

Code No: R1641031

R16

Set No. 1

IV B.Tech I Semester Regular Examinations, October/November - 2019

MECHATRONICS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Identify the various elements and levels of mechatronics system. [2]
- b) Why the signal conditioning is so important in electronic devices used in mechatronics? [3]
- c) What are the different types of fluid systems available for mechatronic system? [2]
- d) List the application of PLCs in computers. [3]
- e) What are the principal functions of Data Acquisition Systems? [2]
- f) Name some future mechatronics system. [2]

PART-B (4x14 = 56 Marks)

2. a) Define a mechatronic product and explain social and economical impacts of mechatronics products. [7]
- b) What are the various major fields of applications of mechatronics? Discuss them briefly. [7]
3. a) Enumerate the different signal conditioning methods? Explain them briefly. [7]
- b) Draw and explain the differential amplifier with a thermocouple. [7]
4. Explain the construction and principle of operation of permanent magnet stepper motor. What are the applications of it? [14]
5. Draw a block diagram of Programmable Logic Controller (PLC) showing in very general terms the main units of it. [14]
6. a) Describe the various interfaces available for analog and digital data acquisition systems. [7]
- b) What is DSP? Draw a block diagram for the data flow in DSP. [7]
7. a) Explain briefly the difference between microprocessor and microcontroller. What is a PLC? [7]
- b) What is a microcontroller? What are the advantages of PLC compared to a microcontroller? [7]



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Set No. 2

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MECHATRONICS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) List the various measurement systems in mechatronics. [2]
- b) What is the purpose of filters in mechatronic systems? Name some filters. [3]
- c) List the different types of Hydraulic systems available for mechatronics. [2]
- d) State the role of micro-controllers in mechatronic system? [3]
- e) Distinguish the analog and digital DAQ's. [2]
- f) How do you abbreviate PLCs? What is its uniqueness? [2]

PART-B (4x14 = 56 Marks)

2. a) What do you know about various design considerations in mechatronic product design? [7]
- b) Explain the various stand alone control systems used in Special Purpose Machines. [7]
3. a) Discuss the various passive components used in filtering noise signals. [7]
- b) Distinguish the BJT and FET diodes. [7]
4. a) What are the important applications of pneumatic actuator systems? [7]
- b) What is timing belt? When the timing belts are used? List and explain the components of hydraulic system. [7]
5. a) List out the various functional blocks of 8051 microcontroller and explain the function of each one briefly. [7]
- b) Explain the dissimilarities of timers and counters in programmable logic controls (PLCs). [7]
6. a) Describe briefly about any one of the analog to digital converter. [7]
- b) Explain the interfacing motor drives used in DSP. [7]
7. a) Classify the different types of Process Controllers? Distinguish them in detail. [7]
- b) Briefly explain the impotence and location of Counters and Registers in PLC with suitable examples. [7]



Code No: R1641031

R16

Set No. 3

IV B.Tech I Semester Regular Examinations, October/November - 2019

MECHATRONICS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

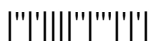
Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Identify the sensors and transducers in mechatronics. [2]
- b) Compare the TRIAC and LEDs. [2]
- c) What are the different types of pneumatic systems available for mechatronics? [3]
- d) List the functions of micro-processors in mechatronics system. [3]
- e) Why digital signal processing employed in mechatronics? [2]
- f) What is a Digital Controller? State its role in mechatronics system? [2]

PART-B (4x14 = 56 Marks)

2. a) Enlist the advantages and disadvantages of mechatronics systems. [7]
- b) Explain the control parameters and system objectives of mechatronic systems. [7]
3. Discuss the following type of amplifiers:
(a) Logarithmic amplifier (b) Differential amplifier
(c) Summing amplifier [14]
4. a) State the basic principles involved in the action of a motor. [7]
- b) Mention the advantages of pneumatic actuators over hydraulic actuators. [7]
5. a) Explain the immediate and indirect addressing modes available in 8051 microcontroller. [7]
- b) Explain the important features of a typical programmable logic controller (PLC). [7]
6. a) Distinguish the features of analog and digital Data Acquisition Systems. [7]
- b) Discuss the importance of DAQ in the DSP with help of suitable example. [7]
7. What is a PLC? How it is different from microcontroller? What are the advantages of PLC compared to a microcontroller? [14]



Code No: R1641031

R16

Set No. 4

IV B.Tech I Semester Regular Examinations, October/November - 2019

MECHATRONICS

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Name the different light sensors in mechatronics. [2]
- b) What is a diode? Classify them. [2]
- c) State the major functions of control valves. [2]
- d) How digital logic controls improve the utility of the mechatronic system? [3]
- e) Draw the data flow block diagram in DSP. [2]
- f) Enlist the principal components in the process controllers. [3]

PART-B (4x14 = 56 Marks)

2. a) State the reasons why sensors and transducers are used in mechatronics. [7]
- b) Explain the working of any one pneumatic actuator and state its advantages. [7]
3. a) Distinguish the DIAC and TRIAC. [7]
- b) Discuss the various applications of amplifiers in mechatronic system. [7]
4. a) What is meant by "Electrical actuation system"? Explain the devices used in such systems. [7]
- b) Draw the neat sketch of pneumatic diaphragm actuator and explain its working. [7]
5. Describe how to select a specific microcontroller for a given application. Briefly give different applications of 8051 microcontroller. [14]
6. a) Explain the signal sampling, Time and space domain and Frequency domain in DSP. [7]
- b) Write a short note on string and segmented DAQ. [7]
7. Explain with the help of ladder rungs the jump control mechanism in a programmable and logic controller (PLC). [14]



