor
8. Household garbage disposal units typically -
- Introduce more organic materials to the waste stream
 - Reduce the amount of organic materials to the waste stream
 - Have no impact on waste streams
 - Introduce more inorganic materials to the waste stream
 - Reduce the amount of inorganic materials to the waste stream
9. Most of the "Dissolved Oxygen" in the waste stream comes from –
- Injected Oxygen at the Lift Stations
 - Naturally occurring by chemical reaction
 - Systems Potable Water Supply
 - Aeration
 - None of the above
10. The operator would expect typical wastewater to be _____ % water & _____ % solids.
- 75 % water – 25 % solids
 - 80 % water – 20 % solids
 - 90 % water – 10 % solids
 - 95 % water – 5 % solids
 - 99.9 % water – 0.1 % solids
11. Suspended solids _____ by filtration
- Can be removed
 - Cannot be removed
 - Are increased
 - Are unchanged
 - None of the above
12. Examples of suspended solids include –
- Plants, animal, sugars, & paper
 - Grit, grease, & bacteria
 - Grit, grease, paper, salts
 - Grease, paper, plants, calcium
 - Grease, paper, minerals

13. Solids in the waste stream can be –
- Dissolved, Settable, or Inorganic
 - Organic and non-settable
 - Suspended, Settable, Organic or Inorganic
 - Inorganic and settable
 - Easily controlled by reducing flow velocity
14. Examples of inorganics in the waste stream are –
- Sand, metal, & plastics
 - Grease, grit, paper, & plastic
 - Sand, grit, paper, wood
 - Plant material, paper, plastic
 - Grit, plastic, heavy metals
15. Excess grease in the waste stream will –
- Assist with lubrication of pumps & bearings
 - Provide more settleability of suspended solids
 - Aid in gravity flow by lubricating insides of main lines
 - Cause stoppages
 - All the above
16. The pH scale is from 0 to 14 – What would be considered neutral ?
- 0
 - 5
 - 7
 - 9
 - 14
17. Hydrogen Sulfide gas produces a _____ smell
- Non-detectable
 - Sweet appealing
 - Decaying animal
 - Petroleum
 - Rotten Egg
18. Methane Gas is found in sewers and is –
- Heavier than air, explosive, odorless
 - Highly Toxic, with rotten egg smell
 - Odorless, heavier than air, & highly corrosive
 - Lighter than air, explosive, odorless
 - Yellowish heavier than air & deadens smell

19. The BOD test measures –
- The amount of solids in lbs/ml
 - The strength of sewage
 - Body Odor Determination
 - Bio Chemical Dioxide
 - Total Chlorine in effluent discharge
20. Pathogens are defined as _____ bacteria –
- Aerobic
 - Anaerobic
 - Disease causing
 - Facultative
 - None of the above
21. Some of the diseases commonly found in wastewater are ?
- Typhoid, Paratyphoid, Bacillary Dysentery & Cancer
 - Typhoid, Paratyphoid, Bacillary Dysentery & Cholera
 - Typhoid, Paratyphoid, Bacillary Dysentery & Swine Flu
 - All of the above
 - None of the above
22. Two Viral diseases commonly found in wastewater are ?
- HIV & Cholera
 - Mumps & Measles
 - Anemia & Blue Babies
 - Polio & Infectious Hepatitis
 - Typhoid & Cholera
23. Once sewage reaches the end treatment facilities it must be treated to –
- Dispose of solids, Destroy Pathogens, Eliminate Nuisances & Protect downstream users
 - Comply with TCEQ & FDA Standards
 - Promote safe community health
 - All the above
 - None of the above
24. Industrial waste contributes the following to the waste stream –
- Grease, Heavy inorganics', Lye, Food scraps, & Low BOD loading
 - Fats, Oils, Inorganics', Dissolved oxygen, & Low BOD loading
 - Flammable oils, Toxic gas, Acids, Alkalis, Heavy metals, & Organic toxins
 - Acid, Grease, Heavy metals, Blood, Food processing by products & neutral pH
 - All the above

