

USELT01 - Electronics Paper-I (Network Analysis and Digital Fundamentals)

P. Pages : 2

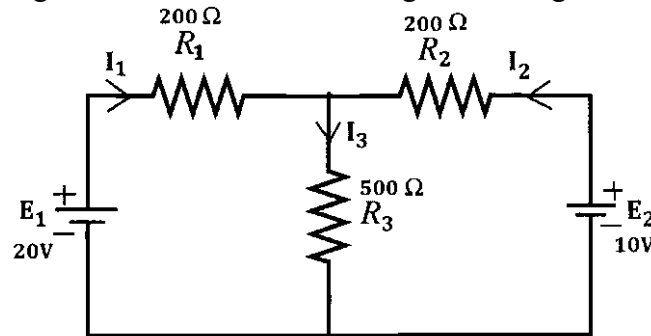
Time : Three Hours

**GUG/W/23/11548**

Max. Marks : 50

- Notes :
1. All questions are compulsory and carry equal marks.
 2. Draw well label diagram wherever necessary.
 3. Use of log table or calculator is permissible.

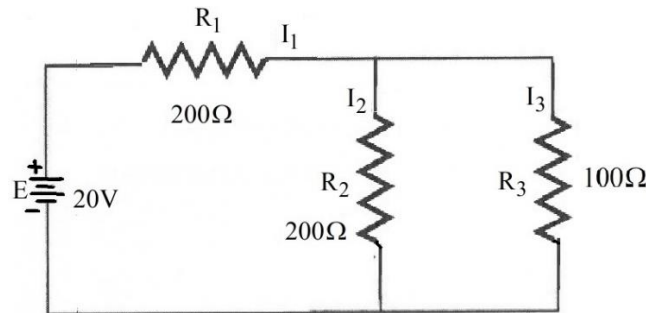
1. a) Explain the concept of voltage source and current source. 5
b) Find the current through resistor R_3 in the following circuit diagram using Kirchhoff's law. 5

**OR**

- c) State and prove the superposition theorem. 6
d) Explain the star network to the delta network, transformation. 4
2. a) State and prove Thevenin's Theorem. 5
b) State and prove the maximum power transfer theorem. 5

OR

- c) Draw the Norton's equivalent circuit of the following circuit and find the current through resistor R_3 . 5



- d) Explain the two-port network using h parameters. 5

3. a) What is a binary number system? Explain the conversion process of decimal to binary number and binary to decimal number with a suitable example. **6**
- b) Perform the following conversion (Show calculation). **4**
- i) $(100)_{10} = (\text{-----})_{16}$ ii) $(35.20)_8 = (\text{-----})_2$

OR

- c) Explain Gray code and excess-3 code with suitable examples. **6**
- d) What is 1's and 2's complement? Perform the following subtraction using 2's complement. **4**
- i) $(1111001)_2 - (11011)_2 = (\text{-----})_2$ ii) $(1001)_2 - (0101)_2 = (\text{-----})_2$
4. a) State and explain the basic gates with their truth table. **6**
- b) Why do NAND and NOR gates called as universal gates? Construct AND gate using only NAND gates. **4**

OR

- c) State and prove Demorgan's theorem. **6**
- d) Construct the XOR and XNOR gates using NAND gate. **4**
5. Attempt **any ten** of the following. **1x10**
- a) State Kirchhoff's voltage law.
- b) What is mesh?
- c) State principle of duality.
- d) State Reciprocity theorem.
- e) What is one port network?
- f) State any two Z- parameters in two-port networks.
- g) What is BCD code?
- h) Perform $(A1)_{16} + (1A)_{16}$
- i) What is radix?
- j) Prove $A(1 + \overline{A}) = A$
- k) Draw the symbol of the NOR gate and give its truth table.
- l) What is inverter?
