

Q-6

Attempt all questions

(14)

- a) An hydraulic control for a straight line motion, as shown in Fig.1.1 Utilises a spherical pressure tank 'A' connected to a working cylinder B. The pump maintains a pressure of 3 N/mm² in the tank.
1. If the diameter of pressure tank is 800 mm, determine its thickness for 100% efficiency of the joint. Assume the allowable tensile stress as 50 MPa.
 2. Determine the diameter of a cast iron cylinder and its thickness to produce an operating force $F = 25$ kN. Assume (i) an allowance of 10 per cent of operating force F for friction in the cylinder and packing, and (ii) a pressure drop of 0.2 N/mm² between the tank and cylinder. Take safe stress for cast iron as 30 MPa.
 3. Determine the power output of the cylinder, if the stroke of the piston is 450 mm and the time required for the working stroke is 5 seconds.
 4. Find the power of the motor, if the working cycle repeats after every 30 seconds and the efficiency of the hydraulic control is 80 % and that of pump 60 %.

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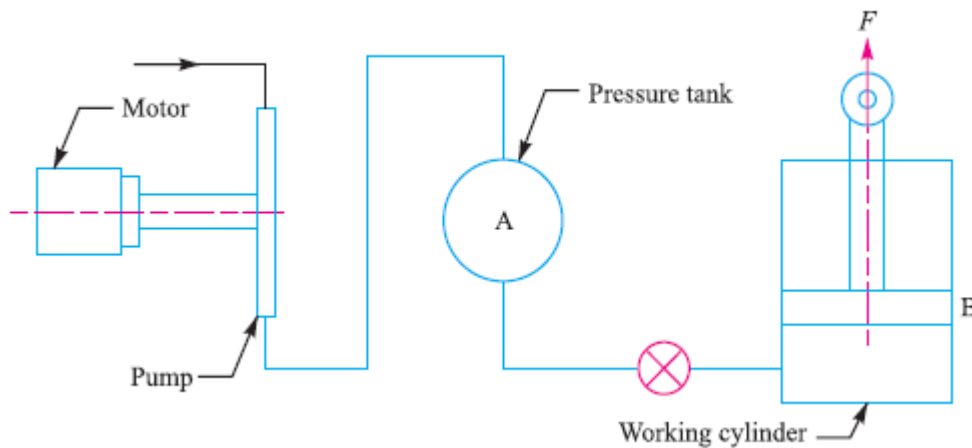


fig. 1.1

- b) What is "Autofrettage"? Write methods of pre-stressing the cylinder

04

Q-7

Attempt all questions

(14)

- a) A conical clutch with semi-cone angle of 12.5°, and have face width 1/3rd of mean radius is used to transmit power from an electric motor running at 1000 rpm, to a stationary machine. The machine is equivalent to rotor of mass 200 kg and radius of gyration as 200 mm. the machine is brought in the full speed of 1000 rpm from stationary condition in 35 seconds. If $\mu = 0.2$ and intensity of pressure is not to exceed 0.09 MPa, find,
- (i) Face Width of conical surfaces
 - (ii) Inner and outer radii. of conical surfaces
 - (iii) Force required to engage the clutch.
 - (iv) Amount of heat generated during each engagement.
 - (v) Capacity of electric motor.

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- b) Explain the important parameters affecting the design of journal bearing

04

Q-8

Attempt all questions

(14)

- a) What are the basic principles to be followed in bearing mounting? Explain the methods of bearing mounting
- b) Explain Wear and Thermal consideration for designing IC Engine Component

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