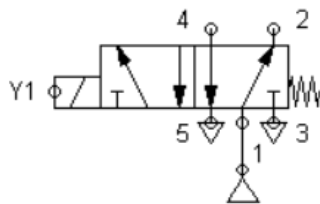


(3 hours)

Total Marks: 80

- NB
- 1) Question No. 1 is compulsory
 - 2) Attempt any three questions out of the remaining five questions.
 - 3) Figures to the right indicate full marks.
 - 4) Assume suitable data wherever required but justify the same.

- Q1. Attempt any four (20)**
- A. Define degree of Freedom (DoF) for robot. Explain robot anatomy in detail.
 - B. Explain Linear regression and its application in AI.
 - C. Write short note on PLC Structure, Advantages and Disadvantages.
 - D. Explain in detail Levels of Automation.
 - E. Draw & Explain the electro pneumatic circuits for direct & Indirect control for Double active cylinder 5/2 DCV both solenoid operated.
- Q2 (8)**
- A. Write detail note on Robot Configurations with respect to joints, applications, advantages & Disadvantages. (any two)
 - B. Write short note on Basic model of ANN. (6)
 - C. Explain FRL unit used in Pneumatics. (6)
- Q3 (10)**
- A. Explain Breadth first search Algorithm in detail with example
 - B. Design electro Pneumatic circuit for two cylinder operation with following sequence using 5/2 both side solenoid operated valve as DCV. (10)
 $(AB) + A - \text{Delay } B -$
 With user selection option single cycle & Multicycle operation.
- Q4 (12)**
- A. Design simple hydraulic circuit for two cylinder operation with following sequence using 4/2 pilot operated valve as DCV using cascade method
 $A + B + \text{Delay } A - B -$
 With user option of single cycle – multi cycle. Also draw displacement diagram.
 - B. Compare Supervised, Unsupervised and reinforcement learning with different parameters. (08)
- Q5 (08)**
- A. Explain any two intelligent agents in detail.
 - B. Explain tree and graph search. (06)
 - C. Explain selection criteria for Robot. (06)
- Q6 (05)**
- A. Differentiate between uninformed and informed search algorithms. (05)
 - B. Write detail note on types of end effecters used in robotics. (05)
 - C. Identify following valve specification & discuss in detail. (05)



- D. Write short note on timers and counters used in PLC Circuits. (05)**

=====XOX=====