3 Hours/100 Marks

Seat No.

MARKS

1. A) Attempt **any six** of following : **(2×6=12)**

   a) Draw symbol and lable the terminals of :

      a) FET

      b) BJT.

   b) State the need for filter in Regulated power supply.

   c) What is thermal runway in transistor ?

   d) Draw pin diagram of IC741 and lable all pins.

   e) Draw the symbol and state the truth table for :

      i) XNOR gate

      ii) NAND gate.

    f) List any four solid state devices.

    g) What is mechatronics ?

    h) List any four types of real time mechatronics systems.

B) Attempt **any two** :   **(2×4=8)**

    a) Draw sketch of bridge rectifier and its output waveform.

    b) Explain with neat sketch the working principle of inverting amplifier.

    c) What is real time mechatronics system ? State its advantages and disadvantages.

2. Attempt **any four** :   **(4×4=16)**

    a) Define biasing. Draw the voltage divider bias circuit for BJT.

    b) Sketch two stage RC coupled amplifier. List its two advantages and disadvantages.

    c) State the ideal characteristics of Op-Amp.

    d) Draw block diagram of IC 555. State function of each block.

    e) What is oscillator ? State Barkhausen criteria for sustained oscillation.

    f) What is a multiplexer ? Draw logic symbol of a 4 : 1 multiplexer.

3. Attempt **any four** :   **(4×4=16)**

    a) Explain with circuit diagram the application of BJT as an amplifier.

    b) Draw and explain the working of Half Adder Circuit.

c) Compare microprocessor with micro controller.

d) What is a decoder ? Draw logic diagram of 3 : 8 decoder write its truth table.

e) List two examples of each primary and secondary transducers.

f) Sketch the block diagram of CNC system from mechatronics view and state functions of each block.

4. Attempt **any four** :   **(4×4=16)**

a) Draw and explain the functional block diagram of AVCS.

b) Describe the working of BJT as a switch.

c) Draw Ladder diagram for start-stop logic with one input push button for start and one push button for stop and one output for motor to activate solenoid valve.

d) What is a data logger ? State its four application.

e) What is a DAS ? State its applications.

f) What is opto-coupler ? State its two applications.

5. Attempt **any four** :   **(4×4=16)**

a) What is a ADC and DAC ? List out its types.

b) Compare between analog and digital transducer.

c) Differentiate between intrinsic and extrinsic semiconductor.

d) Define current gain in CB and CE configuration. State relationship between them.

e) Explain the working of master slave J.K. Flip Flop.

f) List applications of photodiode and phototransistor.

6. Attempt **any four** : **(4×4=16)**

a) Draw block diagram of regulated power supply. State function of each block.

b) Explain load and line regulation in regulated power supply.

c) Compare LC and RC oscillators.

d) Draw block diagram of PLC. State function of each block.

e) Draw and explain the working of decode counter using JK Flip Flop.

f) State important features of 8051 microcontroller.

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