College of Engineering & Technology

Department: Mechanical Engineering Marks: 20
Lecturer: Dr. Rola Afify Time: 2:30 - 4:00
Course Code: ME464 Date: 14/5/2013

Name: **Model Answer**

Answer the following questions:

Question one (5 marks)

Why does the rod of a double-acting cylinder retract at a greater velocity than it extends for the same input flow rate?

$$v_{ext} = \frac{Q}{A_p}$$

$$v_{ret} = \frac{Q}{(A_p - A_r)}$$

$A_p > (A_p - A_r)$, thus $v_{ret} > v_{ext}$

Question two (10 marks)

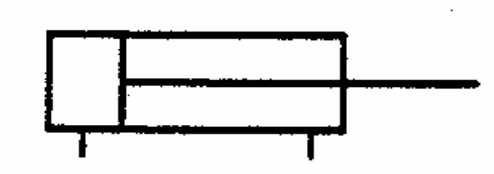
Find the flow rate that an axial piston pump delivers at 1000 rpm. The pump has nine 15-mm-diameter pistons arranged on a 125-mm-diameter piston circle. The offset angle is set at 10° and the volumetric efficiency is 94%.

$Q_T = A_p \times Y \times S \times N = A_p \times Y \times D \tan\theta \times N = 0.0351\ m^3/min$

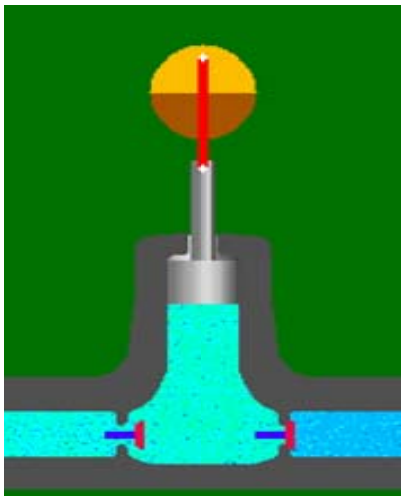
$Q_A = \eta_v \times / Q_T = 0.033\ m^3/min$

Question three (5 marks)

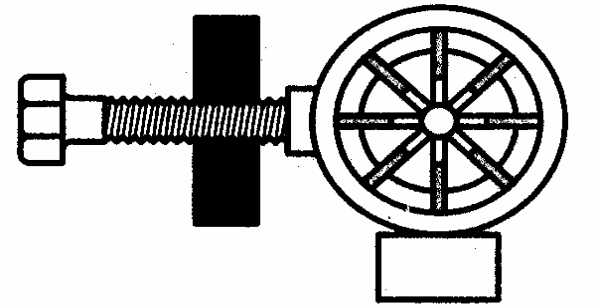
Write down the words that represent each of the following:



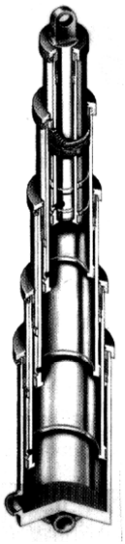
Single-Acting Hydraulic Cylinder



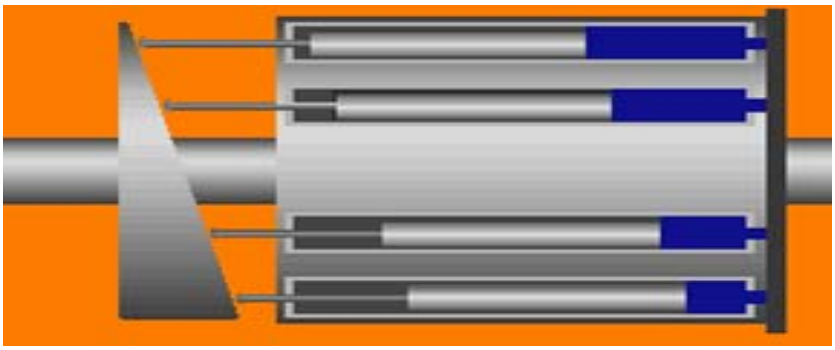
Piston Pump



Variable Displacement Vane Pump



Telescopic cylinder



Swash Plate Design Axial Piston Pump

Good Luck 2/2