Bachelor of Science (B.Sc. -I) (CBCS Pattern) First Semester

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

P. Pages : 2 **GUG/W/18/11548**

Time : Three Hours * 3 6 2 3 * Max. Marks : 50

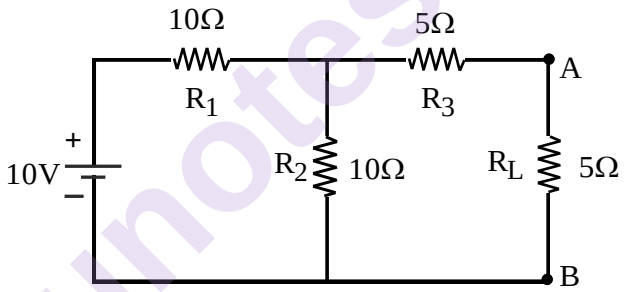
Notes : 1. All questions are compulsory and carry equal marks.
2. Draw neat and labelled diagram wherever necessary.
3. Use of log table/calculator is allowed.

1. a) Explain the ideal voltage source and current source. How does ideal voltage source differ from practical voltage source? State Kirchhoff's current & voltage law. **6+4**

OR

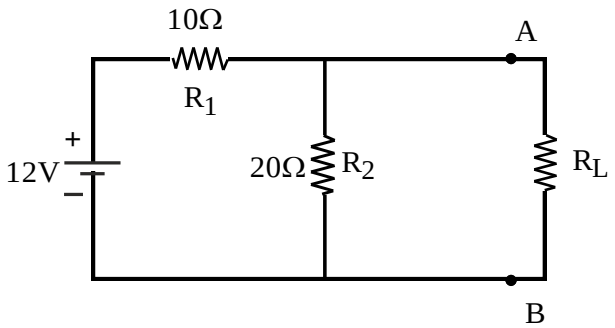
b) State and prove superposition theorem. Explain star and delta networks with suitable diagram. **6+4**

2. a) State and prove Thevenin's theorem. Using Thevenin's theorem, calculate the current flowing through resistor R_L in the following figure. **6+4**



OR

b) State and prove maximum power transfer theorem. **6+4**
Find the value of R_L to abstract maximum power from the circuit shown in following figure.



3. a) Explain the conversion method of decimal to binary number with suitable example. **6+4**
Perform the following conversion.
i) $(120.20)_{10} = (----------)_{16}$.
ii) $(101101101)_2 = (---------)_8$.
iii) $(2A.14)_{16} = (-------)_{10}$.
iv) $(101101101110100)_2 = (---------)_{16}$.

OR

b) Explain: **6+4**
i) 8421 code. ii) Excess-3 code
Perform the following arithmetic operation.
i) $(10111101)_2 + (11011010)_2 = (-------)_2$.
ii) $(10101110)_2 - (110101)_2 = (--------)_2$.

4. a) Why does NAND and NOR gate is called as universal gate? **2+8**
Construct the basic gates using NAND gate only and give its truth table.

OR

b) Sate and prove DeMorgan's theorem for two variables and draw their logic diagram. **6+4**
Construct the XOR gate using basic gate. Give its truth table.

5. Attempt **any ten** of the following. **10x1**

a) What is mesh?

b) State principle of duality.

c) What is difference between current source and voltage source.

d) State Norton's theorem.

e) What is two port network?

f) Give any two natation of h-parameter.

g) Define radix in number system.

h) What is 1's complement?

i) What is signed binary number?

j) State the names of basic gates.

k) Construct Ex-NOR gate using basic gate.

l) Draw logic diagram of 4-bit Controlled inverter using XOR gate.

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