

POKHARA UNIVERSITY

Level: Bachelor

Semester: Fall

Year : 2014

Programme: BE

Full Marks: 100

Course: Basic Electrical Engineering

Pass Marks: 45

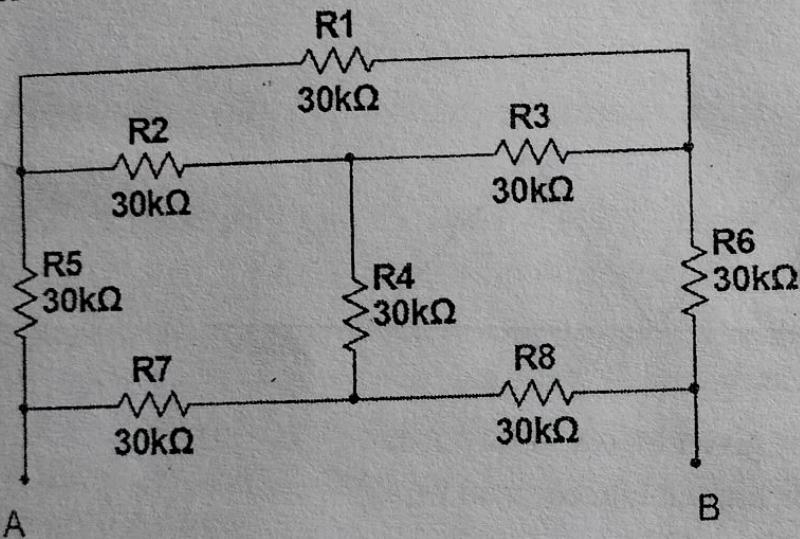
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

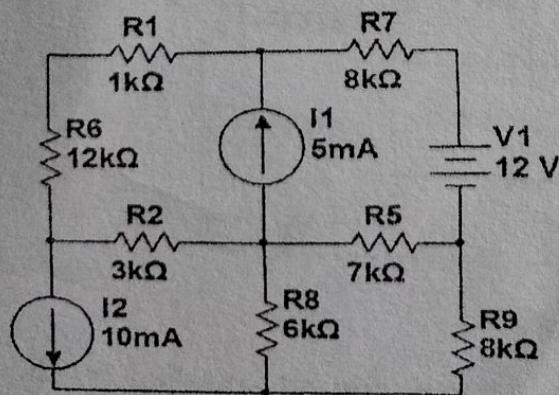
Attempt all the questions.

- a) Find the equivalent resistance across the terminals A-B for the circuit shown 8



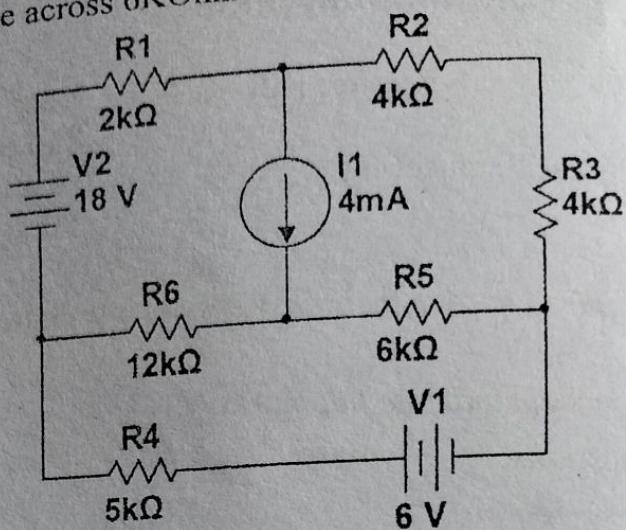
- b) State and explain maximum power transfer theorem with necessary derivation. 7

- a) Determine the voltage across 3KOhm resistor using mesh analysis for the circuit shown below. 8

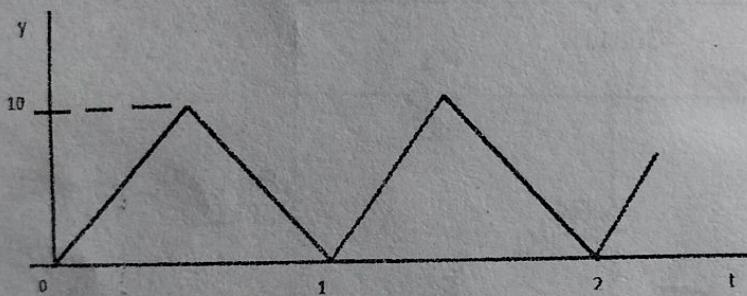


2. ELE 105.3

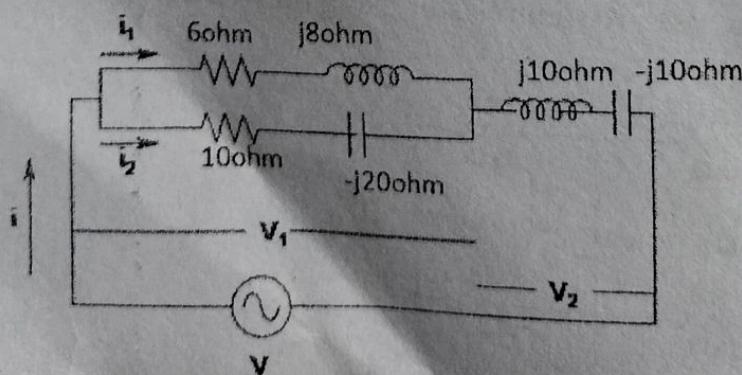
b) Find the voltage across $6\text{k}\Omega$ resistor using Norton's theorem.



3. a) Find the average value, rms value and form factor of the given triangular waveform?



- b) In the circuit given below, total current $i = (20 + j0)$
- Calculate branch current i_1 and i_2
 - Voltage V_1 and V_2
 - Power factor of entire circuit
 - Active and Reactive power in the entire circuit.



4. a) In an R-L-C series circuit, current supplied by the single phase ac

source is $15\angle-38^\circ$ Ampere. Determine the value of all three kind of power if $R=100$ ohm, $X_L=35$ Ohm and $X_C=25$ Ohm. If inductance is 8 Henry, find the resonant frequency.

