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Question Paper Code : 85022

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

First Semester

Electrical and Electronics Engineering

EE25C03 – FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to Electrical and Computer Engineering/Electrical and Electronics Engineering (Training Integrated))

(Regulations 2025)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is power factor? Mention its significance.

2. How voltage source with a source resistance can be converted into an equivalent current source?

3. Define magnetic flux.

4. What is fringing?

5. Mention two advantages of hydroelectric power plant.

6. List the different types of power generation systems.

7. What is earthing? State its purpose.

8. Mention two properties of good insulating materials.

9. Define flip-flop.

10. What is zener breakdown?

PART B — (5 × 13 = 65 marks)

11. (a) Determine the power dissipation in the 4 Ω resistor of the given circuit shown in Figure. 11(a). p

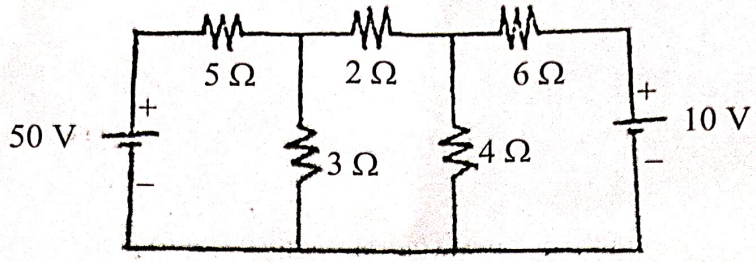

Fig. 11(a)

Or

(b) A series circuit has R = 10 Ω, L = 50 mH and C = 100 μF and is supplied and is applied with 200 V, 50 Hz. Determine the value of : (i) impedance (ii) Current (iii) Power (iv) Power factor (v) Phase angle (vi) Voltage drop across each element.

12. (a) Describe the hysteresis and eddy current losses in magnetic materials. Explain their causes, characteristics and methods to minimise them.

Or

(b) A magnetic core has a mean length of 40 cm, cross-sectional area of 6 cm^2 and relative permeability 800. Compute the reluctance and flux produced if the coil has 200 turns and carries 2 A.

13. (a) Describe the layout and working of a thermal (coal-based) power plant. Explain the functions of boiler, turbine, condenser and cooling tower. Discuss the efficiency, environmental impacts, advantages and disadvantages of thermal generation.

Or

(b) Discuss in detail the various distribution systems, such as radial, ring main and interconnected systems. Explain their construction, operation and applications.

14. (a) Discuss in briefly with necessary diagram, different types of domestic wiring systems : cleat, wooden casing and capping, TRS and conduit wiring. Compare their construction, advantages and limitations.

Or

(b) A house wiring circuit carried a load of 2 kW at 230 V. Calculate the current and decide whether a 5 A fuse or 15 A fuse should be used.

15. (a) Explain with neat diagram, the operation of a bridge rectifier under resistive load and discuss its ripple factor, rectification efficiency and peak inverse voltage.

Or

(b) Draw the logic diagram of SR flip flop and JK flip flop and explain with their truth table.

PART C — (1 × 15 = 15 marks)

16. (a) (i) A circuit consists of three resistors 3 ohms, 4 ohms and 6 ohms in parallel and a fourth resistor 4 ohms in series. A battery of emf 12 V and internal resistance 6 ohm is connected across the circuit. Find the total current in the circuit and terminal voltage across the battery. (7)

(ii) Using Kirchoff's Laws, find the current in various resistors in the circuit shown in Fig. 16 (a) (ii). (8)

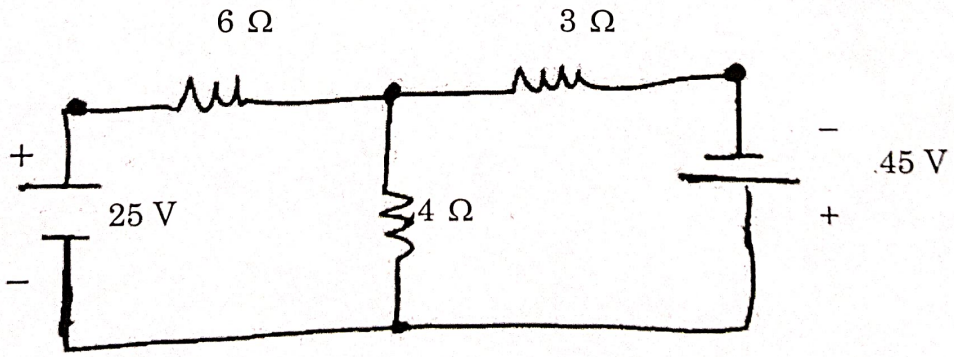

Fig. 16(a)(ii)

Or

(b) (i) An electrical network is arranged shown in Fig. 16 (b) (i).

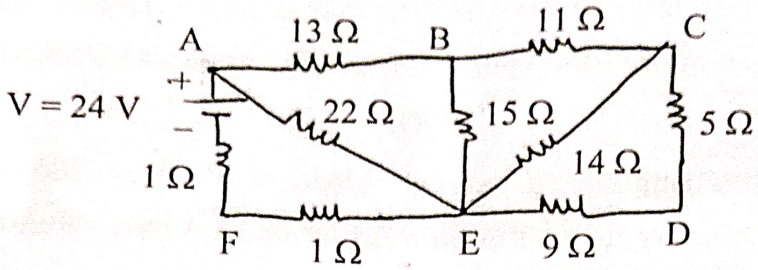

Fig. 16(b)(i)

Find :

(1) the current in the branch AF. (4)

(2) the power absorbed in branch BE and (2)

(3) P.D. across the branch CD. (2)

(ii) Find the average and RMS value of the following waveforms shown in Fig. 16 (b) (ii) (1), (2). Find also the form factor and peak factor.

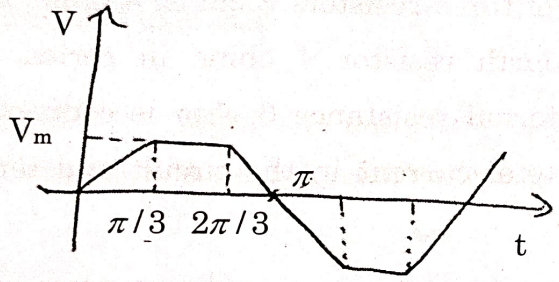

Fig. 16 (b) (ii) (1)

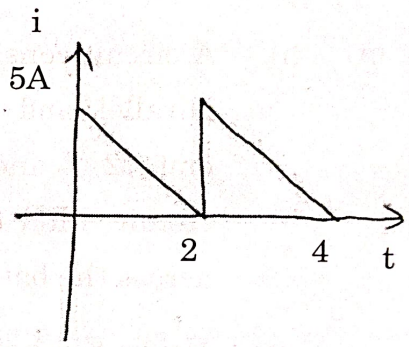

Fig. 16 (b) (ii) (2)