

QP Code : 4802

(3 Hours)

[Total Marks : 80

- N.B. :** (1) Question no. 1 is compulsory.
 (2) Attempt any three questions out of remaining five questions.
 (3) Assume suitable data if necessary and state the same clearly.

1. Explain the following (Any five) 20
 - (a) Newton's Law of viscosity.
 - (b) Pascal's Law and its application.
 - (c) Desirable properties of hydraulic fluid.
 - (d) Darcy's Formula for flow of liquids in pipes.
 - (e) Check valve and its application.
 - (f) Properties of Manometric fluids.

2. (a) Explain the working of regenerative circuit and how it is different from basic hydraulic circuit. Draw both circuits. 10
- (b) An oil of viscosity 5 poise is used for lubrication between shaft and sleeve. The diameter of the shaft is 0.5 and it rotates at 200r.p.m. Calculate the power lost in oil for a sleeve length of 100mm. The thickness of oil film is 1.2 mm. 10

3. (a) An inverted U-tube manometer is connected to two horizontal pipes A and B through which water is flowing. The vertical distance between the axes of these pipes is 30cm. When an oil of specific gravity 0.8 is used as a gauge fluid, the vertical heights of water column between two limbs of the inverted manometer (when measured from respective centre lines of pipes) are found to be same and equal to 35cm. Determine the difference of pressure between the pipes sketch the arrangement. 10
- (b) Explain with neat sketch the operation of sequence circuit. 10

4. (a) Explain the working of any two valves. 10
 - (i) Counter balance valve
 - (ii) 4/3 Directional control valve
 - (iii) Sequence valve
- (b) Water is flowing through a pipe having diameters 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/mm² and pressure at the upper end is 9.81 N/mm². Determine the difference in datum head if the rate of flow through pipe is 40 lit/sec. 06
- (c) State Bernoulli's equation and list the assumption made in deriving equation. 04

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5. (a) Write short notes on any three. 12
- (i) Variable drive speed consisting of variable capacity pumps and fixed capacity motors.
 - (ii) Working of venturimeter with neat sketch.
 - (iii) Different types of flow.
 - (iv) ISO symbols for different types of valves used in hydraulic circuit.
(Any four valves)
- (b) With the help of neat sketch explain the working of balance vane pump. 08
6. (a) A crude oil of viscosity 0.4 stoke is flowing through a pipe of diameter 300mm at the rate of 300 lit/sec. Find the head lost due to friction for a length of 50m of pipe. 06
- (b) A viscous flow is taking place in a pipe of 100 mm diameter. The maximum velocity is 2 m/s. Find the mean velocity and the radius at which this occurs. Also calculate the velocity at 30 mm from the wall of pipe. 06
- (c) Derive an expression for total pressure and centre of pressure for a fully submerged inclined lamina. 08
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