- 1) A three-phase balanced star connected load with $6+j8$ Ohm per phase is supplied by 440 V, 3-phase source. Find the line and phase currents, and the total power dissipated in the load. Derive the relationship between line and phase voltage in three phase balanced star connection. 8
- 2) Explain with a neat diagram the two wattmeter method for the measurement of three phase power and determine watt meter reading when it is connected to resistive load 7
- 3) A 10KVA 200/1000 V, 50 Hz, single-phase transformer gave the following test results: 8
- i. O.C. test(L.V. Side): 200 V, 2.4 A, 100W
 - ii. S.C. test(H.V. Side): 50 V, 10A, 150W
- i. Calculate the parameters of the equivalent circuit referred to L.V. Side.
- ii. Calculate efficiency for $\frac{1}{2}$ rated 0.8 P.f. lagging, & load current for which it gives maximum efficiency
- 4) A 220V dc shunt motor runs at 500rpm when armature current is 50A. Calculate the speed if the torque is doubled Given that armature resistance is 0.2 ohm and flux remain constant. 8
- 5) Explain the working principle of induction motor with neat diagram. 2×5
- Write short notes on: (Any two)
- 1) Ideal voltage & current source
 - 2) Quality factor of RLC series CKT.
 - 3) Power factor and its significance

सुम सेसनरी सलायर्स एड प्रोटेक्टिव सर्विस
वालकुमारी, ललितपुर ९८४९२५५९२
NCIT College

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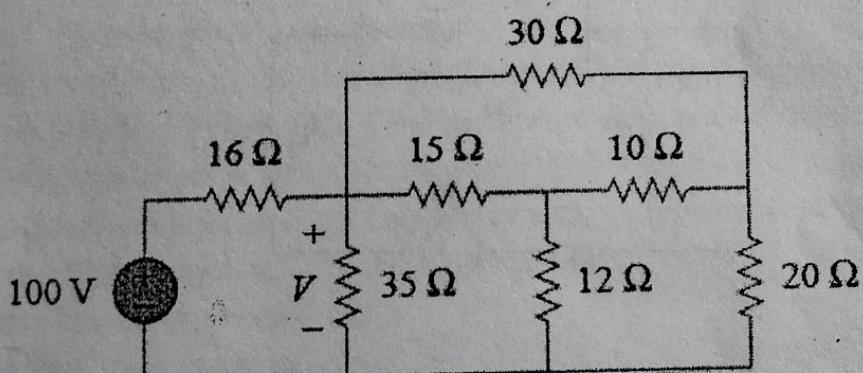
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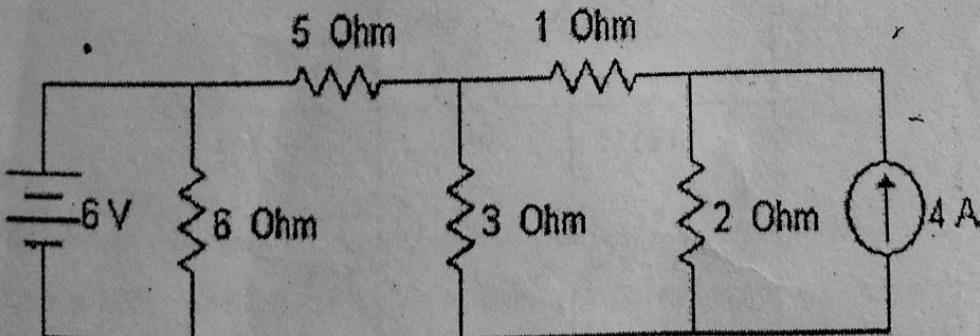
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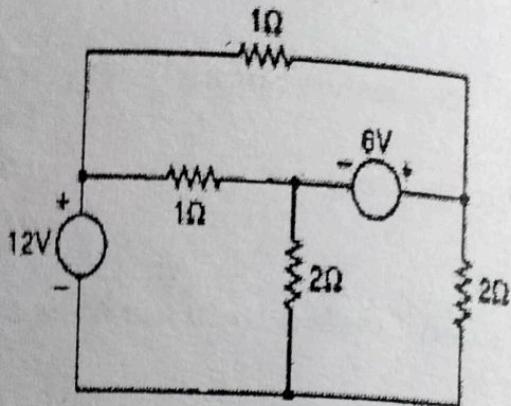
Obtain the equivalent resistance and use it to find source current for 7
the circuit shown below. Also find V.



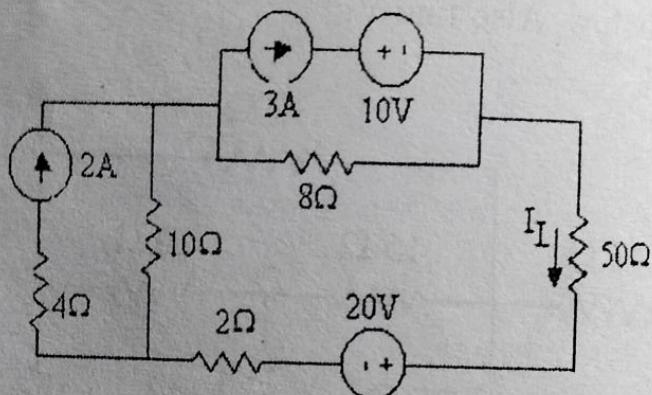
-) Applying Superposition theorem, calculate the current in 5Ω resistor 8
of circuit given below.



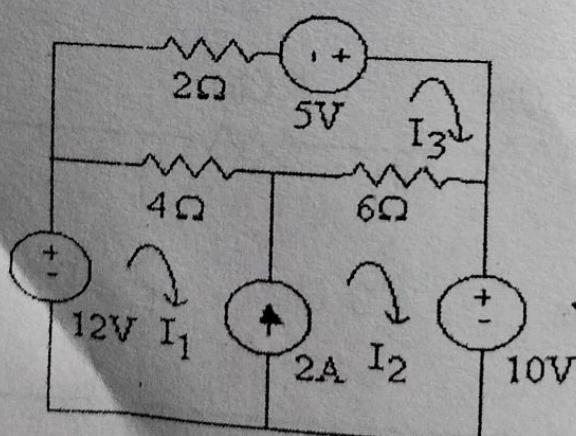
-) Calculate the power absorbed/ delivered by 6V source for the network 7
shown in Fig. using nodal analysis.



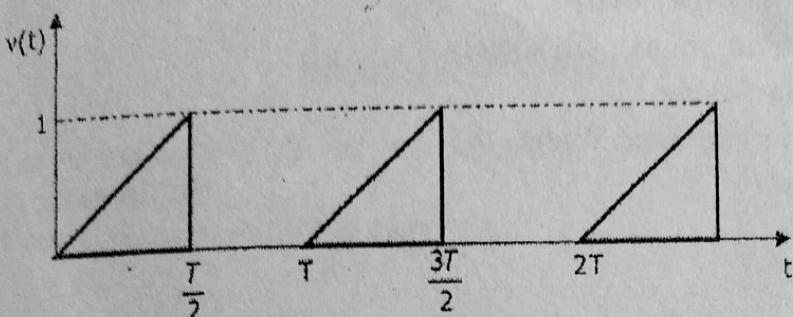
- b) For the circuit shown in Fig. compute the load current using Thevenin theorem and determine the value of the load for which power transfer is maximum.



