

2122  
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.

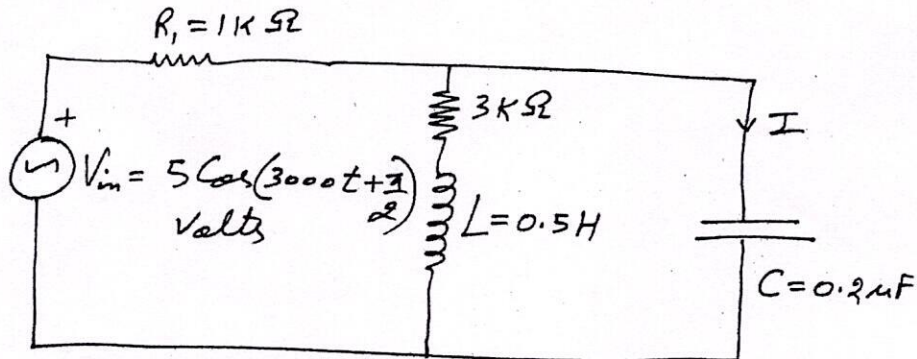
x-x-x

- I. Write short notes on the following:-
- Thevenin equivalent of the circuit
  - Norton equivalent of the circuit
  - Transformer
  - Ratchet & Pawl
  - Microcontroller

(5x2)

UNIT - I

- II. Find steady state current  $I$  through the capacitor in the following circuit.



(10)

- III. Discuss current - voltage characteristics of a typical junction diode and Zener diode. Discuss how a Zener diode can be used to make voltage regulator circuit. (10)
- IV. Explain BJT and FET. Draw and explain a simple transistor switch circuit. (10)

UNIT - II

- V. Derive expression of gains for inverting amplifier, non-inverting amplifier and difference amplifiers. (10)

P.T.O.

(2)

- VI. What is a PLC? What is 'Ondelay Timer' and what are different parameters in this timer? Write a ladder program that will start a pump after 12 seconds. (10)
- VII. Discuss following:-
- a) SR flip-flop
  - b) PIC16F84 microcontroller
  - c) Labview software
  - d) Control of DC motor
  - e) Timing diagram of OR gats
- (10)

x-x-x