

B.Sc. (CBCS Pattern) Semester - I  
**USELT01-DSE-1B - Electronics Paper-I**  
**(Network Analysis and Digital Fundamentals)**

P. Pages : 3

Time : Three Hours



GUG/S/23/11548

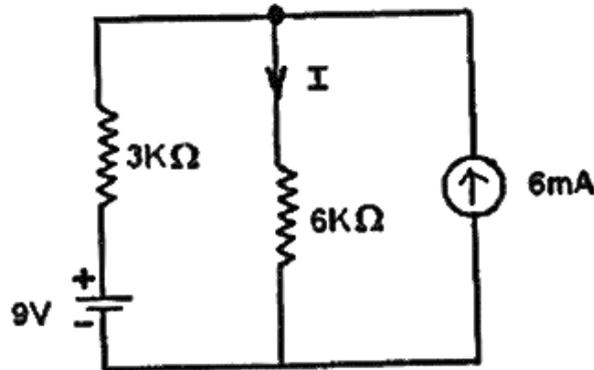
Max. Marks : 50

**Either:**

1. a) Define ideal voltage source. Give its symbols and explain its characteristics. 5
- b) State and explain KCL with suitable example. 5

**OR**

- c) State and explain superposition theorem. 6
- d) Using superposition theorem, calculate current flowing through  $6K\Omega$  resistor in the circuit given below. 4

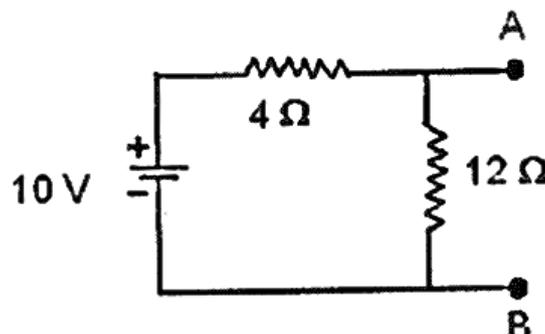


**Either:**

2. a) State and explain Thevenin's theorem. 5
- b) State and explain maximum power transfer theorem. 5

**OR**

- c) State and explain Norton's theorem. 5
- d) Find the Norton's equivalent of the following circuit. 5



**Either:**

3. a) Do as directed: 5
- i)  $(AB.E9)_H = (---)_8$
- ii)  $(23.47)_{10} = (---)_2$

- b) Explain concept of sign magnitude numbers with examples. 5

**OR**

- c) Explain 2's complement method for subtraction of two binary numbers with suitable example. 5

- d) Solve the following using 1's complements method. 5

- i)  $(1001)_2 - (0110)_2$
- ii)  $(1011010)_2 - (10010)_2$

**Either:**

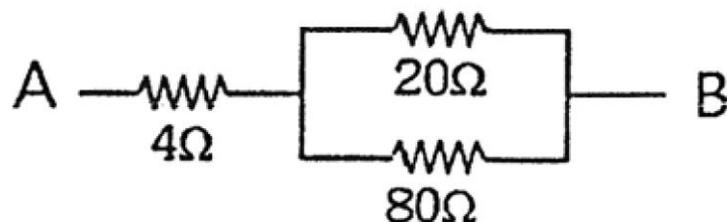
4. a) What is a logic Gate? What are different types of basic logic Gates? Give their symbols and truth tables. 5
- b) Why is NAND gate called universal building block? Explain the construction of basic logic gates using NAND gates. 5

**OR**

- c) State and prove De Morgan's theorem. 5
- d) What is an Ex - OR gate? Construct Ex - OR gate using basic logic gates and verify its truth table. 5

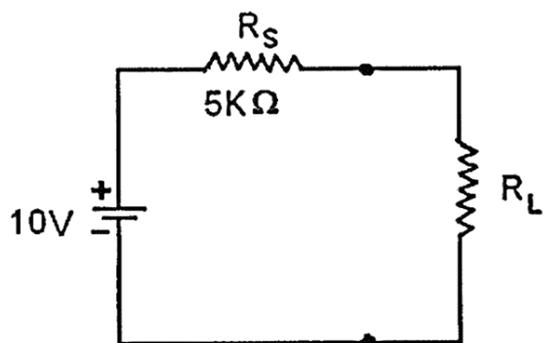
5. Solve **any ten** out of twelve questions. 10

- i) What is internal resistance of ideal DC voltage source?
- ii) Calculate resistance across terminals AB.



- iii) How a voltage source can be converted into current source?

- iv) Find the value of  $R_L$  to abstract maximum power from circuit.



- v) Give the statement of Reciprocity Theorem.
- vi) State Z parameters in two port network.
- vii) Give importance of gray code.
- viii) Define bit and byte in binary system.
- ix) State the radix of octal and hexadecimal number system.
- x) What is Boolean algebra?
- xi) Differentiate between basic gate and Universal gates.
- xii) State any two applications of Ex-OR gate.

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