3. a) Solve the circuit in Fig. use mesh analysis to determine the mesh current I_1, I_2 and I_3 and evaluate the power developed in 10V source.



- b) Find the Average Voltage and rms Voltage of the waveform shown in Fig.



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-) A 2 Ω resistor in series with a 6H inductor is connected across a 220 V, 50 Hz. Source. Determine 7
- The impedance.
 - Input current.
 - The voltage across the resistor and inductor.
 - Power factor.
 - Power input to the circuit.
-) A balanced star connected load of $(2 + j8) \Omega$ per phase is connected to a 3-Φ, 220 V, 50 Hz supply. Find the line current, power factor, power, volt-amperes and reactive power. Draw the phasor diagram showing the line voltage, phase voltage and phase currents. 8
-) Mention the condition for maximum efficiency, and state the different losses in case of a transformer. 7
- 7) The test data were obtained for 20 KVA, 50 Hz, 2000/200 V distribution single phase transformer. Calculate the approximate equivalent circuit parameter refer to both H.V. and L.V. side. 8

Test	Voltage (V)	Current (A)	Power (Watt)
OCC with HV open Circuited	200	4	120
SC with L.V. Short circuited	60	10	300

Also determine efficiency for half load of 0.8 lagging Power Factor.

- 1) Explain the working principle of three phase induction machine. 7
- 2) For a DC separately excited motor, when the field circuit is connected to rated supply, and rated voltage is supplied to armature terminal, motor runs at 1000 rpm at no load. Then estimate the approximate speed of motor if the armature voltage is reduced to 50% of rated value. 8

2. ELE 105.3

Evolve

7. Write short notes on: (**Any two**)
 - a) Role of electricity in modern society.
 - b) Losses in transformer.
 - c) Quality Factor and Band Width.

1. Generation of EMF by electromagnetic induction, Generation of EMF by alternating voltage	2. Sinusoidal functions-terminal voltage (phasor quantities)
Generation of AC Circuits Analysis (10 hrs)	Average and root-mean-square values

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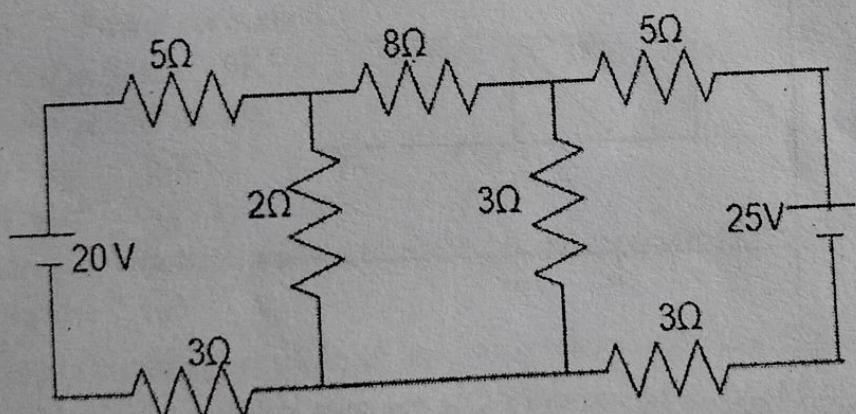
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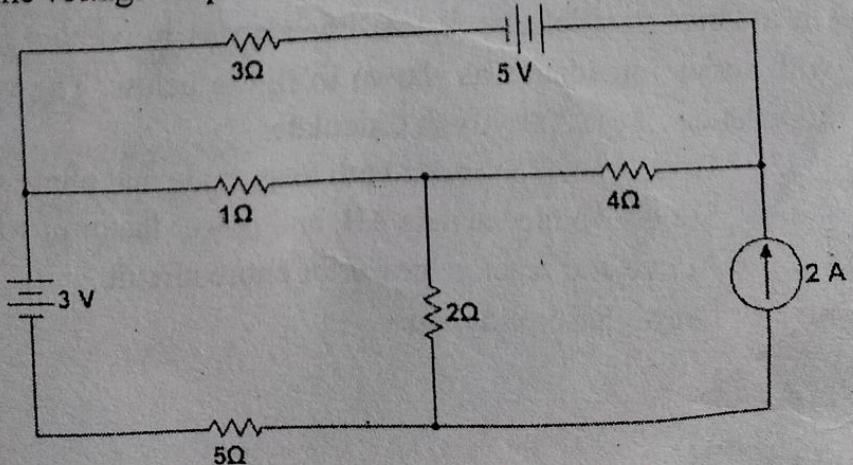
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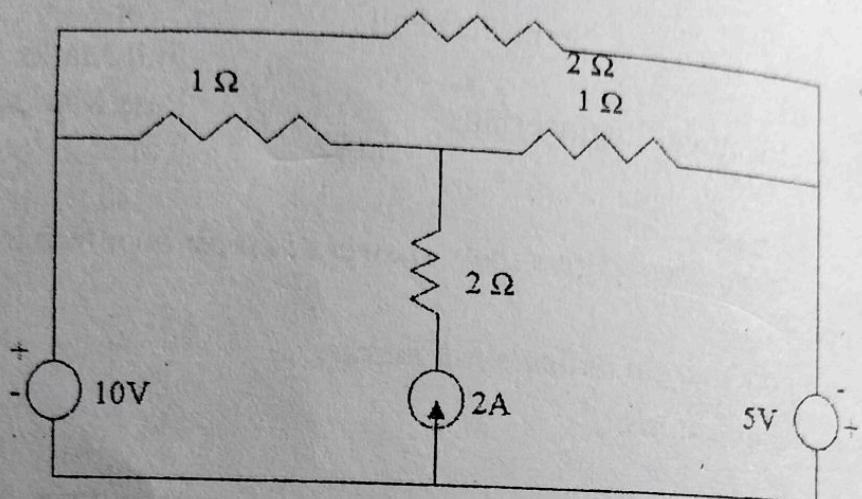
1. a) Explain generation, transmission and distribution with types with the help of single line diagram. 7
 b) Find the current across 8Ω resistor using nodal analysis. 8



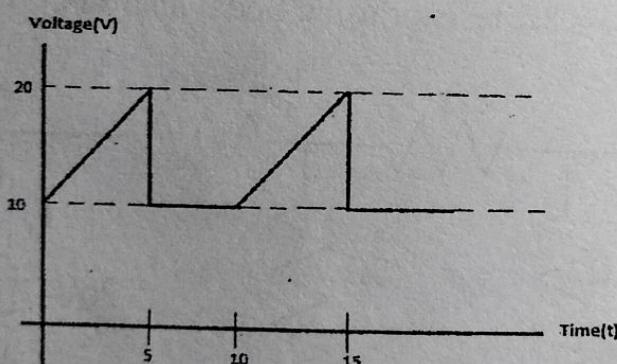
2. a) For the circuit shown in figure, implement Norton's theorem to determine voltage drop across 1Ω resistor. 8



- b) Use Supermesh concept to calculate the mesh currents of the circuit shown below.



