ECE 102

B. TECH. II[nd] SEMESTER EXAMINATION, 2025-26

BACHELOR OF TECHNOLOGY

(IT & ECE)

2402

Basic Electrical Engineering

Time : Three Hours] [Maximum Marks : 75

Note: There are **three** sections (**A**, **B** and **C**) and candidate has to attempt question from all sections. Marks are indicated against each section.

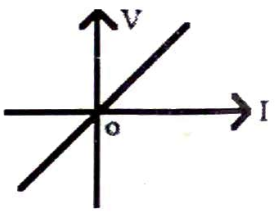
Section-A

1. Attempt **all** questions : 5×3=15

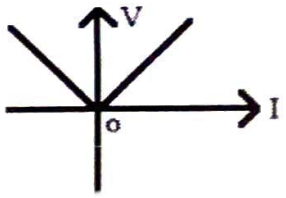
(a) State and explain Kirchoff's law.

(b) Find the elements by V-I graph –

(i)



(ii)



(c) State superposition ?

(d) What do you understand by ammeter shunt ?

(e) Explain the principle of operation of $1-\phi$ transformer.

Note: Attempt all questions of the following : 4×5=20

Section-B

2. (a) Find the value of I_x & V_x using nodal analysis.

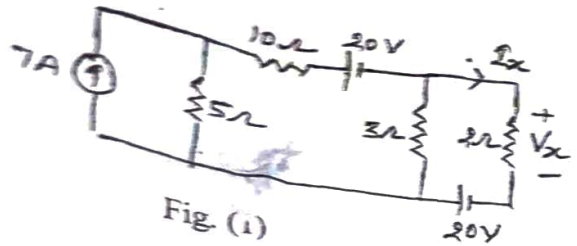


Fig. (1)

Or

(b) Explain the following :

(i) Average value

(ii) RMS value

(iii) Form factor

(iv) Peak factor

3. (a) Find the Thevenin's equivalent of the following circuit as show in figure (2).

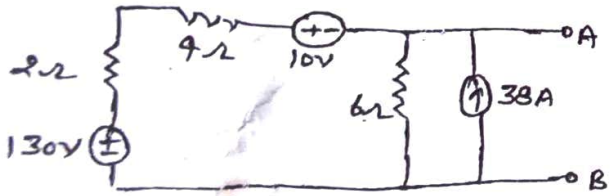


Fig.(2)

(b) Explain the following :

(i) Active power

(ii) Reactive power

(iii) Apparent power

(iv) Power factor

4. (a) What do you mean by balanced and unbalanced load. And also explain convert a balanced star load to delta.

Or

(b) A PMMC instrument gives a reading of 25 mA when the potential difference across it's terminal is 75 mV. Calculate shunt resistance for full scale deflection corresponding to 50A.

5. (a) What is the transformer ? Derive the Emf equation of $1-\phi$ transformer.

Or

(b) Explain and classify the transmission line ?

Section-C

Note: Answer any **two** questions of the following : 2×20=40

6. Derive the expression for average and rms value of sinusoidal waveform. Also find its form factor and peak factor.

7. State and prove maximum power transfer theorem. Determine the value of R_L to have maximum power transfer through it. Find the power consumed through the load in the figure (3).

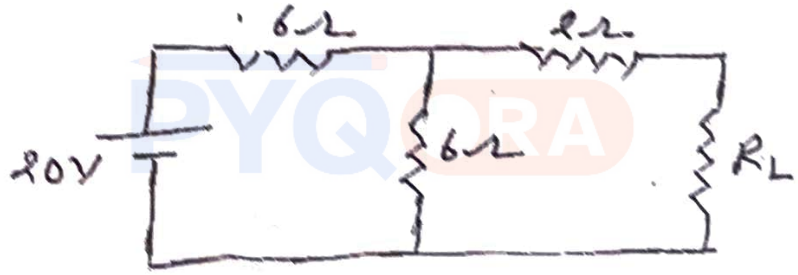


Fig. (3)

8. Describe the construction and working principle of PMMC with the help of diagram.

Describe the construction and working principle of DC machine. Also derive it's Emf equation.

IET DDUGU GORAKHPUR

INTERNAL TEST

BASIC ELECTRICAL ENGINEERING (ECE 102)

TIME: 40 MINUTES **MARKS: 20**

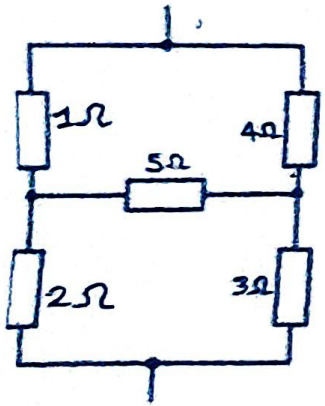
1)Find the equivalent resistance of the given circuit (1).

2) Find the value of current flowing through 4Ω resistance by using Norton's theorem in the given circuit (2).

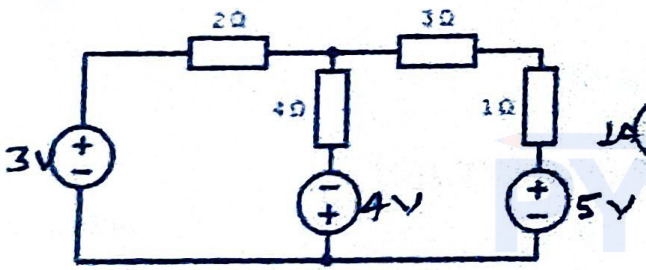
3) find the value of "I" using Nodal Analysis in circuit (3).

