

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 3 – EXAMINATION – SUMMER 2026

Subject Code: BE03009031

Date: 24/06/2026

Subject Name: ELECTRICAL CIRCUIT ANALYSIS

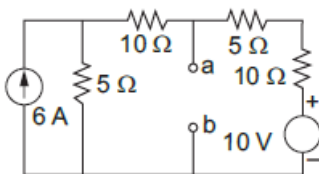
Time: 02:30 PM TO 05:00 PM

Total Marks: 70

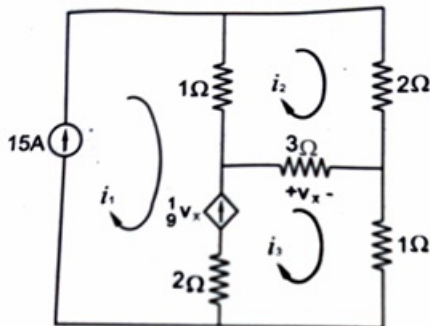
Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What is an ideal source? Explain the difference between ideal & practical source. 03
- (b) State & explain superposition theorem. 04
- (c) Find the Thevenin's equivalent and Norton's equivalent of the circuit with respect to terminals a and b. 07

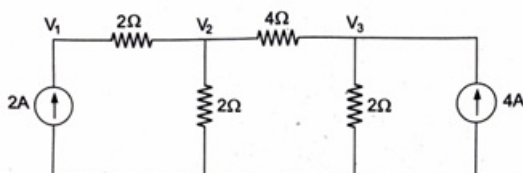


- Q.2** (a) What do you mean by time constant in series RL or RC circuit? 03
- (b) Derive the condition of maximum power transfer in DC circuit 04
- (c) Determine the mesh currents i_1 , i_2 & i_3 in the given network using mesh analysis. 07



OR

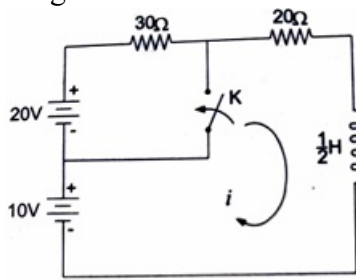
- Q.2** (c) Find V_1 , V_2 & V_3 for the given circuit. 07



- Q.3** (a) Give the relationship between apparent power, average power & reactive power. 03
- (b) Develop an equivalent circuit for inductor and capacitor at $t=0^+$ when there is no initial energy & when the parameters are initially charged. 04

- (c) A steady state is reached with switch k open. At $t=0$, switch k is closed. Find $i(t)$ for the given circuit.

07



OR

- Q.3** (a) Define (i) Average value (ii) RMS value (iii) Form factor. 03
 (b) Define the terms (i) Transient Time (ii) Time Constant (iii) Natural response (iv) Steady state response. 04
 (c) Discuss how values of R, L & C govern the response of an RLC series circuit excited by a DC source. 07

- Q.4** (a) Define H-parameter of a two-port network. 03
 (b) Derive the step response to R-L series circuit using Laplace Transformation method. 04
 (c) State & prove initial value theorem. 07

OR

- Q.4** (a) What are poles & zeroes of a network function? 03
 (b) Define unit ramp function. Obtain Laplace transform of unit ramp function. 04
 (c) Derive condition of symmetry for h parameters 07

- Q.5** (a) Why the current in inductor and voltage in capacitor cannot change simultaneously? 03
 (b) Derive condition of reciprocity of y-Parameters 04
 (c) Write a short note on ABCD parameters of a two port network. 07

OR

- Q.5** (a) Define self-inductance and mutual inductance of a coil. 03
 (b) Derive relationship of h-Parameter in terms of g-Parameters 04
 (c) Obtain Z parameters for the given network. 07

