Examination Content Outline

1	**Source Water Characteristics**	**10**
1A	Evaluate the following source water characteristics:	
1A1	biological (bacterial).	
1A2	inorganic chemical.	
1A3	potential sources of source water contamination.	
1B	Measure static water level and pumping levels of wells.	
1C	Measure and monitor ground water source.	
1D	Perform inspections of ground water well sites and report any issues that may affect water quality (e.g., contamination, flooding, well head protection).	
1E	Educate community on source water protection and conservation.	
2	**Treatment Process**	**23**
2A	Calculate and/or record:	
2A1	plant residuals.	
2A2	daily flow rates.	
2A3	chemical levels and previous days usage.	
2A4	online analyzers data (i.e., pH, chlorine)	
2B	Calculate chemical dosages.	
2C	Operate and maintain HMI and SCADA systems.	
2D	Determine correct disinfectant dosage and contact time to maintain desired level of residual in system.	
2E	Control treatment plant processes, chemical dosages, and equipment used to treat water.	
2F	Determine and adjust plant flows to meet system demands.	
2G	Troubleshoot malfunctions and problems in plant process and equipment.	
2H	Identify trends and abnormal operation in plant processes by interpreting data from gauges, meters, charts, and graphs.	
2I	Interpret facility and process control water meters.	
2J	Maintain records of operation of treatment facilities:	
2J1	daily testing logs.	
2J2	daily equipment logs.	
2J3	daily well production.	
2J4	daily maintenance management reports and notes.	
2J5	microbiological sampling and testing.	
2K	Make appropriate changes in plant processes to optimize performance and efficiency.	
2L	Mix batches of chemical solutions.	
2M	Add chemicals to feed equipment.	
2N	Monitor the transmission and distribution system.	
2O	Monitor, evaluate, and adjust:	
2O1	oxidation and iron/manganese treatment.	
2O2	chemical feed pumps.	

2P	Operate, maintain, and control electric motors, pumps, and valves to regulate flow of water at the treatment facility.	
2Q	Perform calculations related to process monitoring.	
2R	Ensure the supply and proper handling, storage and use of chemicals.	
3	**Distribution System Components**	**22**
3A	Assess water production versus consumption.	
3B	Adjust the water production to meet the demand (e.g., start pumps, adjust flow valves).	
3C	Understand backflow prevention and control devices.	
3D	Implement a cross-connection control program.	
3E	Monitor water distribution system pressure.	
3F	Determine water volume (e.g., tank, main).	
3G	Determine water flow rate (e.g., mains, pumps, services).	
3H	Maintain an up-to-date map of the distribution system (e.g., GIS, repairs, replacements).	
3I	Operate and maintain distribution system components:	
3I1	well pumps and related equipment (e.g., packing pumps, starters and controls).	
3I2	mains and related equipment (e.g., hydrants and valves).	
3I3	metering and related equipment (e.g., remote readers, meter replacements).	
3I4	finished water storage and related equipment (e.g., tanks, overflow pipe, vents, access hatches).	
3J	Understand schematic diagrams.	
4	**Equipment Installation, Operation, and Maintenance**	**18**
4A	Install water lines:	
4A1	service lines (e.g., tapping, curb stops, corporation stops).	
4A2	water mains (e.g., valves, hydrants).	
4B	Monitor and maintain pump stations and related equipment (e.g., check valves, control systems).	
4C	Inspect the cleaned and disinfected finished water storage facilities.	
4D	Inspect finished water storage facilities (e.g., drains, screens).	
4E	Conduct distribution system flushing.	
4F	Repair water line (e.g., install repair clamps and sleeves).	
4G	Repair distribution components (e.g., mains, services, meters, valves, hydrants, pumps).	
4H	Disinfect components used during install/repairs.	
4I	Conduct a leak detection program (e.g., survey, testing meters, water loss audit).	
4J	Operate and maintain well and related equipment.	
4K	Maintain the sanitary condition of the well and well site.	
4L	Measure static water levels and pumping water levels.	
4M	Locate and map water lines (e.g., valves, hydrants).	