4) State and prove maximum power transfer theorem and also determine the value of 'Ri' such that maximum power dissipeated through Load in circuit (4).

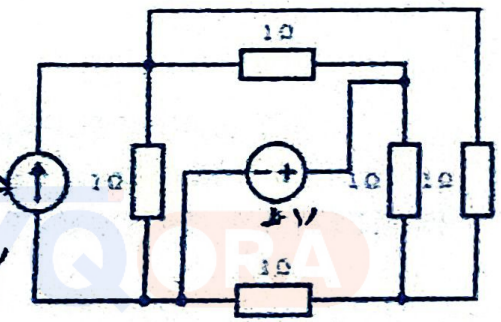
(1)


1Ω
4Ω
5Ω
2Ω
3Ω

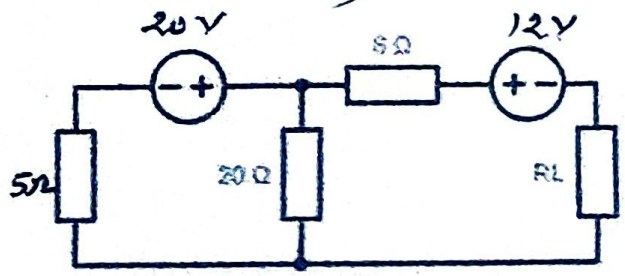
(2)


2Ω
3Ω
4Ω
1Ω
3V
4V
5V

(3)


1Ω
1A
1Ω
1Ω
1Ω
5V
1Ω

(4)


20V
5Ω
12V
5Ω
20Ω
RL

55 to 65

ECE 102

B. Tech. II[nd] SEMESTER EXAMINATION, 2024-25

BACHELOR OF TECHNOLOGY

(IT & ECE)

5924

Basic Electrical Engineering

Time : Three Hours] [Maximum Marks : 75

Note: There are **three** sections (**A, B** and **C**) and Candidate has to attempt question from all sections. Marks are indicated against each section.

Section A

1. Attempt all Questions. 5×3=15

(a) Explain the following :

(i) Unilateral and bilateral elements.

(ii) Linear and Non-linear elements.

(b) Compute equivalent resistance of three resistance connected in

(i) Series

(ii) Parallel

(c) Draw and describe power triangle, explaining active, reactive and apparent power.

(d) State maximum power transfer theorem.

(e) Define form factor and peak factor.

Section-B

Note : Attempt All Questions. 4×5=20

2. (a) Explain voltage and current source of a network. Explain source transformation principle in any circuit.

Or

(b) Calculate current in all resistances of the circuit shown in figure (1) using nodal analysis.

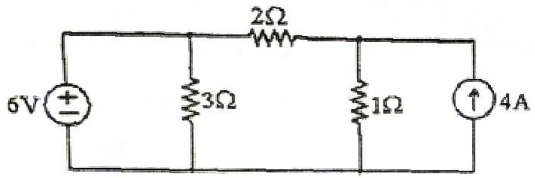


Fig. (1)

3. (a) Find the venin's equivalent circuit of the circuit shown in figure (2) and also find the current through R_L=6Ω.

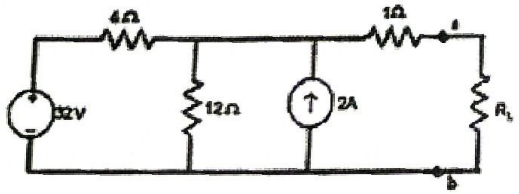


Fig. (2)

Or

(b) Define resonance and derive resonance frequency of parallel RLC circuit also give the graphical representation of the circuit.

4. (a) Explain two wattmeter method for power measurement in three phase system.

Or

(b) A PMMC instrument gives a reading of 25 mA when the potential difference across it's terminals is 75 mV, calculate shunt resistance for full scale deflection corresponding to 50 A.

5. (a) Explain B-H curve of a magnetic material.

Or

(b) Calculate the voltage induced in the armature winding of a 4 pole, ware wound, dc machine having 728 conductors and running at 1800 rpm. The flux per pole is 35 mwb.

Section-C

Note : Attempt any two questions. 2×20=40

6. Derive the expression for average and rms value of sinusoidal waveform.

7. State and explain superposition theorem and find the current 'I' in the following circuit shown in figure (3).

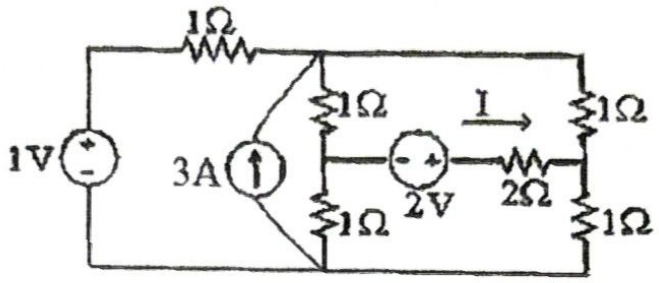


Fig. (3)

8. Describe the construction and working principle of PMMC with the help of diagram.

9. Describe the construction and working principle of transformer also derive the emf equation.

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