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**Question Paper Code : 41419**

15/05/18  
An

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Seventh Semester

Manufacturing Engineering

ME 6702 – MECHATRONICS

(Common to Mechanical Engineering, Mechanical and Automation Engineering/  
Production Engineering)

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. What are the key elements of a mechatronics system ?
2. Write an example for a transducer and state its transduction principle.
3. Define RAM and ROM.
4. What are the instructions of an 8085 instruction set for data transfer from memory to the microprocessor ?
5. What is the bit set reset mode of 8255 PPI ?
6. Distinguish between parallel data transfer and serial data transfer.
7. Draw the ladder diagram to represent a latch circuit.
8. What is the criteria need for the selection of a PLC ?
9. Compare Traditional design with Mechatronics design.
10. What are the sensors used in Engine Management System ?



PART – B

(5×16=80 Marks)

11. a) Explain in detail about the Emerging areas of Mechatronics. (16)  
 (OR)
- b) Explain Principal and working of following sensors :  
 i) Potentiometer  
 ii) Eddy Current Proximity Sensor. (8+8)
12. a) Explain the Internal Architecture of 8058 Microprocessor. (16)  
 (OR)
- b) Discuss briefly about Pin Configuration of 8085 Microprocessor with neat sketch. (16)
13. a) Explain the architecture of an 8255 Programmable Peripheral interface. (16)  
 (OR)
- b) Explain the seven segment LED interface with microprocessor. (16)
14. a) Explain the components of a PLC with a suitable block diagram. (16)  
 (OR)
- b) Draw the ladder diagram and PLC program for the following logic gates.  
 a) AND                      b) OR                      c) NAND  
 d) NOR                      e) XOR                      f) XNOR (16)
15. a) List out the stages in design of Mechatronics system and explain in detail. (16)  
 (OR)
- b) Discuss Mechatronic design of an Engine Management. (16)

Reg. No. :

**Question Paper Code : 80671**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Mechanical Engineering

ME 6702 — MECHATRONICS

(Common to Manufacturing Engineering, Mechanical and Automation Engineering  
and Production Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write about the Mechatronics approach in a micro-processor-controlled washing machine.
2. Write about the bimetallic strips.
3. What is the function of Arithmetic Logic Unit (ALU)?
4. What is difference between microprocessor and microcontroller?
5. What is the function of Program Counter?
6. What is the function of Read/Write control logic in 8255PPI?
7. Why a LATCH circuit are used in PLC?
8. What is ladder programming?
9. How does a car park barrier works?
10. What is the difference between Traditional and Mechatronics Approach?

PART B — (5 × 16 = 80 marks)

11. (a) Explain the static and dynamic characteristics of transducers.

Or

- (b) (i) Explain the principles and working of Hall Effect Sensor. (8)  
(ii) What are the basic elements of a closed loop system? Explain. (8)

12. (a) Explain with neat sketch the architecture of 8085 microprocessor.

Or

- (b) Write short notes on :  
(i) Addressing modes. (8)  
(ii) Instruction set of 8085 microprocessor. (8)

13. (a) Explain with neat sketch microprocessor based temperature control system by using 8255PPI.

Or

- (b) Explain with neat sketch microprocessor based stepper motor control system by using 8255PPI.

14. (a) Explain the architecture of a PLC and explain about its elements.

Or

- (b) Write short notes on PLC for the following :  
(i) Data Movement  
(ii) Data Comparison.

15. (a) What are the roles of sensors in car engine management system? Explain with a block diagram.

Or

- (b) Design a robot to pick and place the object and comment on the various elements in the system.



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Reg. No. :



**Question Paper Code : 20822**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Seventh Semester

Mechanical Engineering

ME 6702 – MECHATRONICS

(Common to Manufacturing Engineering/Mechanical and Automation Engineering/Production Engineering)

(Regulations 2013)

(Also common to PTME 6702 — Mechatronics for B.E. (Part-Time) — Fifth Semester — Mechanical Engineering — Regulations 2014)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Illustrate how capacitive sensor works when area changes?
2. Define response time and time constant based on sensors.
3. Write the needs of register in microcontroller.
4. Sketch the functional pin description of 8085.
5. State CWR of 8255.
6. What are the features of 8255?
7. Draw the ladder diagram of latch ckt.
8. List the different programming methods of PLC.
9. A stepper motor has a step angle of 7.5 degree. How many pulses required for the motor to rotate through five complete revolutions?
10. Write the working principle of stepper motor.

