

(3 Hours)



[Total marks: 80]

Instructions:

1. **Question 1 compulsory.**
2. Attempt any **three** questions from the remaining **five** questions.
3. Assume suitable data, **if necessary.**
4. **Figures/sketches** carry weightage.

- Q1) Explain the following [ Any four] 20
- 1) Concept of polling and interrupt
  - 2) Harmonic Drive
  - 3) Parameters to be considered for selection of an actuator
  - 4) Working principle of DC Motor
  - 5) Pick and place robot
- Q2) a) Explain velocity profile in DC motor with suitable sketches. 06
- b) Explain cantilever beam vibration control using piezo sensors. 08
- c) Explain with a neat sketch office application of Mechatronics. 06
- Q3) a) Two double acting pneumatic cylinders are selected for an industrial application ;The sequence of the movement is as given below:- 10  
(AB)+ Delay, B-, A +Delay.  
Draw electro pneumatic circuit using 5/2 DC valve which is single solenoid and spring operated and also sketch the displacement diagram
- b) Explain with a neat block diagram Peripheral Interface Device. 10
- Q4) a) Explain with a neat sketch the architecture of PLC. 10
- b) Explain different sensors and actuators used in a car engine management system 10
- Q5) a) Explain the difference between Internal and External Gear pumps with neat sketches. 08
- b) Explain the selection process of PLC. 06
- c) Explain with a neat sketch the components of Mechatronics. 06
- Q6) Write short notes on: 20
- 1) Voice coil Actuator
  - 2) Accumulators
  - 3) FRL unit
  - 4) Surveillance balloon