	Alexandria Higher Institute of Engineering & Technology (AIET)	
	Industrial Department	
	ME251	Fluid Mechanics
	Examiners:	Dr. Rola Afify and committee
		2 nd Year
		Final, Jan., 5, 2013
		Time: 3 hours

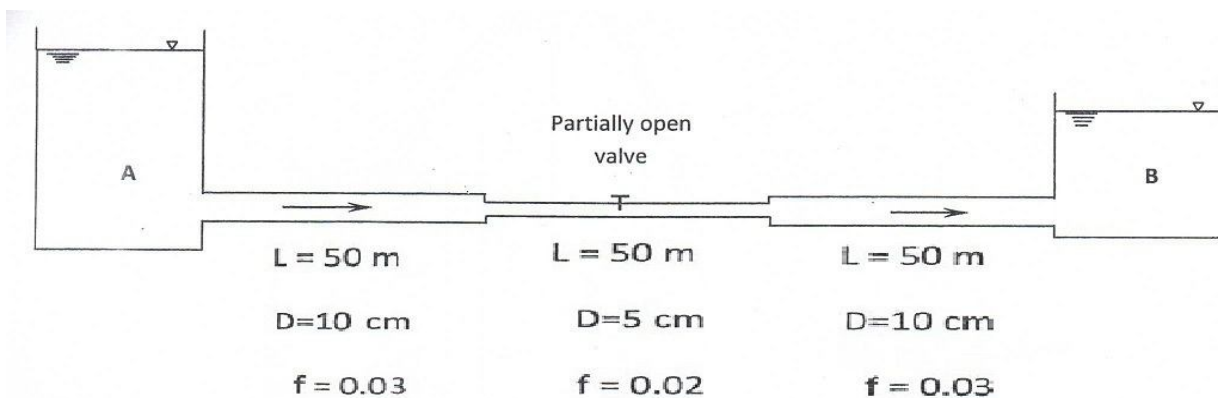
Answer the following questions:

Question one (12 marks)

- A) Define: Specific gravity – Kinematic Viscosity – Bulk modulus of elasticity.
- B) A rectangular tank (3 m long, 2 m wide, and 2.5 m high) contains oil of specific gravity $\gamma = 0.9$. Calculate the magnitude, direction, and line of action of the pressure force on the following:
- The sides of the tank.
 - The tank's bottom.

Question two (12 marks)

- A) Compare between the following:
- Steady and unsteady flow.
 - Friction and Eddy loss.
- B) Water flows from tank A to tank B due to level difference 6m. The line has a partially open valve with a pressure drop ($\Delta P = 1960$ Pa). Calculate the flow rate.



Question three (12 marks)

- A) Show using neat sketch of the following:
- Diaphragm pump.
 - Vane pump.

B) Calculate the volumetric and mechanical efficiencies of gear pump rotating at 1200 rpm and discharging 1.27 lit/sec using 0.7 hp. The gear is 6cm diameter and 4 cm thick. Suction pressure is 0.2 bar, delivery pressure is 2.3 bar when one gear was put in a vessel full of water 80 cm³ of the water was split.

Question Four (12 marks)

A) Explain how to avoid Cavitation.

B) A centrifugal pump has the following performance:

Q (m ³ /hr)	0	15	30	45	60	75
hm (m)	75	72	65	53	38	19
η (%)	0	43	69	73	65	49

- When this pump is used in a system where the difference between delivery and suction levels (h_{st}) is 42 m, it gives a discharge of 47 m³/hr.
- Calculate the discharge and shaft power of the pump when (h_{st}) decreases to 35 m.

Question Five (12 marks)

For the hydraulic circuit shown in figure:-

- A) Write the name of each component.
 B) Also, how it works.

