

QUESTION BANK

SUB CODE & NAME: ME6702-MECHATRONICS

UNIT I (INTRODUCTION)

PART-A

1. Define mechatronics. (NOV/ DEC 2005)
2. Mention the function of a mechatronic system. (APR/ MAY 2013)
3. What are the elements of a mechatronic system? (APR/ MAY 2010)
4. What are the basic elements of the measurement system? (APR/ MAY 2005)
5. Distinguish between measurement system and control system. (NOV/ DEC 2010)
6. Draw the basic feedback system. (APR/ MAY 2006)
7. Distinguish between open loop and closed loop control system. (NOV/ DEC 2007)
8. How do you classify the sensors? (APR/ MAY 2005), (APR/ MAY 2013)
9. State the difference between primary and secondary transducers. (NOV/ DEC 2003)
10. Define Hysteresis. (NOV/ DEC 2009)
11. State the dynamic characteristics. (APR/ MAY 2004)
12. What is the working principle of an eddy current proximity sensor? (NOV/ DEC 2008)
13. List any four applications of proximity sensors. (NOV/ DEC 2011)
14. What is the working principle of temperature sensor? (NOV/ DEC 2004)
15. What is RTD? State its applications. (NOV/ DEC 2015)
16. What is the basic principle of thermocouples? (APR/ MAY 2016)
17. List out the key elements of Mechatronics. (NOV/ DEC 2015)
18. Name few types of Proximity Sensors. (NOV/ DEC 2015)
19. Brief on the working principle of Hall Effect Sensor. (MAY/ JUNE 2016)
20. Differentiate between position and proximity sensor. (MAY/ JUNE 2016)

PART – B

1. With an example explain the various functional units of a measurement system. (NOV/ DEC 2012)
2. Explain open loop and closed loop control system with neat sketches. (APR/ MAY 2005)
3. Explain the basic elements of a closed loop system. (NOV/ DEC 2007)

4. Explain the functioning of a closed loop system with a neat sketch for controlling the speed of a shaft. (NOV/ DEC2010), (APR/ MAY2006)
5. Explain the functioning of a closed loop system with a neat sketch for temperature control system. (NOV/ DEC2011)
6. Explain the functioning of a closed loop system with a neat sketch for automatic water level controller. (NOV/ DEC2007), (NOV/ DEC2009)
7. Explain the static performance characteristics of a sensor. (NOV/ DEC2008), (APR/ MAY2006) (NOV/ DEC2010), (APR/ MAY2010)
8. Explain the dynamic characteristics of a sensor. (NOV/ DEC2010), (APR/ MAY2005), (NOV/ DEC2012), (APR/ MAY2008)
9. Describe neatly potentiometer sensor. (NOV/ DEC2013)
10. Explain the functions of a capacitive sensor with neat sketch. (APR/ MAY2008)
11. Explain the function of a LVDT with neat sketch. (APR/ MAY2013), (APR/ MAY2006)
12. Explain the Hall Effect sensor with neat sketch. (NOV/ DEC2010)
13. Explain the functions of a bimetallic strip with neat sketch. (NOV/ DEC2014), (APR/ MAY2013)
14. Explain the functions of a thermocouple with neat sketch. (NOV/ DEC2013), (APR/ MAY2006)
15. Explain the functions of a RTD with neat sketch. (NOV/ DEC2014), (NOV/ DEC2009)
16. Explain any two types of light sensors with neat sketch. (APR/ MAY2005)
17. Explain the working and construction of Hall Effect Sensor, Thermocouples and RTD. (NOV/ DEC2015)
18. Explain the dynamic characteristics of Sensors. (NOV/ DEC2015)
19. Explain about the model of a measurement system.(10) (MAY/ JUNE2016)
20. Discuss the control systems with example.(6) (MAY/ JUNE2016)
21. Discuss on the Static and Dynamic characteristics of Sensors in detail. (MAY/ JUNE2016)

UNIT-II (8085 MICROPROCESSOR AND 8051 MICROCONTROLLER)

PART – A

1. What is the function of Accumulator?
2. List the advantages of microprocessor.
3. Define machine cycle.
4. What are the flags available in 8085 microprocessor?
5. What is the function of IO/M signal in the 8085?
6. What is meant by wait state?
7. What are the steps involved to fetch a byte in 8085?
8. What is an instruction?
9. What is the use of ALE?
10. What is assembler?
11. What do you mean by opcode and the operand?
12. What are the main features of 8051 microcontroller?
13. What are the addressing modes available in 8051?

