

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 3130906****Date: 28/11/2019****Subject Name: Electrical Circuit Analysis****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) State and explain Reciprocity theorem.	03
	(b) State and explain Maximum power transfer theorem with suitable example.	04
	(c) Obtain Thevenin's equivalent resistance of the circuit given in fig.1 to the left of the terminals a-b.	07
Q.2	(a) In the fig.2, the switch k is first kept at position 1 and steady state condition is reached. At $t = 0$, switch is moved to position 2. Find the current in both the cases.	03
	(b) Explain time constant in case of series R-L and series R-C circuit.	04
	(c) In the fig.3, the switch is closed at $t = 0$. Find value of i , di/dt , d^2i/dt^2 at $t=0^+$. Assume initial current of inductor to be zero.	07
OR		
	(c) Explain in detail about transient response in series R-C circuit having DC excitation.	07
Q.3	(a) Explain the importance of Dot convention in coupled circuit with suitable example.	03
	(b) Draw impedance triangle and explain related terms.	04
	(c) For the network shown in fig.4, find the node current I using node voltage technique.	07
OR		
Q.3	(a) In the fig.5, an unknown impedance of $Z \Omega$ is connected in series with $(5 + j8) \Omega$ coil. If $I = 2.5 \angle -15^\circ$ A, find value of Z.	03
	(b) Find the current in a series R-L circuit having $R = 2 \Omega$ and $L = 10$ H while a DC voltage of 100 V is applied. What is the value of this current after 5 seconds of switching on?	04
	(c) The circuit shown in fig.6 is operating in the sinusoidal steady state. Find I_1 and I_2 by loop analysis and determine ratio V_0 / V_s . Assume $\omega = 10^3$ rad / sec.	07
Q.4	(a) Find driving point impedance of the given network shown in fig.7.	03
	(b) Find inverse Laplace of given $F(s)$. $F(s) = \frac{(s+2)}{s(s+3)(s+4)}$	04
	(c) Obtain the step response for the R-L series circuit shown in fig.8.	07

OR

- Q.4** (a) Explain characteristics of unit ramp function. **03**
(b) Determine the transfer function $H(s) = V_0(s) / I_0(s)$ of the circuit in fig.9. **04**
(c) Find $v_0(t)$ in the circuit of fig.10, assuming zero initial condition. **07**
- Q.5** (a) What is the condition of symmetry of all different two port parameters? **03**
(b) Briefly describe h parameters for a two port network. **04**
(c) Obtain Z-parameters of the circuit shown in fig.11. **07**
- OR**
- Q.5** (a) Find Y-parameters of the circuit shown in fig.12 **03**
(b) Derive expression of ABCD parameters in terms of Z parameters. **04**
(c) Determine Z-parameters of the circuit shown in fig.13. **07**

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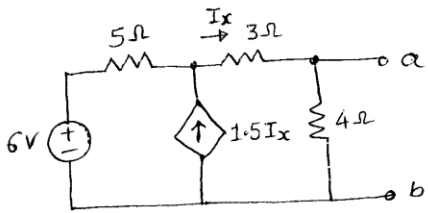


fig. 1

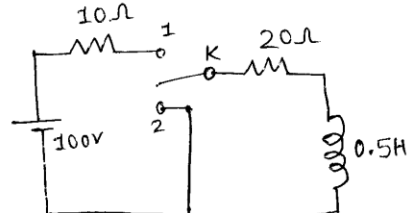


fig. 2

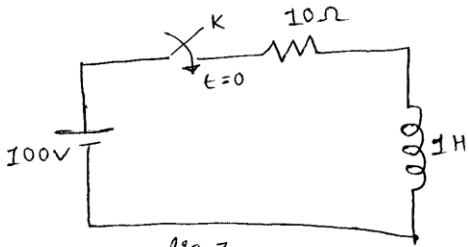


fig. 3

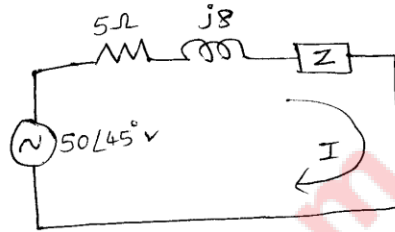


fig. 5

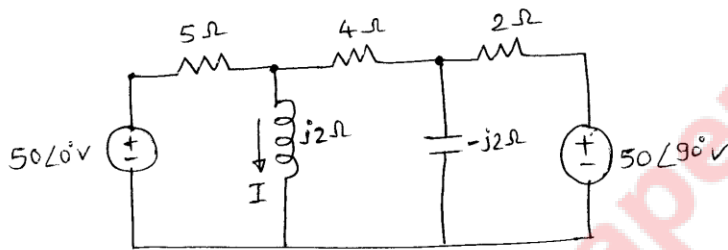


fig. 4

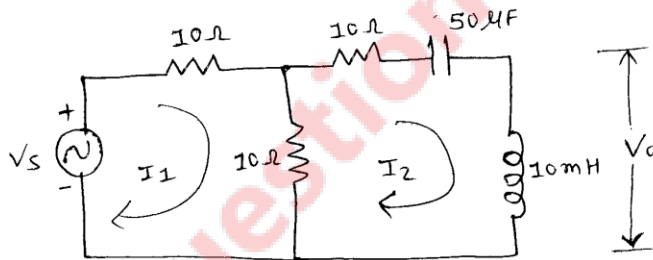


fig. 6

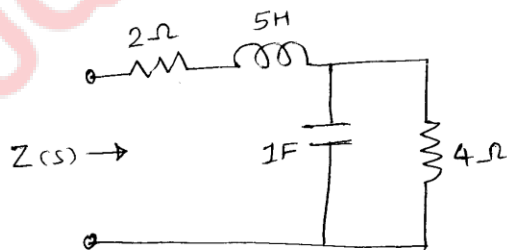


fig. 7