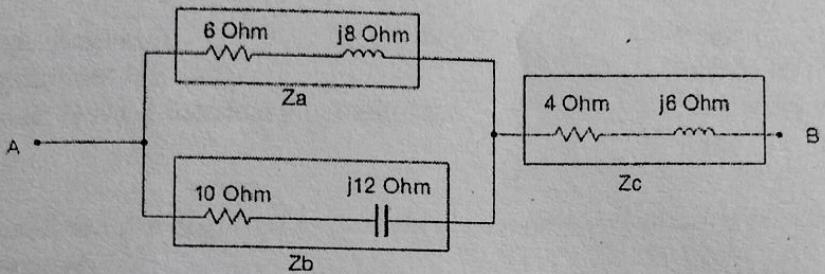
3. a) Find average value, rms value, and form factor of given waveform.



- b) Two impedances $(60+j15)\Omega$ and $(30-j10)\Omega$ are connected in series across a 220V, 50Hz supply. Find current, active power, reactive power, apparent power and power factor of the circuit.
4. a) In a series parallel circuit two impedances in parallel are connected with series impedance as shown in figure below. The voltage across impedance Z_c is $(200+j0)$ V. Calculate:
- Each branch currents, both magnitude and phase.
 - Supply voltage across AB, and power factor of whole circuit.
 - Active and reactive power of entire circuit.
 - Draw phasor diagram.

- b) Explain the method with three equal resistances 15. i. Phas ii. Pow iii. Pow b) A single ph following te O.C test : S.C test : Find the pa LV side. a) Explain wo b) A 220v dc 50A. The resistance drops to 10 Write short not a) MPT The b) Star/Delta c) Speed con

1. Generation of EMF by electromagnetic induction, Generation of alternating voltage.	2. Sinusoidal functions-terminology (phase, phase
Unit III: Single Phase AC Circuits Analysis (10 hrs)	Norton's, maximum power transfer, equivalent circuit analysis.



- b) Explain the measurement of three phase power by two wattmeter method with necessary derivations and phasor. 7
- a) Three equal impedances having resistance $20\ \Omega$ and inductive resistance $15\ \Omega$ are connected in delta connected system. Find: 8
- Phase and line current.
 - Power factor.
 - Power consumed.
- b) A single phase 10KVA , $200/400\text{ V}$, 50Hz , transformer gave the following test results: 7
- O.C test : 200V , 1.3A , 120W
S.C test : 22V , 30A , 200W
- Find the parameters of equivalent circuit as referred to HV side and LV side.
- a) Explain working principle of induction motor with neat diagram. 7
- b) A 220v dc shunt motor runs with 1200rpm with an armature current of 50A . The value of armature resistance is $0.2\ \Omega$. Calculate the value of resistance to be connected in series with the armature so that the speed drops to 1000rpm . 8
- Write short notes on: (Any two) 2x5
- a) MPT Theorem.
b) Star/Delta transformation.
c) Speed control of dc motor.

સુધી દેસનારી સાલાર્યસ એંડ ફોટોકોરી સર્વિસ
માલદુમારી, લલિતપુર ૧૬૪૫૯૯૨
NCIT College

Unit III: Single Phase AC Circuits Analysis (10 hrs)

- Generation of EMF by electromagnetic induction, Generation of alternating voltage
- Sinusoidal functions terminology (phase, phase

10. Network theory
Norton's, maximum power transfer
10. Norton's, maximum power transfer

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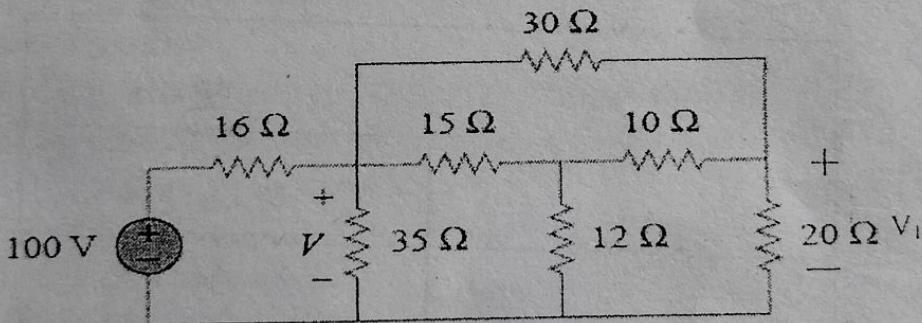
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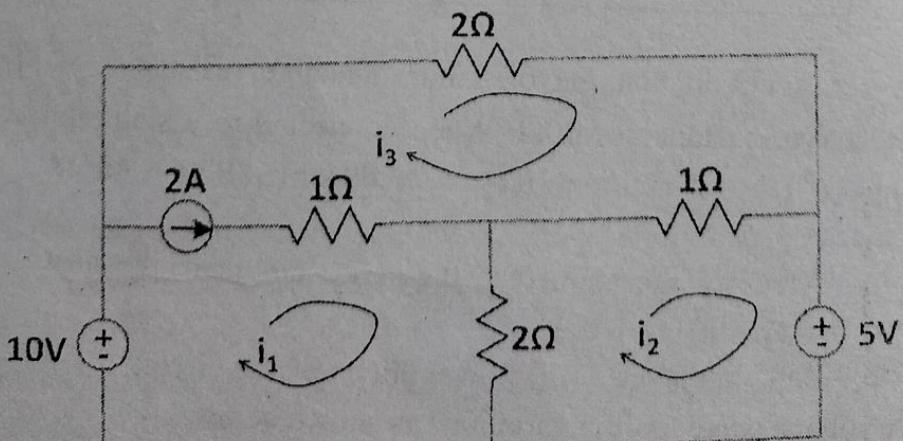
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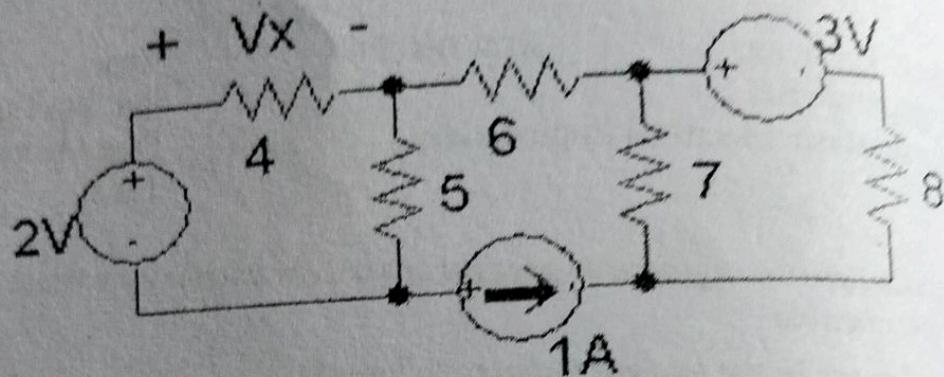
- a) Obtain the equivalent resistance seen from source terminal and find 7
 V_1 .



