**AMET UNIVERSITY,CHENNAI**

**DEPARTMENT OF MECHANICAL- IV YEAR**

 **MECHATRONICS QUESTION BANK**

**UNIT-1 TWO(2) MARKS**

1. Define mechatronics sketch the graphical representation of mechatronics?
2. What are the elements in typical mechatronic systems?
3. What are the types of mechatronic systems?
4. What are the main applications of mechatronics?
5. What are the advantages and disadvantages of mechatronics systems?
6. What is meant by a system in mechatronics?
7. What is meant measurement system in mechatronics?
8. What are the basic elements of the measurement system and sketch its block diagram?
9. What is meant by control system in mechatronics?
10. Give some applications of control systems?
11. How the control system are classified?
12. What are the basic functions of control system?
13. What is meant by open loop system? Give examples?
14. What are the elements of open loop system?
15. What are the advantages and disadvantages of open-loop control system?

 **UNIT-2 TWO MARK QUESTIONS**

1. Write down the applications of fluid systems?

2. State the advantages of fluid systems?

3. What are the disadvantages of fluid systems?

4. What is called pneumatic system?

5. List down basic element of a pneumatic system?

6. What are the advantages and disadvantages of pneumatic system?

7. Mention various components of a hydraulic system?

8. Mention various components of a hydraulic systems?

9. What is called hydraulic accumulator/

10 .What is the function of hydraulic pumps in a hydraulic system?

11. State any four advantages and disadvantages of hydraulic systems?

12. List down the functions of direction control valves?

13. Classify control valves used in hydraulic system?

14. List down the advantages of poppet valve?

15.What are the use of pilot operated valve?

**UNIT-3 TWO MARK QUESTIONS**

1. What is mathematical model?

2. What is lumped parameter system?

3. What are the classifications of mechatronic systems?

4. List the basic elements of traditional system?

5. What is a spring?

6. Define dashpot?

7. What is mass?

8. What are the types of rotational systems?

9. What is free body diagram?

10 .What are the building blocks of an electrical system?

11. Write the value of the voltage across the building blocks of an electrical systems?

12. Name the three types of systems used in mesh analysis?

13. What are the building blocks of a fluid system?

14. What is hydraulic system?

15. What is a pneumatic systems?

**UNIT-4 TWO (2) MARKS**

1. What is the need of controllers?

2. Write about PLC?

3. Write the operating principle of the logic controllers?

4. What is the main advantages of PLC?

5. What are the features of PLC as a controller?

6. Write about the architecture of a PLC?

7. Write about relay?

8. What is ladder programming?

9. Draw the logic diagram for an AND system?

10 .Draw the logic diagram for an NOR system?

11. Draw the logic diagram for an NAND system?

12. Draw the logic diagram for XOR system?

13. What is a latch circuit?

14. Write about TIMER circuit?

15. What are the types of counters?

**UNIT NO:5 Two (2)mark questions**

1. What are the stages in designing a mechatronic system?

2. Mension any four statements about the problem definition?

3. Distinguish between traditional design approach and mechatronics approach?

4. The design of mechatronics system is different from that of traditional system?

5. List the advantages of mechatronics design over traditional design?

6. How a traditional design of temperature control of domestic cetral heating system is improved by mechatronic design?

7. What are the requirement satisfied before starting the timer?

8. How can delay be varied in a simple program?

9. What are the advantages of PLC system in timed switch over traditional one?

10. What is a windscreen wiper?

11. What are the configurations in operating stepper motor?

12. Write the basic steps of the program to run a stepper motor?

13. What is the function of decoder?

14. What are the various movement of robots?

15. What are autonomous mobile robots?

**Unit 1 8 MARKS AND 16 MARKS**

1. Describe the elements of mechatronics systems, indicate various modules involved in it?

2. Explain open loop and closed loop control system with neat sketch?

3. What are the basic elements of a closed loop system? Explain?

4. Identify various elements of a closed loop system in automatic water level controller and describe their functions?

5. Explain the functioning of a closed loop system with a neat sketch for controlling the speed of a shaft?

6. What is a s equential controller? Explain how a microprocessors based controller operates a washing machine?

7. Explain the working principle of Hall Effect sensor?

8. Explain the working principle of a automatic camera?

9. Explain the working principle of LVTD?

10 .Explain the working of Bourdon tube pressure sensor?

**Unit 2 8 and 16 marks questions**

1. Explain the working of pneumatic systems with the help of a neat sketch?

2. List down the elements of hydraulic systems and explain each briefly?

3. Describe the working of rotary actuator mechanism with neat sketch.

4. Explain sliding and rotary spool valve in control process?

5. Discuss the selection criteria in bearings.

6. Classify AC motor and explain it.

7...Explain the Speed control of AC and DC motor.

8. Explain working principle of A C servo motor.

9. Explain working principle of D C servo motor.

10. Explain the working principle of various stepper motor.

**Unit3 16Mark questions**

1. Explain the building blocks of mechanical system

2. Explain electrical mechanical system.

3 Explain the working of hydraulic power system.

4. Expain about rotational translation system

5. Explain about adaptive control system?

6. Explain electronically proportional derivative (PD) controller with necessary circuit diagram?

7. Explain electronic proportional integral (PI) controller with necessary circuit diagrams?

8. Explain the characteristics of PID controller

9. Explain about digital controller?

10. Explain open loop and closed loop in control system?

 **Unit 4 Big questions**

1. What are the advantages of PLC over relay logic?

2. Compare the PLC and general purpose computer?

3. Explain the basic function of the major parts of the CPU?

4. Explain the input modules and output modules circuit with a neat sketch?

5. Write short notes on Timer?

6. What is meant by Internal relays? Explain.

7. Briefly explain how data handling is carried out in PLC?

8. Explain how you select a PLC and give specifications of a typical PLC?

9. Explain the functioning of cascaded Timer, on-off cyclic timers, and delay-off Timers with ladder diagram?

10 .Explain different operations carried out by PLC in data handling?

 Unit 5 **16 Mark questions**

1. What are the various stage in desining a mechatronic system? Explain?

2. Briefly explain traditional and mechatronics design?

3. Compare the traditional and mechatronics design approaches?

4. Explain different possible design solution of timed switch?

5. Explain different possible design solution of windscreen wiper?

6. Describe the two configurations of stepper motor in operation?

7. Design hardware to interface 7 segment LEDs with 8085 microprocessor? Write a software to display number from 0 to 9 continuously with a suitable delay time?

8. Explain the working of a weighing scale using mechatronics solution compare this over a traditional mechanical system?

9. Discuss the design aspects of a pick and place robot, in terms of the various mechatronic elements involved?

10 .Design a pick and place robt using mechatronics elements and explain about the robot control?