



# MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)

Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

## Department of Mechatronics / Robotics & Automation Question Bank - Academic Year (2021-22)

Course Code & Course Name : 19MZC01/19RAC01 & Applied Hydraulics and Pneumatics  
Year/Sem : II/ III

### UNIT-I: FLUID POWER SYSTEMS AND FUNDAMENTALS

1. Define fluid power.
2. State any four advantages of fluid power system.
3. Define viscosity.
4. Define kinematic viscosity?
5. Define dynamic viscosity.
6. Draw the symbol of single acting cylinder with spring return
7. Draw the symbol of 4/3 valve.
8. List the fluid used in hydraulic system.
9. Define flash point
10. Define pour point.
11. State Pascal's law.
12. What is meant by Reynolds's number?
13. What is meant by laminar flow?
14. Write the formula to find the loss of head due to bent in pipe.
15. Write the application of Pascal law
16. Write the Darcy equation.
17. What is meant by turbulent flow
18. Draw the symbol for pressure reducing valve.
19. Write the difference between fluid transport and Fluid power system
20. State the significance of Reynolds number.

### PART-B

1. Discuss about the properties and types of hydraulic fluids.
2. Draw and explain various components of hydraulic system.
3. Explain the various components involved in pneumatic system.
4. Explain the advantages and application of fluid power system.
5. Discuss about the laminar, turbulent flow and Reynolds number.
6. How to calculate frictional losses in common valves and fittings?
7. Write the applications of Pascal's law.
8. Explain the Darcy's equation.

9. State and explain the methods of transmitting power with its advantages of fluid power.
10. List out the various types of fluid power system and explain the basic components and working principles of closed loop system

## **UNIT- II HYDRAULIC SYSTEM & COMPONENTS**

### **PART-A**

1. Write the different types of positive displacement pumps.
2. What is the principle of pump?
3. What is the general classification of hydraulic actuators?
4. A pneumatic system is operated at a pressure of 1000kpa. what diameter cylinder will be required to move a load requiring a force of 12KN?
5. How do you specify pump?
6. Write the pump performance of the pump.
7. What is meant by variable displacement pump?
8. Write the types vane pumps.
9. Write the types of piston pump.
10. Write the difference between positive displacement pump and non -positive displacement pump
11. What is meant by cylinder cushioning?
12. State the difference between single acting cylinder and double acting cylinder.
13. Draw the symbol for single acting and double acting cylinder.
14. What is meant by Rodless cylinder?
15. What is the application of telescopic cylinder?
16. Draw the symbol of tandem cylinder.
17. Draw the symbol of fluid motor.
18. Write the application of rotary actuators.
19. Draw the symbol of variable displacement pump.
20. What is use of compressor?

### **PART-B**

1. Draw and explain the piston and internal gear pump.
2. Draw and explain external gear pump.
3. Draw and explain the balanced and unbalanced vane pump.
4. With a neat sketch, outline the construction and operation of a telescopic cylinder.
5. Explain in detail about cylinder cushioning.
6. Demonstrate the construction and working of the following with the help of simple sketch for each:  
(a) Lobe pump (b) gerotor Pump
7. Discuss about the piston motor with neat sketch.
8. With a neat sketch, illustrate the construction and operation of a double acting hydraulic actuator.

9. Briefly explain in detail about Rotary actuators.
10. With a neat sketch, illustrate the construction and operation of a single acting hydraulic actuator.
11. Explain in details about Piston motors.
12. Demonstrate the construction and working of the following with the help of simple sketch for each screw pump.

### **UNIT - 3 DESIGN OF HYDRAULIC CIRCUITS**

#### **PART- A**

1. Difference between pressure control valve and pressure relief valve.
2. Write the function of a solenoid valve.
3. What is a ladder diagram?
4. Draw the symbol for pressure relief valve.
5. Draw the symbol of check valve
6. Draw the symbol of shuttle valve
7. Draw the symbol of adjustable flow control valve
8. Draw the symbol of 4/2 valve.
9. Draw the symbol for intensifier, accumulator.
10. Write the applications of accumulator.
11. Write the applications of intensifier.
12. Draw the symbol for the pressure relief valve.
13. Draw the symbol for weight load accumulator
14. Draw the symbol for spring load accumulator
15. Draw the symbol for gas load accumulator
16. What are the types of accumulator?
17. What is meant by intensifier?

