PAPER ID—10703

B.Tech. (Civil Engg.)

EXAMINATION, 2023

(Second Semester)

BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

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. Q. No. **1** is compulsory.

1. (a) What are the active and passive elements of an electric circuit ?

(b) What are independent and dependent sources ?

(c) What is meant by Complex power ?

(d) What is resonance in an electric circuit ?

(e) Draw the V-I characteristics of a practical *p-n* diode.

(f) What is meant by thermal stability ?

(g) What is pinch off voltage ? 2×7=14

2. (a) Describe the concept of electric field and electric charge. Derive expression for electric field due to a point charge.

(b) Three resistors 30 Ω, 25 Ω, 45 Ω are connected in series across 200V.

Calculate :

(i) Total resistance

(ii) Current

(iii) Potential difference across each element. 7×2=14

3. (a) State and explain Thevenin's theorem and discuss its applications and limitations.

(b) Draw the power triangle and discuss real power, reactive power, and apparent power. 7×2=14

4. (a) Draw the circuit diagram and phasor diagram of a RLC series circuit and explain each component.

(b) Find the instantaneous value of alternating voltage for the given equation $v = 10 \sin (3\pi \times 10^4 t)$ volt at :

(i) 0 s

(ii) 50 μs

(iii) 75 μs. 7×2=14

5. (a) What is *p-n* junction diode ? Explain its forward mode of operation.

(b) Draw and explain the circuit diagram of half wave and full wave rectifier.

7×2=14

6. (a) Draw and explain CB characteristics of BJT.

(b) Explain Transconductance (gm) parameter of JFET. 7×2=14

7. (a) What is depletion and enhancement type MOSFET ?

(b) Explain three regions of operation of a MOS transistor. 7×2=14