



Try in the following questions

**Question One** (30 Marks)

- 1- a)** Discuss the type of coagulants used to enhance sedimentation process in water treatment.
- b)** Explain the different modifications in sedimentation processes to reduce the size and increase the efficiency
- c)** Design the super-pulsator sedimentation tanks and connecting pipes in a water treatment plant of 100,000 m<sup>3</sup>/day.
- Draw plan and sections** for the designed unit with its connecting pipes.

**Question Two** (30 Marks)

- 2- a)** Discuss the theories of filtration for purification water supply.
- b).** Explain the different method of disinfection and their disinfection by products.
- c)** Design the filtration house and connecting pipes in a water treatment plant of 250,000 m<sup>3</sup>/day.
- Draw plan and sections** for the designed filtration house with its connecting pipes.

**Question Three** (20 Marks)

- 3-a)** Discuss briefly using sketches the reasons and methods for removing high concentrations of Iron and Manganese in water supply.
- b)** Explain the different mode of Water Hardness, its effect on water supply and methods of reducing Hardness.
- c)** Design a water softening plant working 20 hrs/day, of flow 5000 m<sup>3</sup>/day, raw water hardness 400 mg/l, allowable hardness in treated water 40 mg/l, ion exchange capacity of used resin 25 kg/m<sup>3</sup>, capacity of regeneration salt 50 kg/m<sup>3</sup>.

**Question Four** (20 Marks)

- 4-a)** Discuss with using flow diagram the common methods employed in desalinations.
- b)** Explain in details the use of **Reverse Osmosis** for sea water desalination (idea, advantage, disadvantages, flow diagrams).

*With my best wishes*

*Prof. M. Elsheikh*

This exam contribute by measuring in achieving Program Academic Standards NARS			
Question No.	Q1-a, Q1-b, Q2-a, Q3-a, Q4-a	Q2-c, Q3-b	Q1-c, Q2-b, Q4-b
Skills	A-3	B-3	C-1
	Knowledge & Understanding	Intellectual Skills	Professional Skills