8909 921921

TEE–101

B. TECH. (FIRST SEMESTER)

MID SEMESTER EXAMINATION, NOV., 2021

(All Branches)

BASIC ELECTRICAL ENGINEERING

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each question carries 10 marks.

1. (a) Define Kirchhoff's laws. Describe the significance of these laws in electrical circuits. 10 Marks (CO1)
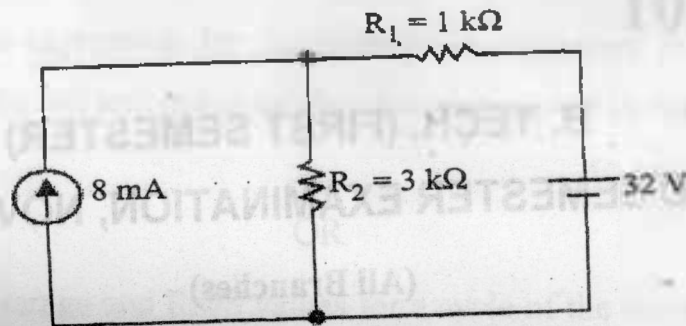
OR

(b) Define the following terms as associated with electrical circuits :

10 Marks (CO1)

(i) Branch

(ii) Junction

(iii) Mesh

(iv) Active elements

(v) Passive elements

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2. (a) State and explain Superposition Theorem with suitable example. Apply Superposition Theorem in the circuit given below and calculate the current through R_1 resistance.   10 Marks (CO2, CO5)

$R_1 = 1\ k\Omega$

8 mA $R_2 = 3\ k\Omega$ 32 V

(b) Explain the procedure to solve an electrical network using Thevenin's Theorem. Find the Thevenin's voltage across A-B terminals.

10 Marks (CO2, CO5)

4 Ω   A   5 Ω

4.5 V   6 Ω   3 V

B
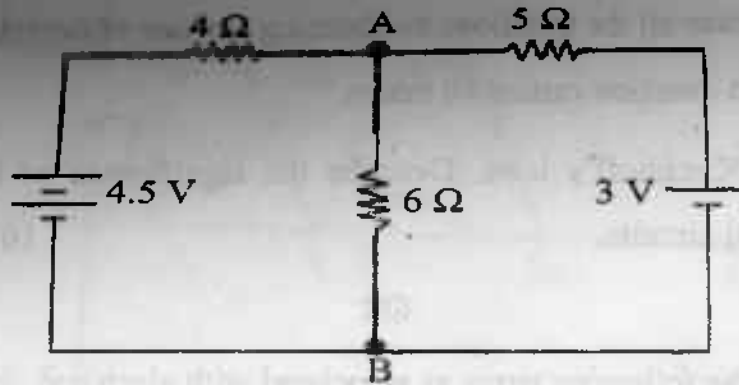
3. (a) Define Norton's Theorem as used in DC circuits. Find Norton's equivalent of the circuit shown below across terminals a—b.

10 Marks (CO1, CO5)

4 Ω   4 Ω

24 V   4 A   8 Ω

a

+

b
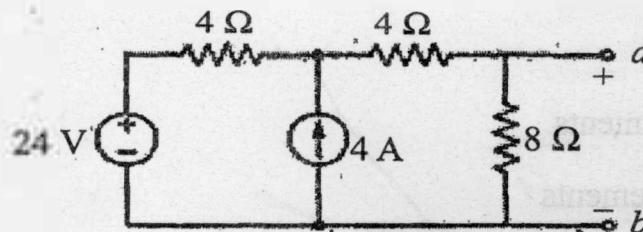
OR

(b) What do you understand by maximum power transfer theorem ? What is the condition for the maximum power transfer in DC circuits ? Explain in brief.　　　　　　　　　　　　　　　10 Marks (CO1, CO5)
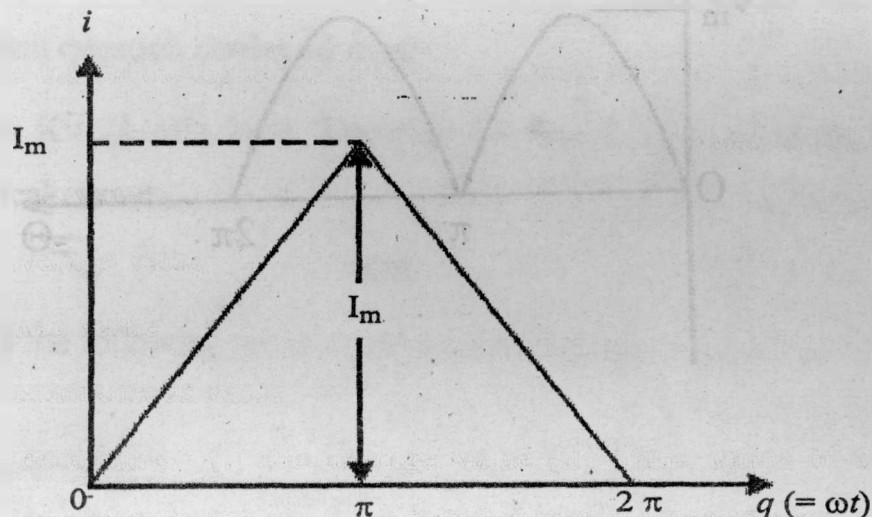
4. (a) Define the following terms as associated with alternating quantity :

　　　　　　　　　　　　　　　　　　　　　10 Marks (CO2, CO5)

　　(i)　Peak value

　　(ii)　Average value

　　(iii) RMS value

　　(iv) Instantaneous value

Also, determine : (i) the average value (ii) r.m.s. value of triangular wave (as shown in figure). Also find the form factor and peak factor.

OR

(b) An alternating current is is given by; $i = 141.4 \sin 314t$.

Calculate :　　　　　　　　　　　　　　10 Marks (CO2, CO5)

　　(i)　the maximum value

(ii) frequency

(iii) time period

(iv) the instantaneous value when $t = 3$ ms.

5. (a) Deduce an expression for the average (real) power in a single-phase series RL circuit and hence explain the term power factor.

10 Marks (CO1, CO2)

OR

(b) Find the average and RMS values for a cycle of the waveform shown in fig. below :

10 Marks (CO1, CO2)