PART B — (5 × 13 = 65 marks)

11. (a) Write short notes on Thermistor and RTD with its applications.  
Or  
(b) Brief the construction and working principle of following;  
(i) Linear and rotary potentiometer (5)  
(ii) Strain gauge. (8)
12. (a) List and explain the various types of addressing modes in detail in 8085  $\mu p$  with example for each.  
Or  
(b) Draw and explain the architecture and functional units of 8085 microprocessor.
13. (a) (i) Demonstrate LED interface with 8255. (5)  
(ii) Demonstrate the circuit for interfacing stepper motor interface using 8085 microprocessor and PPI. (8)  
Or  
(b) Briefly explain the pin description, architecture and control modes of 8255 in detail.
14. (a) Draw the ladder logic diagram of OR, NOR, NAND and XOR logic.  
Or  
(b) Elaborate the construction and I/O details of PLC.
15. (a) Demonstrate the automatic car park barrier using PLC.  
Or  
(b) Brief the various stages of mechatronics system development.

PART C — (1 × 15 = 15 marks)

16. (a) Demonstrate the details about inductive transducer used to measure the linear displacement.  
Or  
(b) Design a traffic light controller using 8255 microprocessor.



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**Question Paper Code : 91853**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Fifth/Seventh Semester

Mechanical Engineering

ME 6702 – MECHATRONICS

(Common to Manufacturing Engineering/Mechanical and Automation  
Engineering/Production Engineering)

(Regulations 2013)

(Also common to PTME 6702 – Mechatronics for B.E. (Part-Time) Fifth Semester  
Mechanical Engineering – (Regulations – 2014))

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. What are the need of mechatronics systems ?
2. Write the working principles of Edey current sensor.
3. Distinguish the microprocessor vs microcontroller.
4. List the various types of Addressing modes.
5. How to select mode B in CWR of 8255 ?
6. Show the pin details of 8255.
7. Define on time delay ?
8. Brief the program scan cycle of PLC.
9. What is modeling in design process ?
10. A stepper motor has a step angle of 1.8 degree. How many pulses required for the motor to rotate through five complete revolutions ?

## PART - B

(5×13=65 Marks)

11. a) A steel cantilever is 300 mm long, 25 mm wide and 5 mm thick.
- Calculate the value of deflection at the free end for the cantilever when a force of 30N is applied at this end. The modulus of elasticity for steel is 200 GPa. (4)
  - An LVDT with a sensitivity of 0.6 V/mm is used. The voltage is read on a 20 V voltmeter having 100 divisions. Two-tenths of division can be read. Calculate the resolution of the LVDT. (4)
  - Find the minimum and maximum value of force. (5)
- (OR)
- b) Consider a parallel rectangular plate air spaced capacitor of 30 cm × 20 cm and the distance between the plates is 1.2 mm. If the relative permittivity for air is 1.006. Calculate the displacement sensitivity of the device by neglecting the displacement of the central plate. Assume permittivity of the plates as  $8.854 \times 10^{-12}$  F/m. (13)

12. a) Sketch the timing diagram for the instruction LDA, 9FH. (13)
- (OR)
- b) The list of mnemonics are given below. Write the corresponding decimal, binary and hexadecimal number of 8085 microprocessor mnemonics to understand the function of assembler. (13)

Sl.No	1	2	3	4	5	6
Mnemonics	LXI B	STAX B	INX B	INR B	DCR B	MVI B

Sl.No.	7	8	9	10	11	12	13
Mnemonics	DAD B	LDAX B	DCX B	INR C	DCR C	MVI C	RRC

13. a) Design an interfacing diagram of ADC with 8085 microprocessor in detail. (13)
- (OR)
- b) Design a keyboard and 7 segment LED display interfacing with 8051 microcontroller for Hexadecimal Characters. (13)

14. a) With neat sketch explain the architecture of PLC and its I/O connection for various system interfacing. (13)
- (OR)
- b) Furnish the list of PLC programming methods. Design a hardwired relay logic circuit, ladder logic circuit for the given program. (13)
- START PB1  
AND CR1  
OR LS1  
AND NOT CR2  
OUT SOL
15. a) Design and explain the fluid power actuator based pick place robot. (13)
- (OR)
- b) Elaborate the design stages involved in mechatronics system development in detail. (13)

## PART - C

(1×15=15 Marks)

16. a) Design a unipolar stepper motor interfacing circuit with 8051 microcontroller. Write an assembly language programming for interfacing stepper motor in detail. (13)
- (OR)
- b) Design a servomotor motor interfacing for speed, position and direction control using 8051 microcontroller. (13)