

2074  
B.E. (Mechanical Engineering)  
Fifth Semester  
MEC-505: Mechatronics

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following:-

- a) Can a transformer be used to increase voltage in a DC circuit? Explain the reason for your answer.
- b) What is the advantage of using a microcontroller in place of a mechanical controller?
- c) How does a microcontroller handle interrupts?
- d) List all the inputs and outputs from a typical microcontroller.
- e) List factors you would consider while finalizing the A/D converter resolution. (5x2)

**UNIT - I**

- II. Explain in detail the Analog signal processing using Operational Amplifiers and the ideal model for Operational Amplifiers. (10)
- III. Discuss in detail the Bipolar Junction Transistor. (10)
- IV. Write short notes on:-
  - a) Ideal model for the operational amplifier
  - b) Inverting and non-inverting amplifier
  - c) Difference amplifier
  - d) Instrumentation amplifier (10)

**UNIT - II**

- V. Using the block diagram, explain in detail the PICF16F84 microcontroller. (10)
- VI. Draw schematic of logic circuits that produce the following logic expressions:
  - a)  $\overline{A} + \overline{B}$
  - b)  $\overline{A.B}$  (10)

P.T.O.

(2)

VII. Write short notes on:-

- a) Solenoids & Relays
- b) Stepper Motor
- c) Ratchet and Pawl Mechanism
- d) Flip flops

(10)

x-x-x