4N	Perform underground locating, marking and notification.	
4O	Adjust pumps to meet demand.	
4P	Perform facility startup and shutdown per SOP.	
4Q	Calibrate, operate, and maintain online instrumentation (e.g., pH, Cl analyzer).	
4R	Complete equipment maintenance and repair records, including work orders.	
4S	Operate and maintain chlorine disinfection systems.	
4T	Inspect, exercise, and maintain valves.	
4U	Operate and maintain facility and process control water meters.	
4V	Install and maintain facility piping (e.g., air, water, chemical).	
4W	Lubricate pumps, motors, chains, conveyors, and other machinery and equipment.	
4X	Operate and maintain pumps, drivers, and auxiliary equipment.	
4Y	Operate and maintain onsite backup power generator.	
4Z	Perform calibration of chemical feeders.	
4AA	Operate and maintain emergency systems.	
4BB	Perform routine maintenance of grounds machinery, structures, equipment, and piping systems (e.g., cleaning, painting).	
4CC	Perform inspections on water storage covers, hatches, access covers, vents, and overflows.	
5	**Laboratory Analysis/Interpretation**	**12**
5A	Calibrate laboratory instrumentation to ensure proper operation.	
5B	Collect water samples	
5C	Perform sample preservation and documentation for laboratory samples.	
5D	Perform lab tests, record results, and interpret data (e.g., pH, chlorine, fluoride, phosphate, iron, alkalinity, hardness, temperature)	
5E	Use equipment to evaluate water quality.	
5F	Collect and analyze samples; interpret results:	
5F1	chlorine residual	
5F2	pH	
5F3	temperature	
5F4	microbiological	
5F5	lead/copper	
5F6	organic chemicals	
5F7	inorganic chemicals	
5F8	disinfectant byproducts	
5F9	radionuclides	
5F10	chlorine demand	
5G	Interpret laboratory analysis for:	
5G1	compliance with established water quality standards.	
5G2	meeting standard operating practices.	

6	Security, Safety, Compliance, and Administrative Procedures	15
6A	Accept chemical shipments and inspect chemical containers and security tags before taking delivery (e.g., review SDS's).	
6B	Handle disinfection chemicals.	
6C	Secure the disinfection chemicals (e.g., chain cylinders, lock the disinfection facility).	
6D	Advise on need to order chemicals, repair parts, and tools.	
6E	Advise system staff and/or contractors of potential problems and alarms.	
6F	Inspect plant safety equipment (e. g., fire extinguishers, AED, smoke and gas detectors).	
6G	Comply with safety requirements of the facility and actively promote safe work practices.	
6H	Develop and maintain standard operating procedures.	
6I	Determine and procure materials, labor, and cost needed for operation, maintenance, and repairs.	
6J	Investigate consumer complaints regarding water quality and take remedial action.	
6K	Comply with lockout tagout procedures.	
6L	Determine if water quality violations have occurred.	
6M	Ensure compliance with regulatory agency standards.	
6N	Manage safety and environmental issues in compliance with appropriate regulatory agencies.	
6O	Monitor and control well production and chemical residuals to comply with regulatory permit limits.	
6P	Monitor the use of energy and chemicals.	
6Q	Complete monthly reports.	
6R	Track and maintain inventory (e.g., equipment, chemical, and general supplies).	
6S	Maintain and evaluate operating records and trends.	
6T	Implement and execute a confined space program.	
6U	Work in or around excavation sites: implement appropriate trenching and shoring.	
6V	Notify the public when reportable maximum contaminant levels are exceeded.	
6W	Inform customers of planned repairs or changes in the water line.	
6X	Perform facility and perimeter security checks.	
6Y	Communicate observed unsafe workplace conditions.	
6Z	Identify opportunities to mitigate risks.	
6AA	Perform safety procedures (e.g., calibration of atmospheric testing devices, chemical hazards and chemical spill response, pathogens, personal protective equipment).	
6BB	Perform supervisory duties.	
6CC	Review and update facility emergency response plans.	

6DD Respond to emergencies (e.g., major spill response, natural disasters, system contamination).
6EE Participate in safety/compliance program.
6FF Perform traffic control during maintenance, repairs, and construction.
6GG Secure all water system facilities in a manner that protects the supply from contamination and prevents unauthorized entry and vandalism.
6HH Investigate system tampering and theft.
6II Maintain an emergency plan of operations.
6JJ Maintain system records (e.g., laboratory, consumption, maintenance).
6KK Interpret plans, maps, and system standard specifications.
6LL Address water quality communications (e.g., taste, odor, color).
6MM Read plant meters.
6NN Address customer inquiry.
6OO Participate in consumer confidence reports.