14. What is TRAP interrupt and its significance?
15. List the control and status signals of 8085 microprocessor and mention its need.
16. What is a stack in an 8085 microcomputer system?
17. What is indexing?
18. What is the function of program counter in 8085 microprocessor?
19. What is the different control machine instruction used in 8085 microprocessor?

PART – B

1. Explain with a neat block diagram the architecture of 8085 Microprocessor.
2. Explain the addressing modes of 8085 Microprocessor with suitable instructions.
3. Explain the pin diagram of 8085 Microprocessor.
4. Explain about instruction format of Intel 8085.
5. Explain about 8051 architecture with neat diagram.
6. Mention the difference between the Microprocessor and Microcontrollers.

UNIT –III (PROGRAMMABLE PERIPHERAL INTERFACE)

PART – A

1. What is key debouncing?
2. Define PPI.
3. Write down the function of OPF in 8255.
4. Name the modes available in 8255.
5. What are the applications of D/A converter interfacing with 8255?
6. What is keyboard interfacing?
7. State the purpose of NOP instructions.
8. Show the control word format of 8255 in BSR mode.
9. Name any two types of ADCs.
10. What is the bit set Reset mode of 8255 PPI?
11. What is the need for interfacing?
12. Mention some performance parameters of DAC.
13. Define conversion time.
14. Define Resolution.
15. What are the kinds of interface available in stepper motor?

PART – B

1. Explain the operating modes of 8255 PPI.
2. Explain the interface 8085 microprocessor with A/D and D/A converters.
3. Explain the Mode 1 input mode operation of 8255 in detail.
4. Explain the seven segment LED interface with microprocessor.
5. Describe with a neat diagram the stepper motor control using Microprocessor 8085.
6. Describe with a neat diagram the traffic light control using Microprocessor 8085.

7. Describe with a neat diagram the temperature control using Microprocessor 8085.

UNIT –IV (PROGRAMMABLE LOGIC CONTROLLER)

PART -A

1. Define a PLC. (NOV/ DEC 2012), (NOV/ DEC 2013)
2. What is shift register? (NOV/ DEC 2013)
3. Derive a PLC timing circuit that will switch on output on for 10 seconds and then switch off. (NOV/ DEC 2007), (NOV/ DEC 2008)
4. What are the logic functions that can be obtained by using switches in series? (NOV/ DEC 2007)
5. Explain delay on and delay off timer with ladder diagrams. (APR/ MAY 2008)
6. Explain latching with ladder diagram. (APR/ MAY 2008)
7. Draw the ladder logic diagram to represent two switches that are normally open and both have to be closed for a motor to operate. (NOV/ DEC 2008)
8. Draw the general ladder rungs to represent a latch circuit. (NOV/ DEC 2009)
9. Obtain a NOR logic function using ladder diagram. (APR/ MAY 2010)
10. How does the PLC differ from relay logic? (NOV/ DEC 2010)
11. State the use of JUMP control in PLCs. (NOV/ DEC 2011)
12. Define Adaptive control. (NOV/ DEC 2011)
13. What is an internal relay in a PLC? (NOV/ DEC 2012)
14. State the purpose of shift registers. (APR/ MAY 2013)
15. How will you the input and output of PLC? (APR/ MAY 2014)
16. Draw a Ladder diagram for NAND operation. (NOV/ DEC 2015)
17. What are the features of PLC? (NOV/ DEC 2015)
18. Brief on Shift Registers. (MAY/ JUNE 2016)
19. What are the advantages of master relay? (MAY/ JUNE 2016)

