(3 Hours)   [Total Marks : 80

N. B. : (1) **Question No.1** is **compulsory**.
       (2) Attempt **any three** questions out of **remaining**.
       (3) Assume suitable **data** where **required**.
       (4) **Figures** to the **right** indicate **full marks**.

Q.1 a) Define Mechatronics and discuss the elements of Mechatronics system.   20

    b) Write Short note on: Fuzzy logics in Mechatronics.

    c) Discuss the features of 8051 micro controller.

    d) Explain digital encoder and its importance.

Q.2 a) Explain Anti lock Braking system as a case study of Mechatronics.   10

    b) Draw and explain the architecture of PLC   10

Q.3 a) Draw the ladder logic for following   10

     AND, OR, NOT, EX-OR and NAND

    b) Discuss the interfacing of hex keyboard with 8051.   10

Q.4 a) A metal punching press should operate when the four combinations defined
     in the following equation. Design a logic circuit to get the required result.   10

$$Out = \overline{A}\,\overline{B}\,C\,D + \overline{A}\,B\,C\,D + A\,B\,C\,D + A\,\overline{B}\,C\,D + A\,B\,\overline{C}\,\overline{D} + A\,B\,\overline{C}\,D + A\,B\,C\,\overline{D}$$

    b) Explain design methodology of Mechatronics systems with proper diagram.   10

Q.5 a) Draw the pneumatic circuit sequence of operation in cascading as below   10

     A+, B+ delay A- B-

    b) Give applications of electro hydraulic   05

    c) Compare microprocessor and microcontroller   05

Q.6 Write short notes on: (any two)   20

    a) Pick and Place Robot

    b) 8051 Pin Diagram and its addressing modes

    c) Pneumatic cascade method for sequence of operation with example

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