#### **PART-B**

1. Discuss about sequence control with the application.
2. Draw and discuss about check valve and shuttle valve.
3. Explain the different types of cylinder mountings.
4. Explain the construction of compound pressure relief valve.
5. With neat sketch explain the weight loaded accumulator.
6. Explain air over oil intensifier system with suitable example
7. Write any two applications of accumulators with neat circuit diagram
8. Explain the gas loaded accumulator with neat sketch.
9. Explain the different types of positions for a four way three position control valve and mention the applications.
10. Briefly explain about in Accumulators circuits in leakage cylinder with neat sketch.
11. List out the Directional control valve and explain any two of them with neat sketch.

## UNIT – 4 PNEUMATIC SYSTEMS AND COMPONENTS

### PART- A

1. What is meant by Boyles law
2. Write the properties of air.
3. List the various pneumatic actuators.
4. Draw the symbol for cylinder with cushion.
5. What is meant by FRL?
6. What is meant by compressor?
7. Draw the symbol of compressor
8. State Charles law
9. State Gay lussac law
10. Draw the symbol for cylinder with adjustable cushion.
11. List the factors to be considered for fluid power circuit designing?
12. What are types of speed control circuit?
13. What is the importance of cascading circuit?
14. Write the application where sequencing circuit an be used.
15. What is meant by A+ B+ A- B-
16. What is meant by A+A-B+B-
17. What is meant by meter in circuit?
18. State meter out circuit.
19. What are the factors considered in selection of filters?
20. What are the factors considered in selection of DCVs?

### PART-B

1. Describe briefly about FRL unit.
2. Discuss briefly about quick exhaust valve
3. Explain the multi stage compressor with the neat sketch.
4. Determine the actual power required to drive a compressor that delivers air at 3.5 std m<sup>3</sup>/min at 8 bar gauge. The overall efficiency of the compressor is 74%.
5. Draw circuit by cascade method for the following sequence **A+ B+ B- A- C+ C-**
6. Describe the hydraulic circuit for synchronizing two cylinders with flow control valves.
7. Draw the speed control circuits for pneumatic cylinder.
8. Draw and explain the regenerative circuit.
9. Describe the Sequential circuit design for simple applications using cascade method.
10. Explain about Fluid Power Circuit Design using pneumatic system.

## UNIT V DESIGN OF PNEUMATIC CIRCUITS

### PART- A

1. Compare servo valve and proportional valve
2. What is the problem that occurs in linear actuators?
3. What is meant by fluidics?
4. What is meant by relay?
5. What is meant by proportional valve
6. Draw the symbol for servo valve
7. Differentiate ladder logic and Relay logic programming
8. What is ladder programming?
9. Write the applications of PLC.
10. Define fluidics.
11. What is meant by bi stable flip flop?
12. What is meant by flip flop?
13. State pneumatic logic circuit.
14. Write failures occur in cylinders.
15. List the failures occur in DCVs.
16. List the trouble shooting methods for DCV failures.
17. Differentiate ladder logic and Relay logic programming
18. What is ladder programming?
19. Write the applications of PLC.
20. Draw the graphic symbols of ladder diagram.

### PART-B

1. Draw and explain hydro mechanical servo system
2. Draw and explain electro hydraulic servo system
3. Explain proportional valve in detail.
4. Explain basic bi-stable flip flop with neat sketch and truth table.
5. Explain about the PLC applications in fluid power control.
6. Discuss about failures and trouble shooting of hydraulic system
7. Discuss about failures and trouble shooting of pneumatic system.
8. Explain any one monostable flip flop in detail.
9. Write a short notes of following with neat sketch ladder diagrams
10. Briefly explain about Electro Hydraulic Pneumatic logic circuits