25. The _____ is the state law regulating pollution control in Texas –
- The Texas Wastewater Code
 - The Texas Water Code
 - The Texas Pollution Reduction Act
 - The Texas Clean Rivers Act
 - The Texas Safe Water Code
26. An accidental discharge or bypass is –
- Deliberate discharges into state waters
 - Chlorinated wastewater authorized by permit
 - Routine operating procedure
 - Authorized by the state but a special permit is required
 - Inadvertent discharges into state waters
27. The _____ sets permit conditions such as –
- TCEQ & Duration, Maximum Discharge, Discharge Point, Discharge Quality
 - TWDB & Duration, Maximum Discharge, Discharge Quality, Chlorine residual
 - EPA & Duration, Maximum Discharge, Discharge Quality, Chlorine residual, & Fees
 - City Council & Duration, Maximum Discharge, Discharge Quality, & Chlorine residual
 - Texas Dept. of Health & Treatment capacity, Discharge Quality & User fees.
28. Should an event occur that affects “Aquatic Life” (fish) the _____ is the state agency that enforces any violation.
- Texas Commission on Environmental Quality (TCEQ)
 - Texas Water Development Board (TWDB)
 - Texas Section of EPA
 - Texas Parks and Wildlife
 - Texas Railroad Commission
29. Every city over _____ population MUST have a water pollution control program –
- 3,000
 - 5,000
 - 7,000
 - 10,000
 - No current rule or requirement
30. The current system design criteria requirements are covered in the _____ rules –
- TAC - Chapter 30
 - TAC – Chapter 290
 - TAC – Chapter 217
 - TAC – Chapter 341
 - TAC – Chapter 713

31. Overflows in the Collection System are addressed under the Clean Water Act – specifically in the category of ?
- CMOM – (Capacity, Management, Operation, & Maintenance)
 - COMO - (Capacity, Operation, Maintenance & Oversight)
 - DOMC - (Design, Operation, Maintenance, & Costs)
 - CMOP – (Capacity, Management, Operation & Performance)
 - CPAT – (Capacity, Performance, Administration, & Training)
32. The Minimum requirement for velocity of flow in a gravity system is ?
- One foot per second
 - Two feet per second
 - Four feet per second
 - Twelve feet per minute
 - Velocity only applies to Pressure Mains
33. All trenching and shoring requirements are set by –
- TCEQ – Texas Commission on Environmental Quality
 - TWDB – Texas Water Development Board
 - OSHA – Occupational Safety & Health Administration
 - TRC – Texas Railroad Commission
 - TDH – Texas Department of Health
34. All trenches over ____ deep require shoring protection
- Three Feet
 - Four Feet
 - Five Feet
 - Seven Feet
 - Only Suggestions, No Current Requirements
35. _____ & _____ pipe cannot be used in the Wastewater Collection System
- PVC & Clay
 - Ductile Iron & Pre Cast Concrete
 - Vitrified clay & Concrete
 - Aluminum & Fiberboard
 - Threaded & Compression Fittings
36. Rules related to trench width indicate the ASTM minimum trench width is
- One & one half pipe diameter plus 12 inches
 - Pipe diameter plus 16 inches
 - Pipe diameter plus 24 inches
 - Pipe diameter plus 36 inches
 - Six inches on either side of the pipe at the narrowest point

37. Bedding is very important. Current TCEQ requirements state that pipe bells MUST be at least ____ inches off the trench bottom and have at least ____ clearance from trench walls.
- Four inches & Six inches
 - Four inches & Twelve Inches
 - Six inches & Six inches
 - Six inches & Sixteen inches
 - Eight inches & Sixteen inches
38. New brick manholes are prohibited in the collection system – therefore all new manholes must be ?
- Fiber reinforced Cinder Block, Cast Concrete, Fiberglass, or High strength poly
 - Cast in place concrete, Precast Concrete, Fiberglass, or High density polyethylene
 - 100 mil poly liner, Fiberglass, Precast Concrete, or High density poly
 - Eliminated and replaced with clean outs
 - No current rule in place regulating manhole construction
39. Manholes are typically located at –
- Change in line alignment, Change in grade, Change in pipe diameter, Line intersection,
 - Change in grade, Change in pipe diameter, Street intersections, & as specified
 - Line intersections, each 500 feet, or as specified by design engineer
 - Change in line alignment, Change in pipe diameter, & as specified by Director of PW
 - The specification of each system or entity – no current state standard
40. When referring to Inflow & Infiltration (I & I) in the Collection System – the concern would be ?
- Unaccounted potable water or suspected illegal dumping
 - Storm drains & natural percolation
 - Rainfall & other waters such as high water table entering the collection lines
 - Industrial waste inflow or high BOD loading from Dairy operations
 - Illegal or unauthorized discharge into state waters
41. In lift stations – Dry wells MUST BE ventilated & ventilators must sized to change the air inside the structure _____ per hour.
- Two times
 - Four times
 - Six times
 - Eight times
 - Twelve times

