

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA

Odd Mid Semester Examination for Academic Session 2025-26

COURSE NAME: B.Tech

SEMESTER: 1st

BRANCH NAME/SECTIONS: M, N, O, P, Q, R, S, T

SUBJECT NAME: BASIC ELECTRICAL ENGINEERING

FULL MARKS: 30

TIME: 90 Minutes

Answer All Questions.

The figures in the right hand margin indicate Marks. Symbols carry usual meaning.

Q1. Answer all Questions. [2 × 3]

- | | | |
|----|--|---------------|
| a) | Differentiate between ideal and practical sources? | - CO1 |
| b) | How much work will be done by an electric energy source with a potential difference of 3 kV that delivers a current of 1 A for 1 minute? | - CO2 |
| c) | Define the terms "Form Factor" and "Peak Factor" in connection with electric network. | - CO1/
CO2 |

Q2. [8]

- a) Find the branch currents in the fig. 1 by using Nodal Analysis - CO1

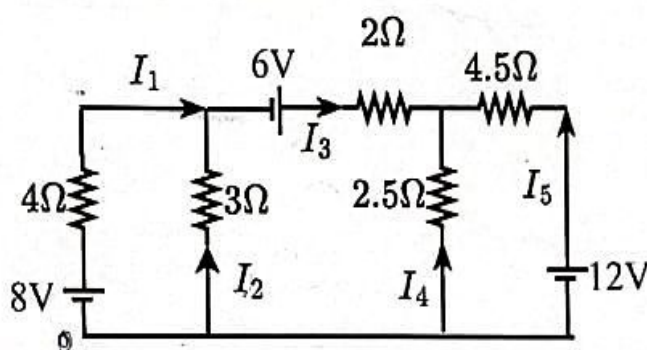


Fig. 1

- b) Using Thevenin's theorem, determine the power dissipated in the 5 Ω resistor shown in the fig. 2

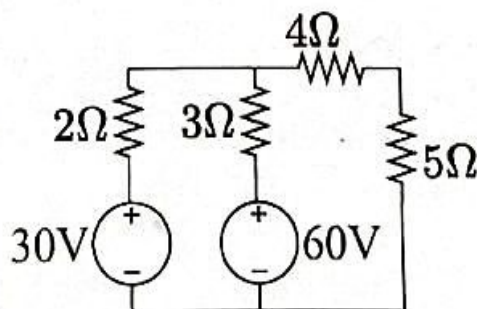


Fig. 2

OR

- a) Using superposition theorem find the current I in the Fig. 3 - CO1

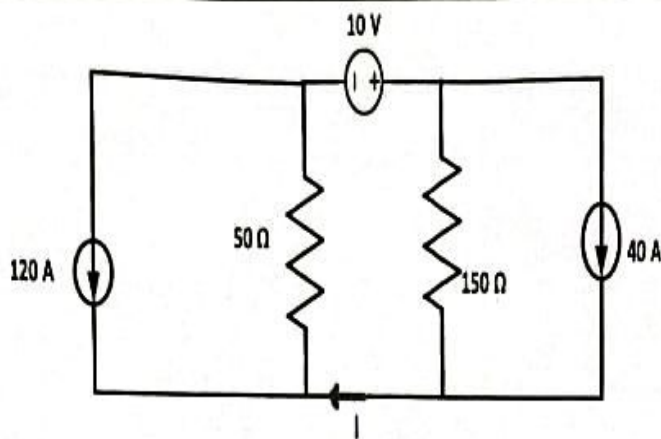


Fig. 3

	b)	State and explain Maximum Power Transfer Theorem. Derive the expression of maximum power.	
Q3.			[8]
	a)	The current in a RC circuit is given by $(4.5+j12)$ A, when applied voltage is $(100 + j150)$ V. Determine (i) Complex expression for the impedance (ii) Power (iii) Draw the phasor diagram	- CO2
	b)	Prove that rms value of the sinusoidal alternating current is 0.707 times its maximum value.	
		OR	
	a)	In a series circuit containing pure resistance & pure inductance. The current & voltage are expressed as $i(t) = 5 \sin\left(314t + \frac{2\pi}{3}\right)$ and $v(t) = 15 \sin\left(314t + \frac{5\pi}{6}\right)$ (i) what is the impedance of the circuit? (ii) what is the value of resistor ?(iii) what is the value for inductance ?	- CO2
	b)	Draw Impedance and Power triangle with proper notion and Units mentioned. State the expression of Power Factor for each case.	
Q4.			[8]
	a)	Find the branch currents in the above circuit shown in Fig. 1 by using mesh analysis	- CO1/ CO2
	b)	Using Norton's theorem, determine the current through the 5Ω resistor and calculate the power dissipated in that resistor shown in Fig.2	
		OR	
	a)	A resistance of 20 ohm, inductance of 0.2 H and a capacitance of $150\mu\text{F}$ are connected in series and fed by a 230 V, 50 Hz supply. Find (i) voltage across resistor, inductor, capacitor (ii) value for inductive reactance & capacitive reactance (iii) Impedance & admittance (iii) active power, reactive power	- CO1/ CO2
	b)	Derive the expression for average power in single phase RC series circuit.	