



- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Solve Question 9 OR Questions No. 10.
 7. Solve Question 11 OR Questions No. 12.
 8. Due credit will be given to neatness and adequate dimensions.
 9. Assume suitable data whenever necessary.
 10. Diagrams and chemical equations should be given wherever necessary.
 11. Illustrate your answers wherever necessary with the help of neat sketches.
 12. Use of non programmable calculator is permitted.
 13. Discuss the mechanisms where ever necessary.

1. a) What are the advantages of hydraulic systems over mechanical systems. List out various practical application of Hydraulic systems. **5**
- b) Discuss the desirable characteristics of hydraulic fluids. **4**
- c) Draw the standard symbols for the following items. **4**
 - i) Pressure Relief valve
 - ii) Accumulator
 - iii) Intensifier
 - iv) Sequence valve
2. a) What is the importance of seals in hydraulic systems. Discuss various types of seals used in hydraulic systems and explain in brief criteria for selection of seals. **7**
- b) Discuss various sources of contamination of oil in hydraulic system and suggest remedial measures to avoid it. **6**
3. a) Explain in brief construction and working of a any one of the following with neat sketch. **8**
 - i) Radial piston pump.
 - ii) External gear pump.

Also discuss the specifications of hydraulic pump along with its selection criteria.
- b) Discuss in brief under what circumstances, Accumulator and intensifier is required to be incorporated in hydraulic system. State advantages of both. **6**

4. a) Following data is given with reference to the gear pump. 8
- | | | |
|------------------|---|-------------|
| Outside Diameter | = | 90 mm |
| Inside Diameter | = | 60 mm |
| Gear width | = | 30 mm |
| Actual flow rate | = | 200 lit/min |
| Rated pressure | = | 7000 KPa |
| Speed | = | 2000 RPM |
- Determine :
- i) Output hydraulic power.
 - ii) Mechanical Efficiency.
 - iii) Volumetric efficiency.
 - iv) Theoretical flow rate.
- b) Determine the weight required to generate 11 MPa from an accumulator with a cross sectional diameter of 0.31 m. What should be the length of stroke for capacity of 0.25 m³. Also suggest type of accumulator. 6
5. a) Discuss in brief objectives & necessity of the following controls. 6
- i) Pressure controls.
 - ii) Volume or flow controls and
 - iii) Directional controls.
- b) Discuss the working of a solenoid operated 4/3 directional control valve with neat sketch. 4
- c) What do you understand by pressure override in context with PCV. 3
6. a) Discuss any three types of neutrals (centres) used in directional control valves with their effect on the pump and actuator. 7
- b) Why in flow control valve the pressure and temperature compensation is required. How it is incorporated. 4
- c) List out the various methods used for activation of directional control valves. 2
7. a) A hydraulic motor is supplied with oil at the rate of 75 lit/min and 100 bar. If the motor has volumetric displacement of 150 cm³/rev, Determine 6
- i) Speed of the motor.
 - ii) Torque developed.
 - iii) Power produced.
- Assume vol. efficiency = 80% and Mech. Efficiency = 80%
- b) What is the function of actuator in hydraulic system? State practical applications of liner actuators and hydraulic motors. 4

- c) Differentiate between seals and gaskets. **3**
8. a) Draw and explain in brief construction and working of a double acting linear actuator. What type of seals are used in it? Also draw its symbol. **5**
- b) Explain the construction and working of a hydraulic motor in brief with neat sketch. State what is the role of rotary actuator in machine tools. Also draw its symbol. **5**
- c) Discuss the materials used for hoses and pipes in hydraulic systems. **3**
9. a) Draw and explain in brief the construction and working of hydraulic circuit illustrating the application of a counter balance valve. **7**
- b) Draw and explain the working of a suitable hydraulic circuit for operating two double acting linear actuators in sequence. **7**
10. a) Draw and explain in brief working & operation of motor in flow control circuit. State its advantages and limitations. **7**
- b) Draw and explain in brief travel & feed hydraulic circuit. **5**
- c) Explain in brief the use of unloading valve with suitable example. **2**
11. a) Draw a general layout of pneumatic system with the help of symbols. State the merits and limitations of pneumatic systems over hydraulic systems. **7**
- b) Draw and explain in brief working and operation of a pneumatic circuit used for one double acting linear actuator with forward speed control. **6**
12. a) What is FRL unit? Explain its importance in pneumatic system. Draw its symbol. **7**
- b) Write brief notes on the following **any two**. **6**
- i) Air motors.
- ii) D.C. valves used in pneumatics.
- iii) Flow controls used in pneumatics.



www.solveout.in