

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER M. TECH DEGREE EXAMINATION

Electronics & Communication Engineering
(Robotics & Automation Engineering)
04EC6905 - Fluid Power Automation

Max. Marks: 60

Duration: 3 Hours

PART A

Answer All Questions

Each question carries 3 marks

1. Draw the ISO symbols of any 4 DCV's.
2. Explain the working of single acting cylinder with neat sketch?
3. How a telescopic cylinder operates? Explain with diagram.
4. How do servo valves differ from proportional control valves?
5. Draw the circuit diagram for the speed control of a hydraulic motor.
6. Explain the procedure for designing a hydraulic circuit with cascade method.
7. Double acting cylinder is used to perform forward and return motion. Pneumatic cylinder is advanced by pressing push button, PB1. Cylinder is returned by pressing push button, PB2. Draw the pneumatic circuit, PLC wiring diagram and ladder diagram to implement this task.
8. Explain the basic structure of a PLC.

PART B

Each question carries 6 marks

9. (a) Explain the operation of a hydraulic pump with neat sketches. (b) The inlet to a hydraulic pump is 0.6 m below the top surface of an oil reservoir. If the specific gravity of the oil used is 0.86, determine the static pressure at the pump inlet.

OR

10. Write the differences between a hydraulic motor and a hydraulic pump. Explain the details with neat sketches.

11. Write a detailed note on Linear Actuators.

OR

12. Give a short notes on (a) Spring Return Single acting Cylinder and (b) Double acting cylinder with a piston rod on both sides
13. Draw and explain the internal architecture of a 4-way DCV with its symbol.

OR

14. Draw and explain the operation of (a) 2/2 DCV (b) 3/2 DCV
15. How an electro-hydraulic servo valve works?

OR

16. What are the different types of Servo valves? Explain in detail.
17. Explain about Double-Pump Hydraulic System?

OR

18. List three important considerations to be taken into account while designing a hydraulic circuit. What are the different methods using for the design of hydraulic systems?
19. Draw a ladder logic program for generating the activation sequence A+, B-, A-, B+ for the 2 cylinders A and B. Four limit switches a-, a+, b-, and b+ are connected to the cylinders A and B. Assume a starting switch "START" to start operation and that initially switch b- is active. After all 4 sequences one alarm should ring for 5 seconds.

OR

20. Explain in detail about the control of a hydraulic cylinder using limit switch with neat sketches and explain about different electrical components used in the system with its symbols. Draw the ladder logic for the same.