

Course Code: EST 130

Course Name: **BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**  
**PART I: BASIC ELECTRICAL ENGINEERING**  
(2019 Scheme)

Max. Marks: 50

Duration: 90 min

**PART A**

*Answer all questions, each carries 4 marks.*

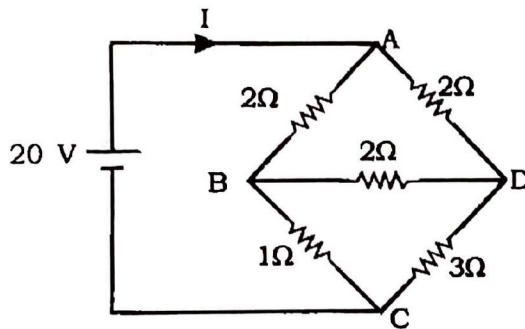
- 1 What are statically and dynamically induced emfs? Explain.
- 2 Derive the expression for average value of a sinusoidal wave form.
- 3 Derive an expression for the energy stored in an inductor.
- 4 Prove that in a purely capacitive circuit the current leads the applied voltage by 90 degrees and the power consumed is zero.
- 5 Derive the relation between line and phase currents in a 3 phase delta connected system. (5x4=20)

**PART B**

*Answer one full question from each module, each question carries 10 marks*

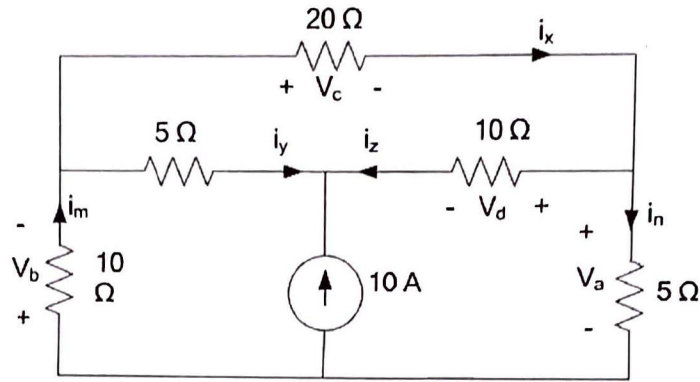
**Module-I**

- 6 Find the source current  $I$  in the below figure using star-delta transformation. (10)



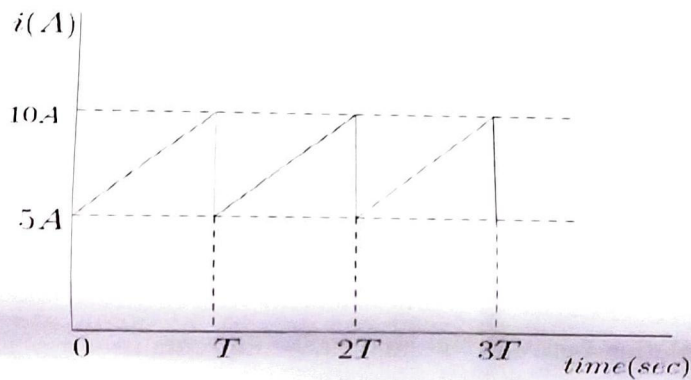
**OR**

- 7 Use the nodal analysis to find voltages  $V_a$ ,  $V_b$ ,  $V_c$ ,  $V_d$ . (10)



### Module-II

- 8 Determine the average value and rms value of the current waveform shown in figure below. (10)



OR

- 9 a) A coil of  $50\ \Omega$  resistance is placed in a magnetic field of  $1\text{mWb}$ . The coil has 50 turns and a galvanometer of  $400\ \Omega$  resistance is connected in series with it. Find the average induced emf and the resulting current if the coil is moved in 0.1 second from the given field to another field of  $0.2\text{mWb}$ . (6)
- b) Define rms value and average value of a time varying wave form. (4)

### Module-III

- 10 A resistor of  $50\ \Omega$ , an inductor of  $0.1\text{H}$  and a capacitor of  $40\ \mu\text{F}$  are connected in series and the combination is connected across  $220\text{V}$ ,  $50\ \text{Hz}$  supply. Calculate (i) the circuit impedance (ii) resulting current (iii) power factor (iv) phase angle and (v) power consumed by the circuit. (10)

OR

- 11 Three inductive coils, each with a resistance of  $22\ \Omega$  and an inductance of  $0.05\ \text{H}$  are connected in first in star and then in delta, to a 3 phase  $415\ \text{V}$ ,  $50\ \text{Hz}$  supply. Calculate for both star and delta connections, (i) phase current and line current and (ii) total power absorbed. (10)

**PART II: BASIC ELECTRONICS ENGINEERING  
(2019 Scheme)**

Max. Marks:50

Duration: 90 min

**PART A**

*Answer all questions, each carries 4 marks.*

- 12 Distinguish between active and passive electronic components with examples for each.
- 13 Explain Avalanche breakdown?
- 14 Write a note on potential divider biasing.
- 15 Describe gain and bandwidth of an RC coupled amplifier.
- 16 Distinguish between AM and FM. (5x4=20)

**PART B**

*Answer one full question from each module, each question carries 10 marks*

**Module-IV**

- 17 a) What are the specifications of a resistor? Define any three (5)  
b) What do you understand by depletion region? (5)

**OR**

- 18 a) Describe the colour coding of a resistor. (4)  
b) Explain the VI characteristics of a diode with relevant sketches. (6)

**Module-V**

- 19 a) Explain the working of a full wave bridge rectifier with capacitor filter. (7)  
b) With a neat sketch explain the block diagram of an instrumentation system. (3)

**OR**

- 20 a) Define line regulation and load regulation. (4)  
b) Draw the circuit diagram of a CE amplifier and discuss the role of each component used in it. (6)

**Module-VI**

- 21 a) With a neat sketch explain the basic block diagram of a GSM system. (7)  
b) Explain the principle of an antenna. (3)

**OR**

- 22 a) Write the expression for an AM wave and comment on the bandwidth requirement and modulation index. (5)  
b) Explain the concept of cellular communication systems. (5)

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