

Instructions:

1. **Question 1 compulsory.**
2. Attempt any **three** questions from the remaining **five** questions.
3. Figures to the right indicate full marks.
4. Assume suitable data wherever required but justify the same.

- Q.1.** Solve ANY FOUR questions from following.
- |          |   |           |
|----------|---|-----------|
| <b>a</b> | List four levels of automation with suitable examples   | <b>05</b> |
| <b>b</b> | Explain backpropagation algorithm used in Artificial Neural Networks.                         | <b>05</b> |
| <b>c</b> | Define Continuous path control system used in robotic system with suitable applications.      | <b>05</b> |
| <b>d</b> | Summarize with a schematic block diagram, an automated system showing all the basic elements. | <b>05</b> |
| <b>e</b> | Explain the concept of Timers and Counters used in PLC architecture.                          | <b>05</b> |
- Q.2.**
- |           |   |           |
|-----------|---|-----------|
| <b>a.</b> | Design an electro- pneumatic circuit for two-cylinder operation with following sequence using 5/2 both side solenoid operated valve as DCV.<br>A+ , Delay B+ , A-B- | <b>10</b> |
| <b>b</b>  | Illustrate with neat diagram counter balance valve and Bleed off hydraulic circuits used in hydraulic system.   | <b>10</b> |
- Q.3.**
- |           |   |           |
|-----------|---|-----------|
| <b>a.</b> | Illustrate with neat sketches any three types of drives used in robotic system with its advantages and disadvantages. | <b>10</b> |
| <b>b.</b> | Illustrate Goal based reflex agents and Model based intelligent agents in AI with examples.                           | <b>10</b> |
- Q.4**
- |           |  |           |
|-----------|--|-----------|
| <b>a.</b> | Design a hydraulic circuit for two cylinder operation with following sequence using 4/2 pilot operated valve as DCV using cascade method , A+ , B+ , Delay B- , A- | <b>08</b> |
| <b>b</b>  | Differentiate between supervised and unsupervised techniques used in machine learning.   | <b>07</b> |
| <b>c</b>  | Define the terms Robot Degrees of freedom for robotic system.  | <b>05</b> |
- Q.5.**
- |           |  |           |
|-----------|--|-----------|
| <b>a.</b> | Explain the significance of latching in PLC.   | <b>06</b> |
| <b>b.</b> | Illustrate K nearest neighbours algorithm used in machine learning.                                    | <b>08</b> |
| <b>c.</b> | Illustrate with neat sketches, the logic of AND and OR gates, used in operation of pneumatic circuits. | <b>06</b> |
- Q.6**
- |           |   |           |
|-----------|---|-----------|
| <b>a.</b> | Differentiate between tree and graph search used in Machine Learning. | <b>08</b> |
| <b>b.</b> | Illustrate the concept of Logistic regression in machine learning.    | <b>06</b> |
| <b>c</b>  | Illustrate the concept of Artificial Neural Networks (AAN) in detail. | <b>06</b> |

\*\*\*\*\*