Code No: 117EV

**R13**

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
### B. Tech IV Year I Semester Examinations, November/December - 2016
## MECHATRONICS
### (Mechanical Engineering)

Time: 3 Hours

Max. Marks: 75

**Note:** This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

### PART- A
(25 Marks)

| | | |
|---|---|---|
| 1.a) | What is a transducer? Write the examples of transducers. | [2] |
| b) | Write about the disadvantages of mechatronics systems. | [3] |
| c) | Define forward bias. | [2] |
| d) | Write about the applications of MEMS. | [3] |
| e) | Explain about servo system. | [2] |
| f) | Explain about control valves. | [3] |
| g) | Define microcontroller. | [2] |
| h) | Explain the applications of PLCs for control. | [3] |
| i) | Write about the need of A to D conversion. | [2] |
| j) | Explain about future trends of mechatronics system. | [3] |

### PART-B
(50 Marks)

| | | |
|---|---|---|
| 2.a) | Explain about elements of mechatronics systems. | |
| b) | Write about force and torque sensors. | [4+6] |

**OR**

| | | |
|---|---|---|
| 3.a) | Write about microprocessor-based controllers. | |
| b) | Write about acceleration and liquid level sensors. | [4+6] |

| | | |
|---|---|---|
| 4. | Explain the features and utilization of PN junction diode. | [10] |

**OR**

| | | |
|---|---|---|
| 5. | Explain the characteristics of various types of filters and contrast them. | [10] |

| | | |
|---|---|---|
| 6.a) | Differentiate between Hydraulic and pneumatic actuating systems. | |
| b) | Explain the role of control valves. | [5+5] |

**OR**

| | | |
|---|---|---|
| 7.a) | Explain about electro-hydraulic servo systems in detail. | |
| b) | List out the advantages of hydro-pneumatic systems. | [5+5] |

6.a) Explain the principle of CNC system with a block diagram.
b) Write NC part program for the part shown in the below figure.                [5+5]



OR
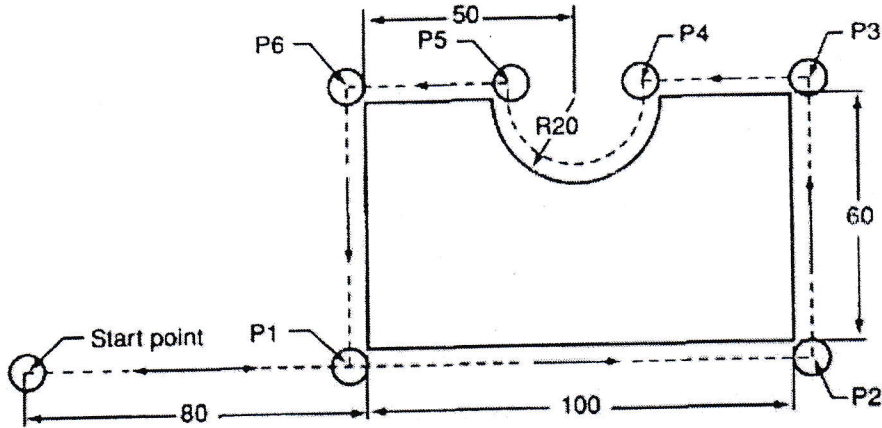
7.a) Explain linier and circular interpolations in CNC systems.
b) What is manual CNC part programming? Explain with an example.              [5+5]

8.a) What is part family? State advantages and limitations of Group Technology.
b) Briefly explain the need of CAPP (Computer Aided Process Planning).         [5+5]

OR

9.a) Explain about the OPITZ coding system generally used in Group Technology.
b) What are the main objectives of MRP (Manufacturing Resource Planning)? Explain them briefly.                [5+5]

10.a) Discuss the various topologies used in CIM with their relative advantages and disadvantages.
b) How does Lean production differ from Flexible production system? Explain.    [5+5]

OR

11.a) Describe the Scheduling and Dispatching issues related to FMS (Flexible Manufacturing System).
b) Define computer aided quality control. Explain how it is implemented.       [5+5]

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