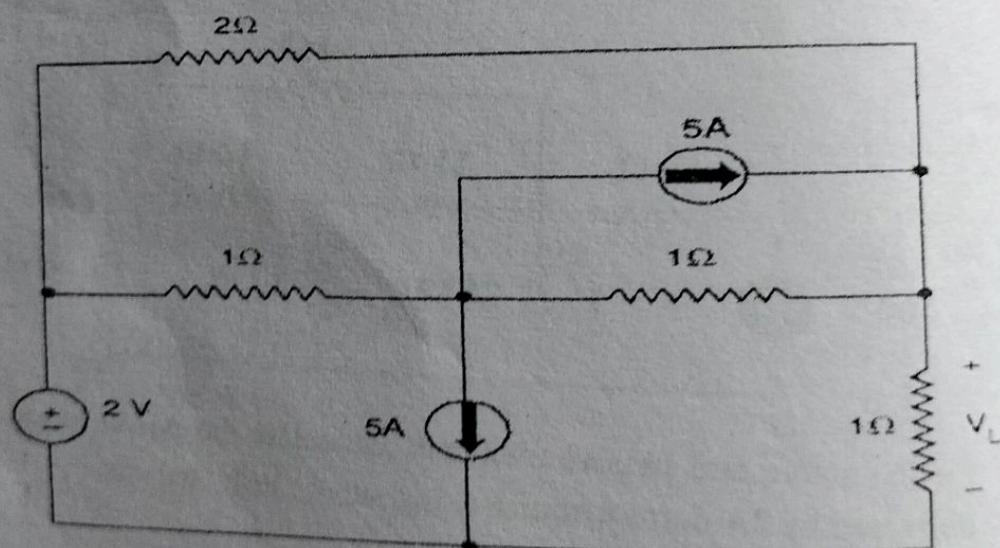
- b) Define active and passive elements. Calculate the power absorbed or delivered by 2A current source using super mesh analysis. 8



2. a) State Superposition theorem and use it to calculate V_x for the circuit shown below (All resistors are in Ohm). 7



- b) State Thevenin theorem and calculate V_L for the below ckt using Thevenin theorem.



3. a) A series circuit consists of a non-inductive resistance of 5Ω , and inductive reactance of 10Ω . When connected to a single-phase A.C. supply, it draws a current: $i(t) = 27.89 \sin(628.3t - 45^\circ)A$. Find:

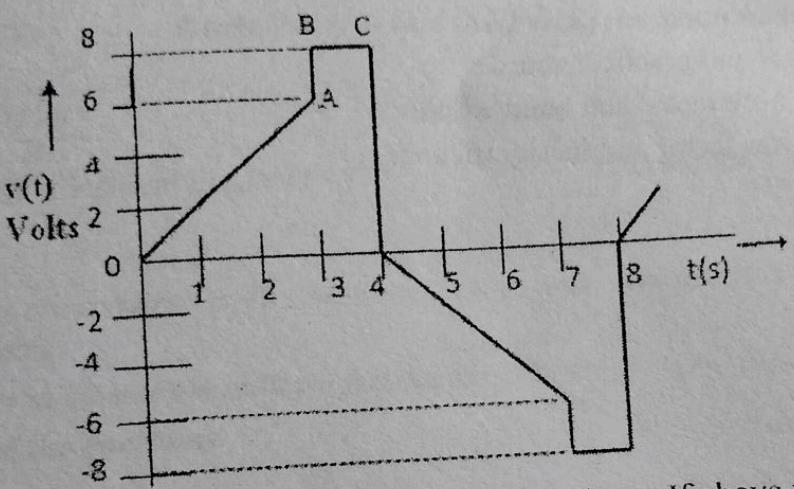
- the voltage applied to the series circuit in the form: $v(t) = V_m \sin(\omega t + 0^\circ)$
 - the inductance (iii) Power drawn by the circuit.
- b) A voltage wave has the variations as shown below:

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Find the average, and effective values of the voltage. If above voltage is applied to a 50Ω resistor, calculate power dissipated in watts.

- a) Explain the measurement of 3ϕ power by two wattmeter method with phasor diagram.

- b) Three similar coils having resistance of 10Ω and inductance of $0.25H$ are connected in star to 3ϕ $400V$, $50Hz$ supply. Calculate:

- Line and phase currents
- Pf
- Power consumed

- a) Define transformer and derive the expression for emf induced in transformer.

- b) A single phase, $25KVA$, $250/500V$ transformer has following results on tests:

Open circuit test	250V	1A	80W
Short circuit	25V	10A	100W

Obtain the parameters of the transformer referred to both LV and HV sides.

- a) A $240V$ shunt motor runs at 1450 rpm at full load with an armature current of $11A$. The total resistance of armature and brush is 0.6Ω . If the speed to be reduced to 1000 rpm with the same armature current, calculate the value of resistance to be connected in series with the armature.
- b) Explain the construction and operating principle of 3ϕ induction motor.

