



بحث مرجعي لطلاب برنامج الميكاترونيات الخاص

المستوي السادس

مقرر المنظومات العاملة بالموائع

Fluid Power Systems

اسم الطالب:

يتم ارسال الإجابات على البريد الإلكتروني:

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Solve the following five problems

1. A hydraulic pump having a displacement of 8.8 ml/rev runs at 2880 rpm. If its volumetric efficiency and torque efficiency are 93 % and 91 %, respectively, determine:
 - a) The actual pump delivery.
 - b) The input power to the pump when it operates against a pressure of 350 bar

2. A pump/accumulator power pack is to supply the fluid flow demanded by a hydraulic system as shown in **Fig.1**. The system working pressure is 125 bar and the maximum pressure at the accumulator is 200 bar. Assuming the accumulator pre-charge pressure is 90% of its maximum working pressure, determine:
- The actual pump delivery required.
 - The maximum volume of fluid to be stored in the accumulator.
 - The accumulator volume assuming isothermal charge and adiabatic discharge of the accumulator.

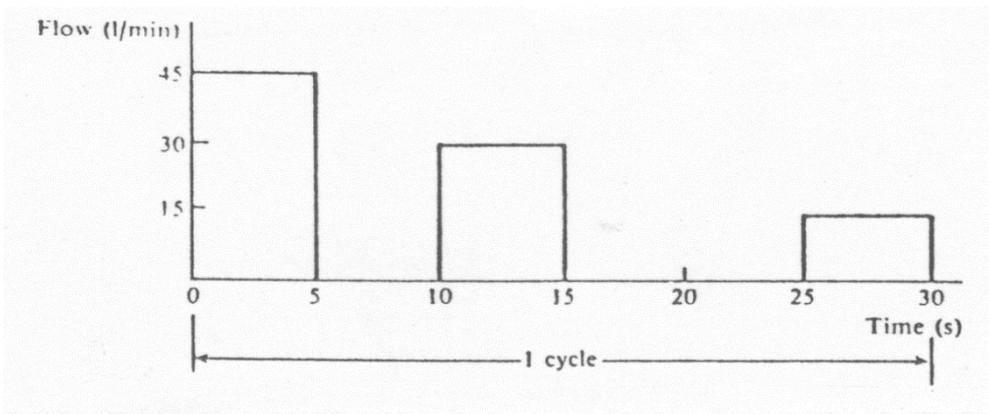


Fig. 1

3. A press cylinder having a bore of 140 mm and a 100-mm diameter rod is to have an initial approach speed of 5 m/min and a final pressing speed of 0.5 m/min. The system pressure for rapid approach is 40 bar and for final pressing 350 bar. A two-pump, high-low system is to be used; both pumps may be assumed to have volumetric and overall efficiencies of 0.95 and 0.85, respectively. Determine:
- The flows to the cylinder for rapid approach and final pressing.
 - Suitable deliveries for each pump.
 - The displacement of each pump if the drive speed is 1720 rev/min.
 - The pump motor power required during rapid approach and during final pressing.
 - The retract speed if the pressure required for retraction is 25 bar maximum.

5. A pump driven at 1440 rev/min having a displacement of 12.5 mL/rev and a volumetric efficiency of 0.87 is used to supply fluid to a circuit with two cylinders. If the cylinder dimensions are 63 mm bore x 35 mm rod x 250 mm stroke; and 80 mm bore x 55 mm rod x 150 mm stroke, find the minimum cycle time for both cylinders to extend and retract fully.