



C16-EC-305

6236

**BOARD DIPLOMA EXAMINATION, (C-16)**  
**MARCH/APRIL—2018**  
**DECE—THIRD SEMESTER EXAMINATION**  
**NETWORK ANALYSIS**

Time : 3 hours ]

[ Total Marks : 80

**PART—A**

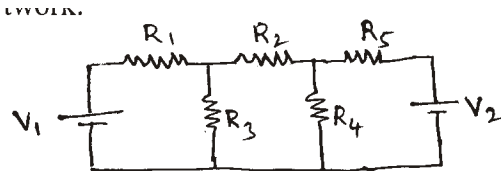
3×10=30

**Instructions :** (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. State Ohm's law.
2. Draw ideal voltage source and ideal current source.
3. Define the terms 'junction', 'loop' and 'mesh' in circuits.
4. Determine the number of node voltage equations required to solve the following network :



5. State reciprocity theorem.
6. Give the transformation formulae for star to delta transformation.
7. Write Laplace transforms for unit-step function and exponential function.

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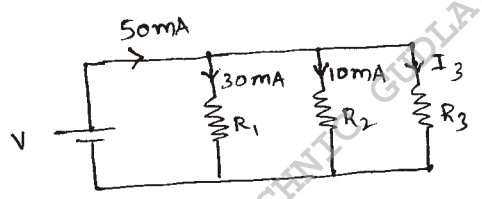
- 8. What are initial conditions?
- 9. Define the terms 'characteristic impedance' and 'propagation constant'.
- 10. List the advantages of constant-k filters.

**PART—B**

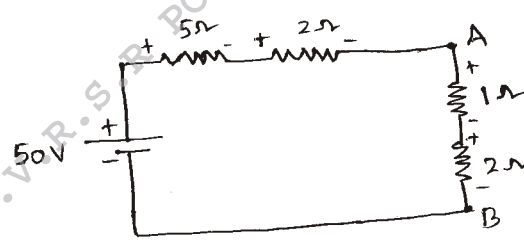
10×5=50

**Instructions :** (1) Answer **any five** questions.  
 (2) Each question carries **ten** marks.  
 (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

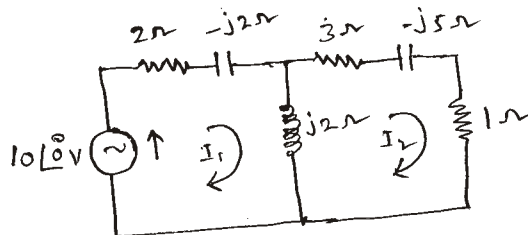
- 11. (a) Determine the current  $I_3$  in the following circuit using Kirchhoff's current law (KCL) : 4



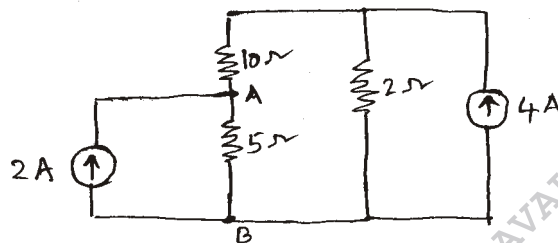
- (b) Find the voltage between A and B in the following circuit using Kirchhoff's voltage law (KVL) : 6



- 12. Find the mesh currents in the following network using mesh current analysis :

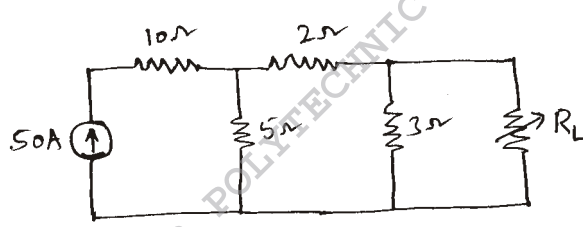


- \* **13.** In the circuit shown below, determine the node voltages  $V_1$  and  $V_2$  using node voltage analysis :



- 14.** Apply superposition theorem to the Network given below and find the voltage  $V_{AB}$  :

- 15.** Determine the maximum power delivered to the load  $R_L$  in the following circuit :



- 16. (a)** Derive an expression for the current in an  $RL$  circuit (series  $RL$  circuit). 6

- (b)** A series  $RL$  circuit with  $R = 50$  ohms and  $L = 10$  H has a constant voltage source  $V = 100$  V applied at  $t = 0$  and the inductor has no initial current. Find the equation for the current in the circuit. 4

- \* **17.** Briefly explain (a) linear property (b) first shifting property and (c) change of scale property of Laplace transform.

- 18.** Explain  $T$ -type attenuator with circuit diagram (symmetrical type).

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