42. Lift station pumps MUST have at least a _____ inch suction and capable of passing a _____ inch object.
- 2 inch & 2 inch object
 - 2 ½ & 2 inch object
 - 3 inch & 2 ½ inch object
 - 3 inch & 3 inch object
 - 3 ½ inch & 3 inch object
43. Lift stations MUST have a “Firm” pumping capacity. Firm capacity refers to ?
- Minimum flow capacity of pumping facility with largest pump out of service
 - Pumping capacity of facility to accommodate system load
 - Peak flow capacity with largest pump out of service
 - Peak flow capacity with one of the pumps out of service
 - Firm pumping capacity refers to pump curve and total head
44. In the Collection System “Force Mains” MUST BE at least _____ in diameter & have a pressure rating of at least _____ -
- 3 inch in diameter & 100 PSI
 - 4 inch in diameter & 150 PSI
 - 6 inch in diameter & 125 PSI
 - 8 inch in diameter & 150 PSI
 - Currently no minimum requirement in TCEQ rules
45. Lift stations MUST BE equipped with ?
- External Flashing Yellow Light & Warning signage
 - External Flashing Red Light & Audible Horn
 - External Flashing Yellow Light & Audible Horn
 - External Steady burn security light & Signage with emergency contacts
 - None of the above - only suggested options
46. In lift stations - Wet wells MUST BE ventilated & ventilators must be sized to change the air inside the structure _____ per hour.
- Two times
 - Four times
 - Six times
 - Eight times
 - Twelve times
47. In pump terminology “Head” refers to -
- The force the pump works against measured in feet
 - The force the pump works against measured in pressure
 - The total pressure the pump is rated to produce in gallons per minute
 - The total horsepower needed to produce desired flow
 - The pump curve & suction diameter of the pump inlet

48. Non-Point Discharges are –
- Constant, no control and include storm water, seepage, & runoff from feedlots
 - Intermittent, no control and include municipal, storm water, and runoff
 - Intermittent, no control and include storm water, seepage, & farm runoff
 - Constant, strict controls and include storm water & agricultural runoff
 - Only applicable to population above 5,000
49. When sizing collection lines and lift station wet wells the incoming lines and holding facilities at the lift station MUST BE sized to hold –
- All flow that accumulates during longest power outage of the last 12 months
 - All flow that accumulates during longest power outage of the last 24 months
 - All flow that accumulates during longest power outage of the last 36 months
 - All flow that accumulates during longest power outage ever recorded
 - None of the above - No such rule exists
50. In the Collection System _____ pumps are the most common –
- Submersible
 - Piston
 - Centrifugal
 - Diaphragm
 - Grinder
51. Typical controls found in lift station to control the function of the facility include –
- Floats, Electrodes, Bubblers, & Acoustic
 - Laser LED, Electrodes, Bubblers, & Acoustic
 - Pressure switches, Floats, Bubblers, & Acoustic
 - Electronic times, Floats, Mercury, & Bubblers
 - Manual switches, Electronic timers, Bubblers, & Floats
52. If an operator is told a pump is “Cavitating” – the device is
- Sized properly & functioning as designed
 - Partially clogged with debris
 - Leaking fluid around shaft seals
 - Out pumping the supply
 - Operating with insufficient power line voltage
53. A “Water Hammer” will occur when –
- Flow through a pipe is suddenly stopped
 - Flow through a pipe is slowly decreased
 - Pressure inside a pipe exceeds UL rating
 - Velocity inside a pipe exceeds 12 feet per second
 - Pressure inside a pipe exceeds 150 PSI

54. The term "Lock out Tag out" refers to
- Intruder security & proper signage
 - Securing Gate Valves & Notification within a Lift Station
 - The main power disconnect being turned off- locked – and tagged with your name
 - The main power disconnect being tested by a licensed electrician and voltage verified
 - An operator making sure the office knows when he / she is performing maintenance
55. Point Source Discharges are –
- Closely monitored and controlled and would be like municipal discharge
 - Loosely monitored and self reporting and would be like municipal discharge
 - Closely monitored and controlled and would be like storm water & farm runoff
 - Reported annually and treated the same as a Authorized By Pass
 - Are only applicable to populations over 5,000
56. When the operator is cleaning or clearing a plugged main line with a water jet machine – this act should be done –
- From upstream and work toward the blockage
 - During normal work hours and whatever is most convenient to the operator
 - Only after camera system has confirmed where the blockage is located
 - From the first manhole that can be located in the trouble area
 - From downstream and work toward the blockage
57. Entering a manhole is discouraged but sometimes necessary. Before entering the operator should –
- Test for petroleum gases and carbon monoxide
 - Test for methane gas and oxygen rich environment
 - Test for harmful gases and oxygen deficiency
 - Have a Will in place and carry insurance documentation
 - Collect a water sample from flow and have BOD established to determine if septic
58. The TCEQ preferred method of Backflow prevention is –
- Physical Air Gap
 - Reduced Pressure Zone Valve (RPZ)
 - Testable Double Check Valve
 - Serviceable Grease & Sand Trap
 - Check Valve on the customer outfall line

