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**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024**

Fourth Semester

**Mechanical and Automation Engineering**  
**20MUPC401 - FLUID POWER AUTOMATION**

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

|   | Marks | K-<br>Level | CO  |
|---|-------|-------------|-----|
| 1. List the advantages of the fluid power.                                | 2     | K1          | CO1 |
| 2. Differentiate between hydraulics and pneumatics.                       | 2     | K2          | CO1 |
| 3. Mention the factors influencing the volumetric efficiency of the pump. | 2     | K2          | CO2 |
| 4. Name the different design of gear pump.                                | 2     | K1          | CO2 |
| 5. Draw the graphical symbol for single acting hydraulic cylinder.        | 2     | K2          | CO3 |
| 6. State the functions of accumulators.                                   | 2     | K1          | CO3 |
| 7. State the use and applications of bled-off circuit control.            | 2     | K1          | CO4 |
| 8. List some applications of intensifier circuits.                        | 2     | K1          | CO5 |
| 9. List the basic components of PLC system.                               | 2     | K1          | CO5 |
| 10. Mention any two roles of pneumatic systems in low cost automation.    | 2     | K2          | CO6 |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

|  |    |    |     |
|--|----|----|-----|
| 11. a) Elaborate on any one applications of Pascal's law with a neat sketch.                                 | 13 | K2 | CO1 |
| <b>OR</b>  |    |    |     |
| b) Compare and contrast the hydraulic, pneumatic and electromechanical power systems.                        | 13 | K2 | CO1 |
| 12. a) Describe the construction and working principle of radial piston pump with neat sketch.               | 13 | K2 | CO2 |
| <b>OR</b>  |    |    |     |
| b) Explain any two types of accumulator devices with neat sketch.  | 13 | K2 | CO2 |
| 13. a) Enumerate the construction and working principle of rotary spool valve used in the hydraulic systems. | 13 | K2 | CO3 |
| <b>OR</b>  |    |    |     |
| b) Describe the construction and working of any two servo control valve with a suitable diagram.             | 13 | K2 | CO3 |

14. a) Construct and explain the counter balance circuit with a suitable application. 13 K3 CO4

**OR**

b) Design a pneumatic circuit for the following sequence using cascade method A+ B+ B- A-, where the + cylinder extension and – cylinder retraction. 13 K3 CO4

15. a) Design an electro-pneumatic system for semi-automatic material handling circuit. 13 K3 CO5

**OR**

b) Draw the PLC ladder diagram for the following logic functions: 13 K3 CO5  
(i) AND, (ii) OR, (iii) NOR and (iv) NAND.

**PART - C (1× 15 = 15 Marks)**

16. a) Design an electro-pneumatic system for sorting two different sizes of boxes moving on a conveyor system and also represent the ladder circuit. 15 K4 CO6

**OR**

b) Design an electro-pneumatic system for automatic sequence of two cylinder pneumatic system. 15 K4 CO6