1. A container with cross sectional area 0.02 m² is filled with 10 L equal parts saltwater (SG = 1.035) and fresh water. Assume properties of mixing are negligible. What will be its gauge pressure at the bottom? (Atmospheric pressure is 1.013×10^5 Pa)

2. A flask has a base of radius 12 cm and narrows to a neck of radius 6 cm. It’s filled to the base of the neck with water. If 5.5x10^-4 m³ of additional water is poured into the flask, by how much does the force of the water on the base increase?

3. A U tube closed at one end holds mercury, for which the level on the open-end side is 31 cm higher than it is on the closed-end side. What is the absolute pressure in the air that is trapped in the closed end of the tube? The density of mercury is 13.6 grams/cm³.

4. A +15 nC point charge is placed on the x axis at x = 1.5 m, and a -20 nC charge is placed on the y axis at y = -2.0m. What is the magnitude of the electric field at the origin?

5. A proton is fired at 5500 m/s directly toward an infinite plane of surface charge density 1.8 nC/m². Assuming it doesn’t hit the plane, how far does it travel before turning around?

6. A solid, nonconducting shell (inner radius 5 cm and outer radius 10 cm) has a total charge of 5 μC. What is the electric field at a point 8 cm from the center of the sphere?

7. Two infinitely long wires carry charges 8 nC/m and -6 nC/m as shown in the figure. Where on the x-axis is the electric field zero?

8. A -3 μC charge is held stationary while a -19 μC charge (weighing 1 g) is placed 2 m away and released. As it reaches a maximum speed, it encounters an opposing electric field. What field strength is necessary to stop the particle over a distance of 3 m?

9. Points A (3 m, 6 m) and B (6 m, -3 m) are in a region where the electric field is uniform and given by E = 12 N/C in the positive x direction. What is the electric potential difference Vₐ - Vₖ?

10. An infinite plane has a surface charge density of 80 nC/m². What distance towards the plane must be traveled to experience a voltage decrease of 98 V?