PART –B

1. Explain the architecture of a PLC. (NOV/ DEC 2007)
2. Explain the basics of ladder programming used in PLC. (APR/ MAY 2008)
3. Write a short notes on Jump control used in PLC using a ladder diagram. (NOV/ DEC 2009), (NOV/ DEC 2014)
4. Explain the factors to be considered while selecting a PLC. (NOV/ DEC 2007), (NOV/ DEC 2009), (NOV/ DEC 2014), (APR/ MAY 2014)
5. Explain the timers, counters, internal relays. (NOV/ DEC 2013), (APR/ MAY 2014)
6. Using simple programs, explain the data handling operation in a PLC. (NOV/ DEC 2012)
7. Explain how the shift register can be used to sequence the event with a neat diagram. (NOV/ DEC 2010)
8. Explain latching with ladder diagram. (NOV/ DEC 2014)
9. With a neat sketch, discuss about the internal structure of a PLC. (10) (NOV/ DEC 2015)

10. Discuss on selection of PLC.(6) (NOV/ DEC2015) (MAY/ JUNE2016)
11. Discuss in detail about data handling.(8) (NOV/ DEC2015)
12. Explain about Mnemonics with examples.(8) (NOV/ DEC2015)
13. Explain the architecture of a PLC.(10) (MAY/ JUNE2016)
14. Discuss on input/output Processing.(6) (MAY/ JUNE2016)
15. Discuss in detail about cylinder sequencing with FLCand its programming.(10) (MAY/ JUNE 2016)

UNIT-V (ACTUATORSAND MECHATRONIC SYSTEM DESIGN)

PART-A

1. Write down any four primary functions of mechanical systems. (NOV/ DEC2014)
2. List the advantages and disadvantages of hydraulic system.(APR/ MAY 2010)
3. Distinguish between ACand DCmotors. (APR/ MAY 2011)
4. What are the properties of a stepper motor? (APR/ MAY 2013), (APR/ MAY 2014)
5. Stepper motor is an open loop control-Justify. (APR/ MAY 2011)
6. Write down the applications of stepper motors. (NOV/ DEC2010), (APR/ MAY 2010)
7. What is a servo motor? (APR/ MAY 2012)
8. List down the various stages in mechatronic design system. (NOV/ DEC2009), (APR/ MAY 2014)
9. List the drawbacks of traditional design. (APR/ MAY 2012)
10. Compare the traditional and mechatronic design. (NOV/ DEC2007), (APR/ MAY 2010), (NOV/ DEC2013), (APR/ MAY 2014)
11. What is timed switch? (NOV/ DEC2009)
12. Name the sensors used in car Engine management system. (NOV/ DEC2011)
13. Give advantages of PLCsystem over traditional mechanical system. (APR/ MAY 2014)
14. Mention the various applications of servomotor. (APR/ MAY 2010)
15. Write the basic steps if the program to run a stepper motor. (NOV/ DEC2013), (NOV/ DEC 2014)
16. Write the governing equation for the motion of a DCmotor. (NOV/ DEC2015)
17. Why Latching is needed to switch on the DC Motor? (NOV/ DEC2015)
18. What are uses of micro motors? (MAY/ JUNE2016)

PART-B

1. Explain construction and working principle of ACand DCmotor. (NOV/ DEC2012), (APR/ MAY 2010), (NOV/ DEC2013), (APR/ MAY 2014)
2. Explain the working principle of stepper motor. (NOV/ DEC2010), (APR/ MAY 2010)
3. What are the various stages in designing a mechatronics system? Explain. (NOV/ DEC2005), (NOV/ DEC2010)

4. Briefly explain traditional and mechatronics designs. (NOV/ DEC2010)
5. Design a pick and place robot using mechatronics elements and explain about the robot control. (NOV/ DEC2005) (NOV/ DEC2007) (NOV/ DEC2009) (APR/ MAY2010) (NOV/ DEC2011)(NOV/ DEC2013)
6. With necessary diagrams, explain the automatic car park system. (APR/ MAY2006)(APR/ MAY2008)(APR/ MAY2014)
7. Explain about the basis of mechatronics system design considering vehicle engine management system as example. (APR/ MAY2006)(NOV/ DEC2009)(NOV/ DEC2014)(NOV/ DEC2007)(NOV/ DEC2013) (MAY/ JUNE2016)
8. With neat sketches explain various types of Stepper motors with the control. (NOV/ DEC2015)
9. Explain about construction and working principle of DC and AC motors. (MAY/ JUNE2016)