(T) Roll No. .....

PAPER ID—16003

B. Tech. EXAMINATION, 2025

(First Semester)

BASICS OF ELECTRICAL AND ELECTRONICS ENGG.

Code : EEE-101

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) State Thevenin's Transfer Theorem. 2

(b) Compare active and passive elements with examples. 2

(c) What the relationship between line and phase, voltage and current for a 3-ϕ star connected balanced system ? 2

(d) Differentiate between real power and complex power. 2

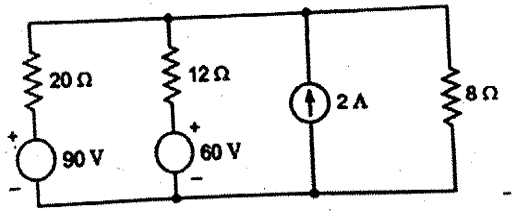
(e) Explain the necessity of a parallel resistor in clamper circuit. 2

(f) Define Pinch-off voltage for JFET. 2

(g) Differentiate between Zener breakdown and avalanche breakdown. 2

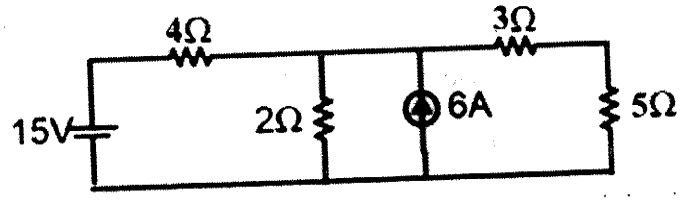
Unit I

2. (a) Find the current in 8 Ω resistance using nodal analysis : 7



(b) What do you mean by an electrical signal ? What are various types of electrical signals ? Explain them with examples. 7

3. (a) Determine the current flowing through 5 ohms resistance in the network shown below using Thevenin's theorem : 7



(b) Discuss the Reciprocity theorem with the help of a typical example. 7

Unit II

4. (a) Derive mathematically dynamic impedance (Z_D) offered by RLC parallel circuit under resonance. Also, draw its phasor diagram. 7

(b) Determine the mathematical expression for instantaneous power and average power in case of R, L and C, elements connected in series across a single phase AC supply of voltage $v = V_m \sin(\omega t)$? Also draw the instantaneous power waveform. 7

5. Write notes on the following : **14**

(a) Reactive power

(b) Real power

(c) Apparent power

(d) Complex power in AC circuits.

Unit III

6. What is a diode ? Discuss the V-I characteristics of a P-N junction diode. Also explain the (i) No applied bias (ii) Forward bias (iii) Reverse bias modes of P-N junction diode. **14**

7. (a) What is a clipper circuit and how does it operate ? Differentiate between the working of a negative and positive clipper. 7

(b) Draw and explain the working of a centre-tapped full wave rectifier. Also calculate its efficiency and ripple factor. 7

Unit IV

8. (a) Describe the construction and working of a enhancement type MOSFET. Also draw its transfer characteristics. 7

(b) What is a MOS capacitor ? Explain. 7

9. Develop the small signal model of JFET. **14**

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