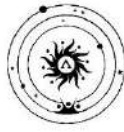


H.T.No: 

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Course Code: 241AE005



# ADITYA UNIVERSITY

B.Tech – I Semester End Examinations Regular (B.Tech2024)

## BASIC ELECTRICAL GADGETS AND INSTRUMENTS (Agricultural Engineering)

Time: 3 hours

Max. Marks: 50

Answer ONE question from each unit

All Questions Carry Equal Marks

All parts of the questions must be answered at one place only

### UNIT-I

- 1 a An *RLC* series circuit has a  $40.0\ \Omega$  resistor, a  $3.00\ \text{mH}$  inductor, and a  $5.00\ \mu\text{F}$  capacitor. (a) Find the circuit's impedance at  $60.0\ \text{Hz}$  and  $10.0\ \text{kHz}$ . L3 CO1 [5M]
- b Derive the impedance of a series *RL* circuit? L3 CO1 [5M]

(OR)

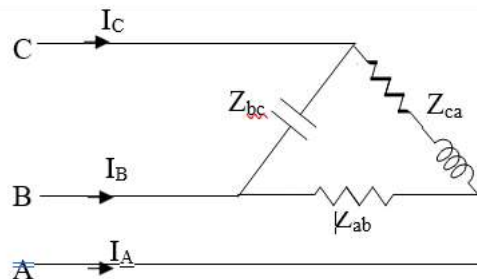
- 2 a What is resonance in an AC series circuit? L2 CO1 [2M]
- b Derive the formula for resonance frequency of a series *RLC* circuit. L3 CO1 [8M]

### UNIT-II

- 3 Show that in two-wattmeter method, the sum of the meter readings equals the total power dissipated in the load, whether the load is balanced or unbalanced, *Y* – connected or  $\Delta$  - connected. L3 CO2 [10M]

(OR)

- 4 Determine: i) phase currents and ii) line currents for the unbalanced  $\Delta$  connected load shown in Figure 1. The load impedance  $Z_{ab} = 100\ \Omega$ ,  $Z_{bc} = -j60\ \Omega$ , and  $Z_{ca} = 30 + j60\ \Omega$ . Assume a positive sequence voltage for the balanced supply system with a line –line source voltage of  $230\ \text{V}$ . L3 CO2 [10M]



### UNIT-III

- 5 a Explain Zener diode as source voltage regulator. L2 CO3 [6M]
- b Explain Zener diode as load voltage regulator. L2 CO3 [4M]

(OR)

- 6 With a neat sketch explain input and output characteristics of transistor in CE configuration. L2 CO3 [10M]

**UNIT-IV**

- 7 a Explain the operation of OP-AMP as adder. L2 CO4 [6M]  
b Explain the operation of OP-AMP as comparator. L2 CO4 [4M]

(OR)

- 8 a What is a Karnaugh map (K-map)? L2 CO4 [5M]  
b Explain the truth table of basic gates along with symbols. L2 CO4 [5M]

**UNIT-V**

- 9 Explain the measurement of displacement using capacitive transducers. L2 CO5 [10M]

(OR)

- 10 a What is an Anemometer? Explain working principle of anemometer. L2 CO5 [6M]  
b Explain the construction and working of digital multimeter. L2 CO5 [4M]

MODEL QUESTION PAPER