**MECHATRONICS** QUESTION BANK

Part A: (2 Marks)

1. Define Mechatronics.
2. What is meant by a system in mechatronics?
3. Name the applications of Mechatronics.
4. What are the elements of a measurement system and sketch its block diagram?
5. What are the basic functions of control systems?
6. Compare closed loop and open loop control system.
7. Sketch and name the elements of a closed loop control system.
8. Distinguish between a sensor and transducer.
9. What is hysteresis?
10. What are the different types of strain gauges?
11. Define Hall Effect.
12. What is the difference between absolute encoder and incremental encoder?
13. List the types of proximity sensors.
14. What is stroboscope?
15. What are the instruments used to measure linear velocity?
16. What are load cells? Mention its principle of working.
17. Write down the advantages and limitations of potentiometric transducer.
18. Mention the various components of a hydraulic system.
19. What is a pneumatic system?
20. List down the various components of a pneumatic system.
21. What are the advantages and disadvantages of pneumatic system?
22. What is the purpose of using filters in hydraulic system?
23. What are the factors to be considered for selecting compressors?
24. State the functions of control valves.
25. What is the use of flow control valves?
26. What are sequential valves?
27. Define actuator.
28. Classify actuators based on motion.
29. Define mechanism.
30. What is a cam?
31. Mention the use of ratchet and pawl mechanism.
32. What are tactile sensors?
33. State the advantages and disadvantages of orifice meter.
34. List down the instruments used to measure temperature.
35. What is the principle used in bimetallic strip?
36. What is the principle of RTD?
37. What is a thermistor?
38. Write short notes on LVDT.
39. What are the various configurations of a thermistor?
40. What is a thermocouple?
41. What is a photo diode?
42. Write any four factors to be considered for the selection of sensors.
43. What do you mean by interfacing?
44. List out some applications of microprocessor.

Part B: (5 Marks)

1. Explain shaft speed control with a neat diagram.
2. Explain sequential control in washing machine.
3. What is an engine management system? Explain briefly.
4. Explain the working principle of automatic camera.
5. Discuss the various static characteristics of a transducer.
6. Discuss the various dynamic characteristics of a transducer.
7. Describe neatly potentiometer sensor.
8. Explain the working principle of LVDT.
9. Define interfacing devices.
10. What is transceiver?
11. What is the role of tristate buffer in interfacing of peripherals with CPU?
12. Write the use of ALE signal in 8085
13. List the fundamentals of I/O technique.
14. List any two points comparing memory I/O and peripheral I/O.
15. Define the term step angle with reference to a stepper motor.
16. Explain the working of Hall Effect sensor.
17. Discuss how velocity is measured using electromagnetic sensors.
18. Write a detailed note on pressure measuring systems and pressure measuring transducers.
19. Explain the working principle of thermistor.
20. Explain the working of thermocouple.
21. Explain how an optical encoder can be used to measure the absolute position.
22. Explain the working of pyro electric sensors.

Part: C (10 Marks)

1. Name the hydraulic components, draw their symbols and explain their use.
2. Explain how control valves can be used as processing elements?
3. Explain sequencing of cylinders.
4. Distinguish between hydraulic and pneumatic systems.
5. With help of a block diagram, explain signal flow in fluid power system.
6. Design a pneumatic circuit to give a sequence of A+, B+ and the retraction of both cylinders simultaneously.
7. Describe the various functions of mechanisms.
8. Give classification of an electric motor.
9. Explain the working principle of synchronous motor.
10. Explain the working principle of AC servo motors.
11. Explain the principles of induction motor and list their advantages.
12. Explain the working of stepper motor.
13. Explain how a Thyristors can be used to control the level of a DC voltage.
14. What are the major differences between JFET and MOSFET?
15. Draw & explain the block diagram & operation of temperature controlling system with a microprocessor.
16. Draw & explain the block diagram & operation of traffic light controller with a microprocessor.
17. How to control the speed of stepper motor with 8085 CPU & its interface? Draw a neat diagram & explain its operation.
18. Write short notes on keyboard interfacing.