



College of Engineering & Technology

Department: Mechanical Engineering

Marks: 15

Lecturer: Dr. Rola Afify

Time: 11:15 – 12:00

Course Code: ME464

Date: 26/3/2013

Name: Model Answer

Answer the following questions:

Question one (5 marks)

What are the advantages of Positive Displacement Pumps over Non- Positive Displacement Pumps?

Positive Pumps have the following Advantages over Non-Positive Pumps:

- High-Pressure Capability (up to 12,000 psi)
- Small, Compact Size
- High Volumetric Efficiency
- Small Changes in Efficiency throughout the design pressure range
- Great Flexibility of Performance

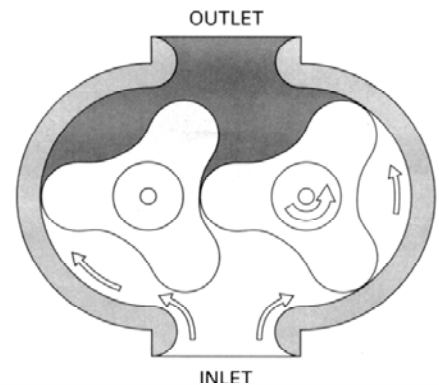
(can operate over a wide range of pressure requirements and speed ranges)

Question two (10 marks)

Compare between Lobe Pump and Screw Pump using neat sketches.

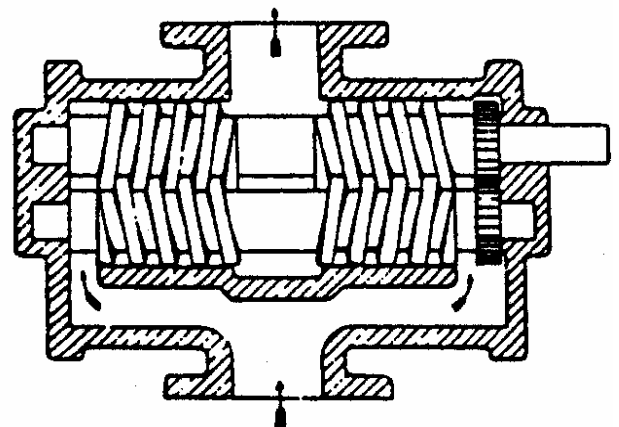
Lobe Pump

Also in the General Family of Gear Pumps is the Lobe Pump, which operates in a Fashion Similar to the External Gear Pump. But Unlike the External Gear Pump, Both Lobes are Driven Externally so that they do Not actually Contact Each Other. Thus, they are Quieter than Other Types of Gear Pumps. Due to the Smaller Number of Mating Elements, the Lobe Pump Output will have a Greater Amount of Pulsation, although its Volumetric Displacement is generally Greater than that for Other Types of Gear Pumps.



Screw Pump

The Screw Pump is an Axial Flow Positive Displacement Unit. Three Precision Ground Screws, Meshing within a Close-Fitting Housing, Deliver Non-pulsating Flow Quietly and Efficiently. The Two Symmetrically Opposed Idler Rotors Act as Rotating Seals, Confining the Fluid in a Succession of Closures or Stages. The Idler Rotors are in rolling contact with the Central Power Rotor and are Free to Float in their respective Housing Bores on a Hydrodynamic Oil Film. There are No Radial Bending Loads. Axial Hydraulic Forces on the Rotor set are balanced, Eliminating Any Need for Thrust Bearings. It is rated at 500 psi and can deliver up to 123 gpm. High-Pressure Designs are available for 3500-psi Operation with Output Flow Rates up to 88 gpm.



Two-Screw Pump