Graphic Era
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act 1956

End Term (Even) Semester Examination May-June 2025

Roll no.....

Name of the Program and semester: B.Tech (II Sem)
Name of the Course: Basic Electrical Engineering
Course Code: TEE 201

Time: 3 hour

Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1.

(2X10=20 Marks)

(CO1)

a. Differentiate between:
(i) Mesh and loop
(ii) Node and junction
(iii) RMS and average value
(iv) Form Factor and peak factor
(v) Real Power and Apparent Power

b. Find out current in 5Ω resistor with the help of Norton's Theorem in the circuit shown in Fig 1.

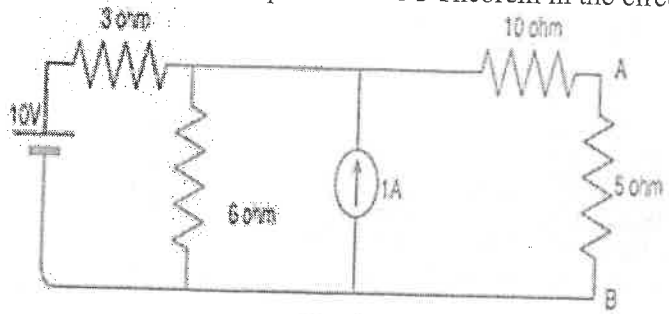

Fig. 1

c. Determine current through 15-ohm resistance by nodal analysis shown in Fig. 2.

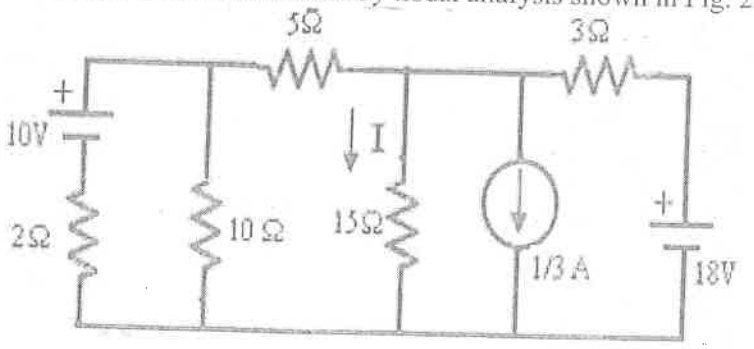

Fig. 2

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Q2. (2X10=20 Marks)
(CO1 & CO2)

a. a. Consider the loop in Fig. 3 which forms part of an electric circuit. Find i_4. Given $v_1 = 6V$, $i_2 = 2A$, $i_3 = 4A$

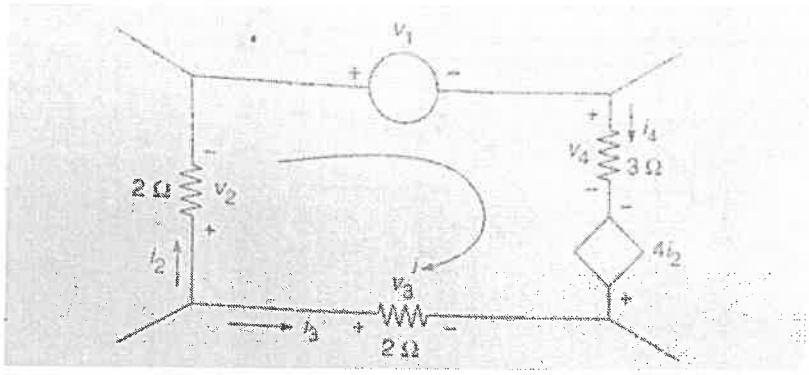

Fig. 3

b. A resistor and capacitor are connected in series across an ac generator. The emf of the generator is given by

$v(t)=V_0\cos\omega t$,

where $V_0=230V$, $f=50Hz$, $R=200\Omega$ and $C=4.0\mu F$.

a. What is the impedance of the circuit?
b. What is the amplitude of the current through the resistor?
c. Write an expression for the current through the resistor.
d. Write expressions representing the voltages across the resistor and across the capacitor.

c. Find out equivalent resistance between AB terminals in Fig. 4.

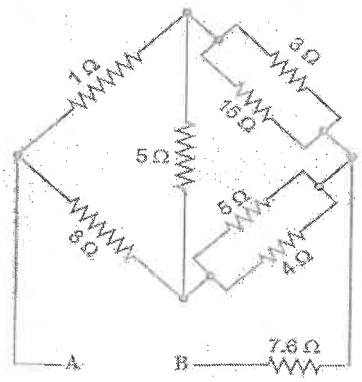

Fig.4

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Q3. (2X10=20 Marks)
(CO3)

a. Calculate the average value, RMS value, form factor and peak factor of half wave rectified alternating current output.

b. A choke coil having a resistance of 25 ohm and inductance of 0.08H is connected in series with a condenser of 200 μF. The whole circuit has been connected to 230 Volt, 50 HZ supply. Calculate:

(i) Impedance of the choke coil
(ii) Impedance of the condenser
(iii) Current
(iv)Power factor of the coil
(v) Apparent and reactive power of circuit.

c. Derive the expression for average power in series RC ciruit.

Q4. (2X10=20 Marks)
(CO4, CO5)

a. Explain the different types of electrical wiring systems used in domestic installations. Compare conduit wiring with casing and capping in terms of safety, cost, and installation.

b. Discuss the construction, operation, and advantages of Miniature Circuit Breaker (MCB) and Moulded Case Circuit Breaker (MCCB). In what scenarios would you prefer MCCB over MCB?

c. Discuss the various types of wires and cables used for internal wiring. How do you select the appropriate cable for a given electrical load?

Q5. (2X10=20 Marks)
(CO6)

a. Differentiate between AC and DC machines with respect to construction, working principle, and applications. Give at least three points each.
b. Compare and contrast primary cells, secondary cells, and fuel cells. Discuss their advantages and limitations in practical use.
c. Describe in detail the construction and working of a Lead Acid Cell. Also, discuss the chemical reactions occurring during charging and discharging.