2. ELE 105.3

7. Write short notes on: (Any two)
- a) Ideal and practical sources
 - b) Quality factor and bond width
 - c) Power factor and its significance,

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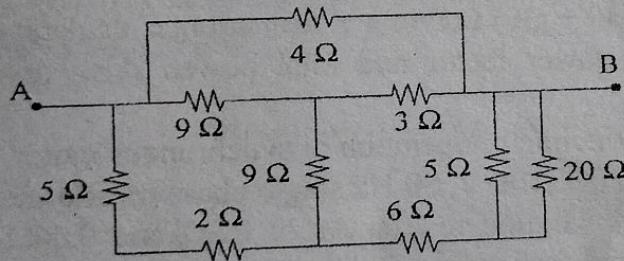
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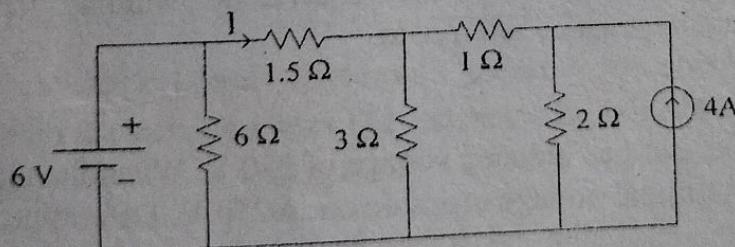
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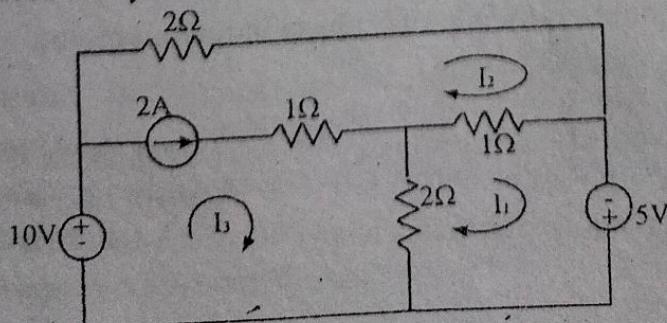
- a) Explain the importance of electricity in real life. How the life would be in the absence of electricity? 5
- b) Illustrate about voltage divider and current divider circuit. 5
- c) Find the equivalent resistance R_{AB} for the network given below. 5



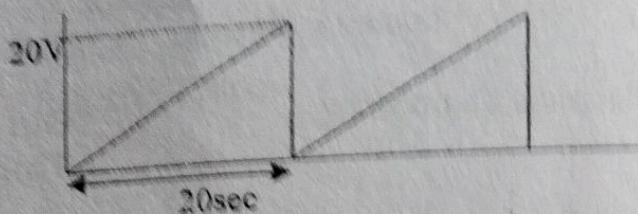
- a) Find the current I using superposition theorem. 8



- b) Find the mesh current I_1 , I_2 and I_3 in the circuit given below using the concept of mesh analysis. 7



3. a) Find the average value, RMS value and form factor for a wave given below.



OR

Find the average value, effective (RMS) value, form factor and amplitude (peak) factor of the sinusoidal waveform.

- b) Explain the parallel resonance in RLC circuit.
4. a) Explain how three phase AC voltage is generated. Differentiate between single phase and three phase system.
- b) Two impedances $(20+j5)\Omega$ and $(30+j8)\Omega$ are connected in series across a 200V, 50Hz supply. Find current, active power, reactive power, apparent power and power factor of the whole circuit.
5. a) A 400V, balanced Y-connected supply is connected to three equal impedances $(40 + j30)\Omega$ in a Y formation. Calculate: phase current, line current, power factor and total power. Also draw the phasor diagram.
- b) Explain the principle of operation of synchronous motor.
6. a) A 25 KVA, 3300/1100 V, 50 Hz single phase transformer has primary and secondary winding resistances of 0.2Ω and 0.06Ω respectively. The primary and secondary winding leakage reactances are 0.32Ω and 0.012Ω respectively. Find the equivalent winding resistance, reactance and impedance referred to
- i. HV side
 - ii. LV side.
- b) A shunt generator has induced voltage of 250 V. When the machine is loaded, the terminal voltage drops down to 230 V. Determine the load current if the armature resistance is 0.05Ω and the field circuit resistance is 23Ω .

OR

7. Explain operating principle of 3 phase induction motor.
- Write short notes on: (Any two)

- a) Maximum power transfer theorem
- b) Ideal and practical voltage source
- c) Transformer efficiency
- d) Power factor and its significances

सुमा स्टेशनरी सप्लायर्स प्रिंटिंग्स एंड प्रोसेसिंग
बालबाबारी, लखितपुर ९८४७५२९५९२
NCIT College

Level: Basic
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10. Network theorem (Superposition, Thevenin's, Norton's, maximum power transfer theorem)
 analysis (without dependent source),

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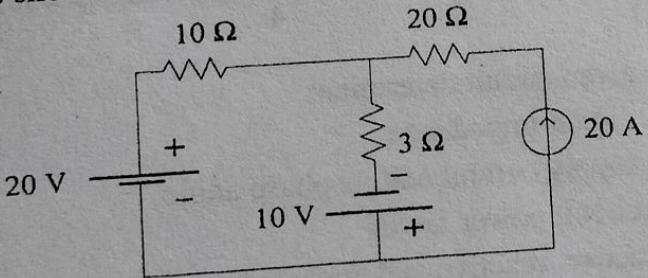
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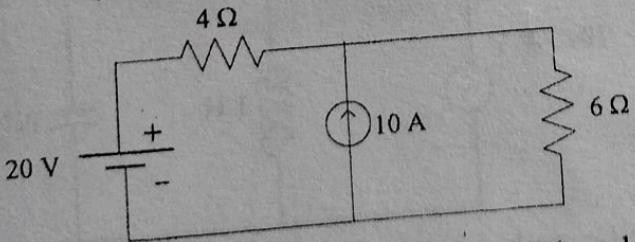
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Attempt all the questions.

- Throw light on role of electricity in modern society. 5
- What are the ideal and non-ideal (practical) sources? Explain each briefly. 5
- What is power factor and explain its significances. 5
- Using superposition theorem, find the current through 10Ω resistor of the circuit as shown below. 8

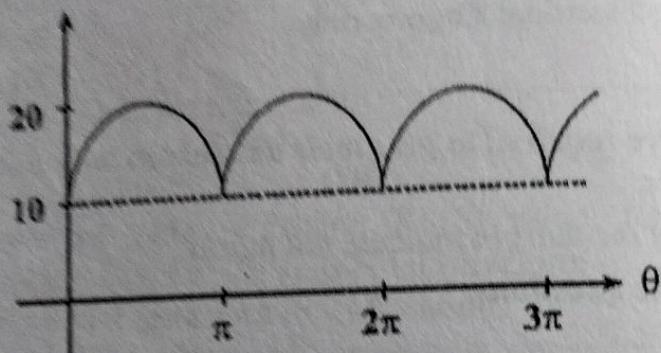


- Differentiate between Thevenin's theorem and Norton's theorem. Also find the voltage across 6Ω resistance by using Norton's theorem. 7



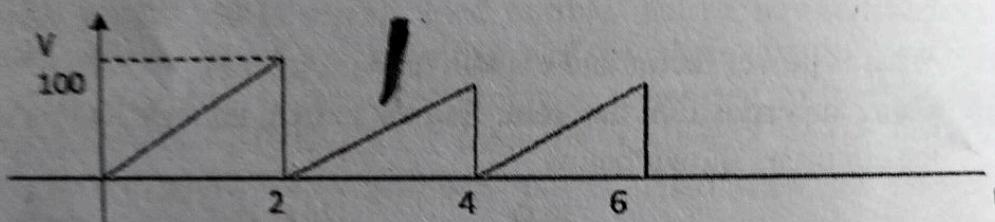
- Compare mesh analysis and nodal analysis. Find node potentials for the given network. Also find the power dissipated in 3 ohm resistor. 8
- Write the difference between series resonance and parallel resonance? Show that the bandwidth for the series resonant circuit is the ratio of resonant frequency and quality factor. 7

4. a) What are advantages of AC over DC? Find the average and rms value of the given waveform. Also find the form factor.

