

Seventh Semester B.E. Degree Examination, Dec. 06 / Jan. 07
Mechanical Engineering
Hydraulics and Pneumatics

Time: 3 hrs.]

[Max. Marks:100

Note : 1. Answer any FIVE full questions.
 2. Draw neat sketches wherever necessary.

- 1 a. Name the six basic components required in a hydraulic circuit. (03 Marks)
 b. In the hydraulic press shown in Fig.1(b), a force of 100 N is exerted on the small piston. Determine the upward force on the large piston. The area of the small piston is $50 \times 10^2 \text{ mm}^2$ and the area of the large piston is $500 \times 10^2 \text{ mm}^2$. Also find the distance moved by the large piston if the small piston moves by 100 mm.

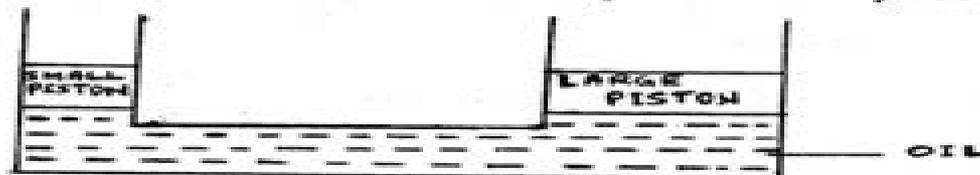


Fig.1(b)

- c. Explain the operation of a vane pump with a neat sketch. (07 Marks)
 (10 Marks)
 2 a. Explain the operation of a gear motor with a neat sketch. (08 Marks)
 b. A pump supplies oil at $0.0016 \text{ m}^3/\text{sec}$ to a 40 mm diameter double acting hydraulic cylinder. If the load is 5000 N (extending or retracting) and the rod diameter is 20 mm, find the
 i) Cylinder kW power during the extending stroke
 ii) Cylinder kW power during the retracting stroke. (05 Marks)
 c. A hydrostatic transmission, operating at 70 bars pressure has the following characteristics :

Pump	Motor
$V_D = 82 \text{ cm}^3$	-
$\eta_v = 82\%$	$\eta_v = 92\%$
$\eta_m = 88\%$	$\eta_m = 90\%$
$N = 500 \text{ rpm}$	$N = 400 \text{ rpm}$

Find the i) Displacement of the motor ii) Motor output torque. (07 Marks)

- 3 a. Explain simple pressure relief valve with a neat sketch. (08 Marks)
 b. A pressure relief valve has a pressure setting of 140 bars. Compute the kW power loss across the valve if it returns all the flow back to the tank from a $0.0016 \text{ m}^3/\text{sec}$ pump. (04 Marks)
 c. A double acting cylinder is hooked up in a regenerative circuit. The relief valve setting is 105 bars. The piston area is $130 \times 10^2 \text{ mm}^2$ and the rod area is $65 \times 10^2 \text{ mm}^2$. If the pump flow is $0.0016 \text{ m}^3/\text{sec}$, find the cylinder speed and load carrying capacity for the i) Extending stroke ii) Retracting stroke. (08 Marks)

Hydraulics Question Paper

Christian Drosten



Hydraulics Question Paper:

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