Code No: R1641031

R16

Set No. 1

IV B.Tech I Semester Supplementary Examinations, February - 2020
MECHATRONICS
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

PART-A (14 Marks)

1. a) Mention the levels of mechatronics system. [3]
- b) What is a DIAC? Show the DIAC symbol. [3]
- c) Mention the applications of pneumatic systems. [2]
- d) What is programmable logic controller? [2]
- e) Write a short note on interfacing motor drives. [2]
- f) Differentiate first order and second order systems. [2]

PART-B (4x14 = 56 Marks)

2. a) What are the different sensors used for measurement of temperature? Explain the principle, working of each with neat diagrams. [7]
- b) What is gauge factor? Describe the strain gauge with neat diagram? Mention the difficulties with strain gauges while measuring the force? How to overcome it? [7]
3. a) Describe the structure and operation of DIAC with suitable diagram? Mention the DIAC applications. [7]
- b) What are the different modes of operation FET's? Explain them with suitable circuit diagrams? [7]
4. a) What are the components used in hydraulic actuating system? Explain. [7]
- b) What are the elements in electrical actuating system? Explain the working principle of electrical actuating system. [7]
5. a) On what basis are microcontrollers classified. Explain. [7]
- b) What do you mean by logic gates? Draw and explain AND, OR, EXOR and NOT gates. [7]
6. a) Discuss about the principle of Digital to Analog conversion process. [7]
- b) Explain the single channel data acquisition system with the help of neat diagram. [7]
7. a) Give the design solution for the lift control system. [7]
- b) What are the features of PLC? Explain with suitable examples. [7]



IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**MECHATRONICS
(Mechanical Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any FOUR questions from Part-B*

PART-A(14 Marks)

1. a) State the significance of light sensors. [2]
- b) List the applications of solid state electronic devices. [3]
- c) State the advantages of electrical actuation systems. [2]
- d) Write the limitations of process controllers. [3]
- e) List the applications of Digital Signal Processing. [2]
- f) Write about principle of controller. [2]

PART-B(4x14 = 56 Marks)

2. a) Discuss about measurement system and control systems. [7]
- b) Explain acceleration sensors with neat diagram. [7]
3. a) Illustrate the working of operational amplifiers with neat circuit diagrams. [6]
- b) Discuss about the following [8]
 - i) PN Junction diode
 - ii) Noise reduction
4. Discuss the working principle of hydro-pneumatic servo system in detail. [14]
5. a) Explain Programmable Logic Controllers (PLCs) versus computers. [7]
- b) Discuss the block diagram of micro controller. [7]
6. Analyze different types of Digital to Analog converters in detail. [14]
7. Explain dynamic models and analogies with an example in detail. [14]

Code No:R1641031

R16

Set No. 2

IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021

MECHATRONICS
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A(14 Marks)

1. a) State the significance of fluid pressure sensors. [2]
- b) Illustrate the types of filters. [3]
- c) Write the limitations of mechanical actuation systems. [2]
- d) List the applications of microprocessor. [3]
- e) Outline the advantages of Digital Signal Processing. [2]
- f) Define digital controllers. [2]

PART-B(4x14 = 56 Marks)

2. a) Illustrate mechatronics design process with neat diagram. [7]
- b) State and explain advantages and disadvantages of mechatronics systems. [7]
3. Discuss analog signal conditioning in detail. [14]
4. a) Differentiate between hydraulic and pneumatic actuating systems. [7]
- b) Discuss the working principle of electro-pneumatic servo system. [7]
5. Analyze the working of programmable logic controllers in detail. [14]
6. Discuss the different types of Analog to Digital converters in detail [14]
7. Explain the design of mechatronics systems and future trends. [14]

IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**MECHATRONICS
(Mechanical Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any FOUR questions from Part-B************PART-A(14 Marks)**

1. a) State the significance of liquid flow sensors. [2]
- b) Write the applications of FET. [3]
- c) Outline the advantages of fluid systems. [2]
- d) List the applications of digital electronics and systems. [3]
- e) Write the importance of system interfacing. [2]
- f) Define static response of system. [2]

PART-B(4x14 = 56 Marks)

2. a) Discuss the levels of mechatronics system. [7]
- b) Explain proximity sensors with neat sketch. [7]
3. a) Illustrate about PN junction diode in detail? [10]
- b) What are the advantages of DIAC? [4]
4. Explain the components and working of hydraulic system with applications. [14]
5. Discuss the block diagram of microprocessors with neat diagram. [14]
6. a) Write about interfacing motor drives. [6]
- b) Explain block diagram of data acquisition system. [8]
7. Interpret various types of process controllers in detail. [14]

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Set No. 4

IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021

MECHATRONICS
(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Question paper consists of Part-A and Part-B

Answer ALL sub questions from Part-A

Answer any FOUR questions from Part-B

PART-A(14 Marks)

1. a) State the significance of liquid level sensors. [2]
- b) Outline the applications of LEDs. [3]
- c) Write the advantages of electro-hydraulic servo system. [3]
- d) List the applications of PLCs for control. [2]
- e) Write the importance of data acquisition. [2]
- f) What is the significance of dynamic models and analogies. [2]

PART-B(4x14 = 56 Marks)

2. a) Discuss elements of mechatronics system. [7]
- b) Explain temperature sensors with neat sketch. [7]
3. a) Write the significance, working and applications of BJT in detail. [10]
- b) What are the advantages of TRIAC. [4]
4. a) Discuss the components and working of pneumatic system. [7]
- b) Analyze different types of control valves. [7]
5. Illustrate about digital logic control and process controllers in detail. [14]
6. Explain Digital Signal Processing and data flow in DSPs in detail. [14]
7. Discuss functions and working of programmable logic controllers? [14]