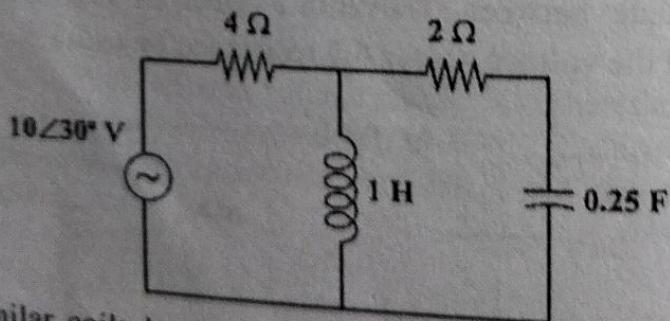
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OR

Calculate the mean value and effective value of the wave shown.



- b) For the given circuit determine:
- circuit impedance
 - supply current and its phase angle
 - circuit power factor
 - active, reactive and apparent power.



5. a) Three similar coils having impedance of $15\angle20^\circ\Omega$ are connected in star to 400V, 3φ, 50Hz supply. Calculate:
- line and phase current
 - Power factor
 - Total 3φ powers

- b) Define transformer and deduce the expression for EMF. 8
 a) 25KVA, 1φ, 250/500v transformer gives the following results on tests: 7

Open circuit test	200V	1A	70W
Short circuit test	25V	5A	80W

Calculate:

- Parameters of the transformer
- Secondary terminal voltage if it supplies 50A at 0.8 pf lag

OR

A 250 V DC shunt motor takes 8A line current on no load and runs at 1000 rpm. The resistance of the field winding and armature winding are 200Ω and 0.8Ω respectively. If the full load line current is 20A, calculate the full load speed, assuming constant air gap flux.

- b) Explain the working principles of 3 - φ synchronous motor. 8

2x5

Write short notes on: (Any two)

- 3φ induction motor
- Three phase power measurement by two wattmeter method
- Maximum power transfer theorem

BE

सुन स्वामी सलाहर्ष एवं फेलोकी समिति
 कलकत्ता, नेपाल १९७५/१९७६/१२
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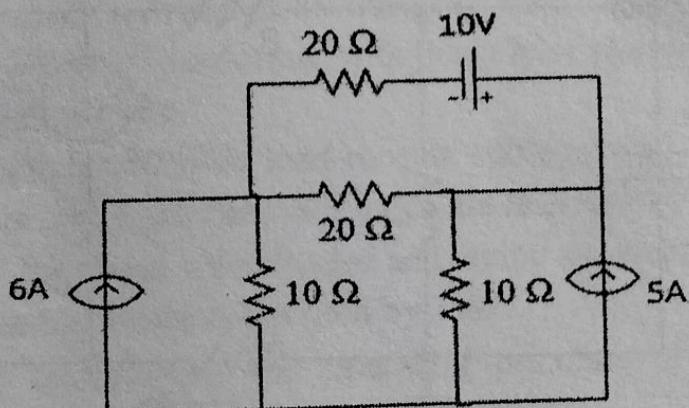
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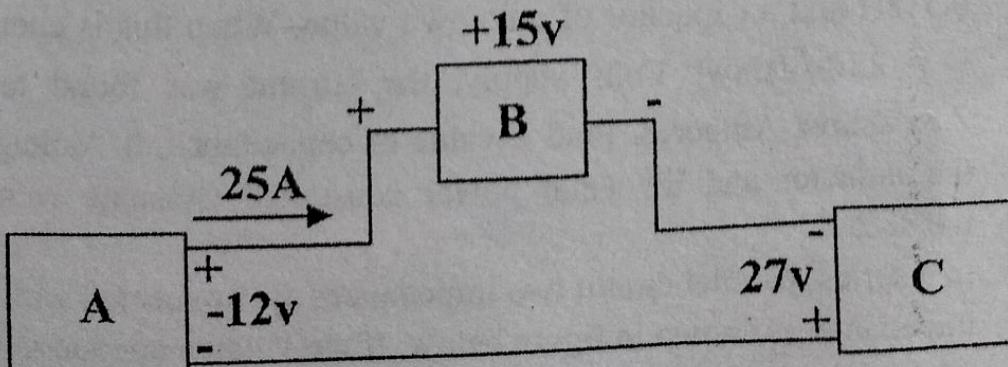
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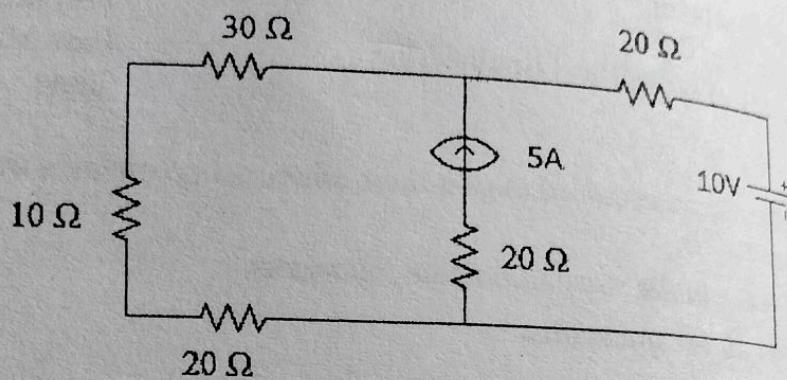
- a) Explain generation, transmission and distribution with the help of 7 single line diagram.
- b) Using Node voltage method, find the current through each 10Ω 8 resistors of the circuit as shown below.



- a) For the circuit shown below 8
 - i. Determine which components are absorbing power and which are delivering power
 - ii. Is conservation of power satisfied? Explain your answer.