59. Operators working in Collections and Treatment will be asked to collect two types of samples and they are –
- Grab & Total
 - BOD & Bacteriological
 - Composite & Dissolved Oxygen
 - Grab & Composite
 - All the above
60. As an operator you are instructed to install 2 miles of 8 inch class 150 PVC main line. The pipe comes in 20 foot sections – how many joints or sections will there be in the project ?
- 176
 - 264
 - 528
 - 5280
 - 10,560
61. You are instructed to install 1,000 feet of 8 inch diameter gravity flow sewer pipe what is the recommended fall in feet per 100 feet and what will be the overall fall from the beginning to the end of the 1,000 feet line to be installed ?
- 0.20 & 2.0 feet
 - 0.25 & 2.5 feet
 - 0.33 & 3.3 feet
 - 0.33 & 33.3 feet
 - 0.50 & 50.0 feet
62. In your system you have a lift station that is pumping 800 gallons per minute and runs continuous – how many MGD (Million Gallons Per Day) will this be ?
- 19,200 MGD
 - 48,000 MGD
 - 1.15 MGD
 - 1.51 MGD
 - Not enough information to compute
63. You are instructed to dig a trench 150 feet long, 3 feet wide, and 4 ½ feet deep – How many cubic yards of soil will be excavated ?
- 7.5
 - 75
 - 750
 - 2,025
 - Not enough information to compute

64. The Wet Well in a lift station measures 12 feet X 12 feet & is 30 feet deep – How many gallons of water will this tank hold if 100 % full ?
- 4,320
 - 5,400
 - 9,000
 - 32,313
 - 40,392
65. You work for a facility that has a population of 3,210 persons. Your flow measuring equipment is not working. Approximately how many gallons of wastewater will be discharged into the collection system each 24 hours ?
- 54,570 gallons
 - 545,700 gallons
 - 321,000 gallons
 - 3,210,000 gallons
 - Not enough information to compute
66. In your facility you have a line interceptor structure that is 8 feet in diameter and is 24 feet deep – if this facility is 100 % full how many gallons of water will it hold ?
- 1,205 gallons
 - 1,611 gallons
 - 2,872 gallons
 - 9,019 gallons
 - Not enough information to compute
67. In your facility you have 6,230 feet of 36 inch high pressure main. How many gallons of water will this pressure main hold if completely full ?
- 47,409 gallons
 - 60,394 gallons
 - 83,867 gallons
 - 84,734 gallons
 - Not enough information to compute
68. Your entity currently has 2,200 active residential connections. Assuming the average household is 3 persons. What would the expected BOD in total pounds per day received at the wastewater treatment facility ?
- 561 pounds per day
 - 1,122 pounds per day
 - 1,221 pounds per day
 - 6,600 pounds per day
 - Only applicable to populations over 500,000

69. In your entity you have a 12 inch gravity flow main. This main is 7,200 feet in overall length. If you placed a plastic ball in the upper manhole and it takes 40 minutes for the ball to reach the bar screen 7,200 feet downstream - what is the velocity of flow in this main ?
- .34 feet per second
 - 1.8 feet per second
 - 3 feet per second
 - 6 feet per second
 - No enough information to compute
70. Your entity has a holding pond at the treatment facility that measures 300 feet long and 150 feet wide and there is approximately 3 ½ feet of water in this basin - how many gallons does this structure hold and how long in hours would it take to fill if the basic is completely empty and the rate of flow is 225 GPM ?
- 157,500 gallons & 11.6 hours
 - 157,500 gallons & 70.0 hours
 - 1,178,100 gallons & 87.2 hours
 - 1,178,100 gallons & 52.3 hours
 - Not enough information to compute

Collection Answer Key

- | | |
|-------|-------|
| 1. D | 41. C |
| 2. A | 42. C |
| 3. D | 43. C |
| 4. A | 44. B |
| 5. D | 45. B |
| 6. D | 46. E |
| 7. A | 47. A |
| 8. A | 48. C |
| 9. C | 49. B |
| 10. E | 50. C |
| 11. A | 51. A |
| 12. B | 52. D |
| 13. C | 53. A |
| 14. A | 54. C |
| 15. D | 55. A |
| 16. C | 56. E |
| 17. E | 57. C |
| 18. D | 58. A |
| 19. B | 59. D |
| 20. C | 60. C |
| 21. B | 61. C |
| 22. D | 62. C |
| 23. A | 63. B |
| 24. C | 64. D |
| 25. B | 65. C |
| 26. E | 66. D |
| 27. A | 67. A |
| 28. D | 68. B |
| 29. B | 69. C |
| 30. C | 70. C |
| 31. A | |
| 32. B | |
| 33. C | |
| 34. C | |
| 35. D | |
| 36. B | |
| 37. C | |
| 38. B | |
| 39. A | |
| 40. C | |