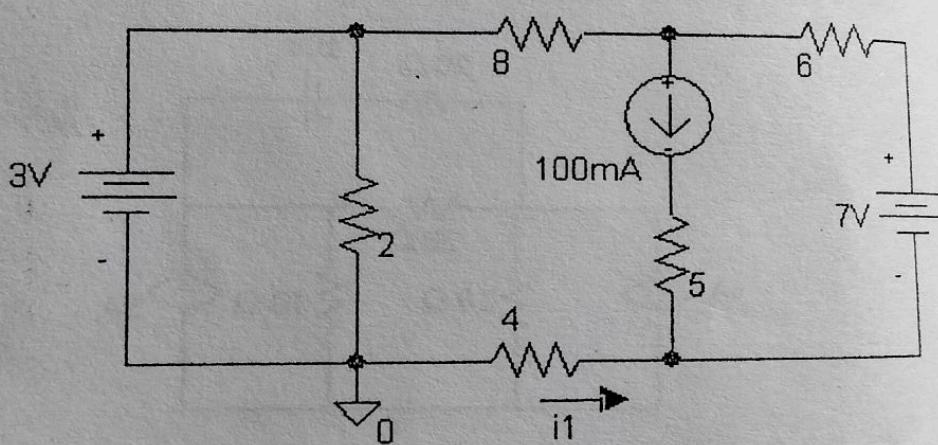


- b) Explain Thevenin's theorem. Also find the current across 10Ω resistance by using Norton's theorem.



- i. Current I_A , I_B
- ii. Voltage across 10Ω
- iii. Active and reactive power
- iv. Draw the P-V diagram

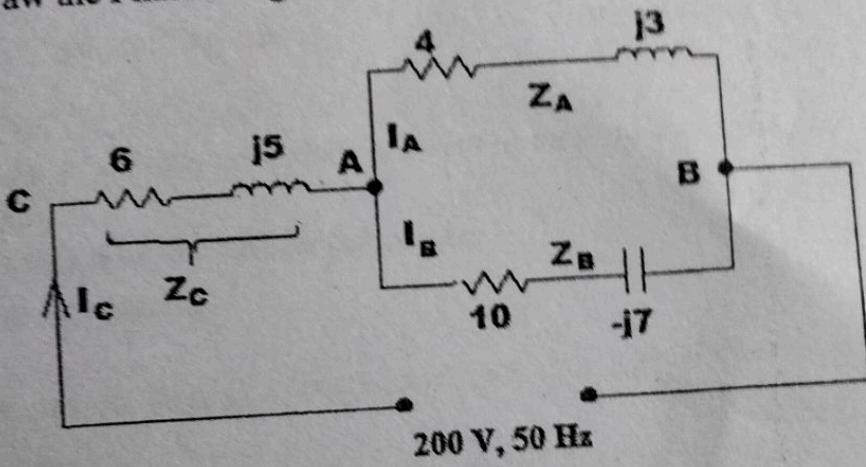
3. a) Solve for the current i_1 (through the 4Ω resistor) in the circuit shown below using superposition theorem. (All resistors are in Ohm).



- a) Explain the difference between primary and secondary side of a transformer
- b) List out the advantages of three phase system
- c) Explain the principle of induction
- a) A 250V shunt generator has a total armature resistance of 0.5Ω . Calculate the armature reaction per pole
- b) Explain the working principle of a motor.
- Write short notes on
- a) Star/Delta connection
- b) Two wattmeter method
- c) Speed control of DC motor

- b) Calculate the average value, RMS (effective) value and form factor of the output of half wave rectifier when the input to the rectifier is a purely sinusoidal alternating current.
4. a) A series RLC circuit consists of a 100Ω resistor, an inductor of $0.318H$ and a capacitor of unknown value. When this is energized by $v = 230\sqrt{2}\sin\omega t$ Volts supply, the current was found to be $i = 2.3\sqrt{2}\sin\omega t$ Amperes. Find i. value of capacitance, ii. Voltage across the inductor and iii. Total power consumed (Assume $\omega = 314.15 \text{ rad/sec}$)
- b) In a series, parallel circuit two impedances are connected with series impedance as shown in figure below. If the voltage applied to the circuit is 200V, 50Hz. Calculate:

- 10Ω
- Current I_A , I_B and I_C
 - Voltage across AB
 - Active and reactive Power of the entire circuit
 - Draw the Phasor diagram



- shown
- a) Explain the differences between single phase and three phase system. 4
 - b) List out the advantages and disadvantages of star connected supply. 4
 - c) Explain the practical transformer with the help of phasor diagram with unity power factor load. 7
 - a) A 250V shunt motor on no load runs at 1000rpm and takes 5A. The total armature and shunt field resistance are respectively 0.2Ω and 250Ω . Calculate the speed when loaded and taking a current of 50A, if the armature reaction weakens the field by 3%. 7
 - b) Explain the construction and operating principle of 3ϕ induction motor. 8
 7. Write short notes on: (Any two) 2×5
 - Star/Delta transformation
 - Two wattmeter method of power measurement
 - Speed control of dc motor

POKHARA UNIVERSITY

Level: Bachelor

Semester: Fall

Year : 2018

Programme: BE

Full Marks: 100

Course: Basic Electrical Engineering

Pass Marks: 45

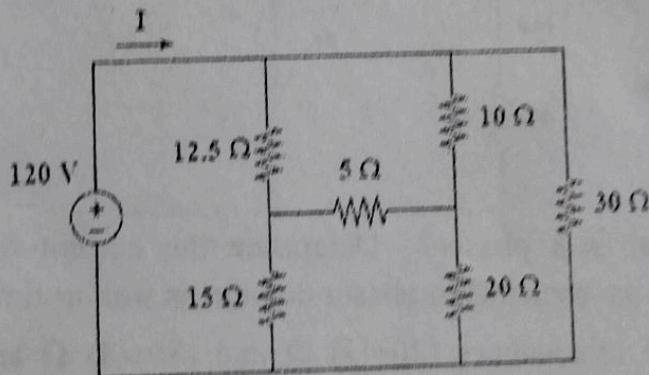
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

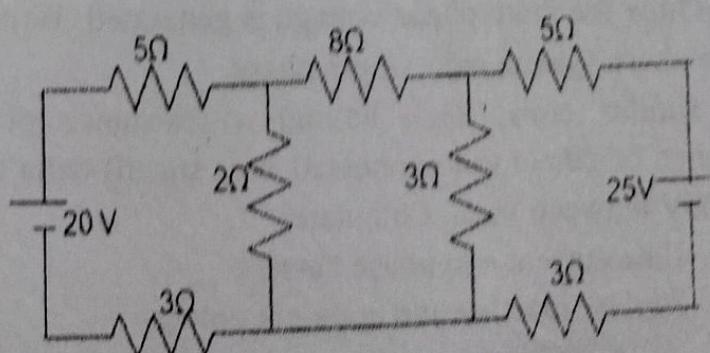
The figures in the margin indicate full marks.

Attempt all the questions.

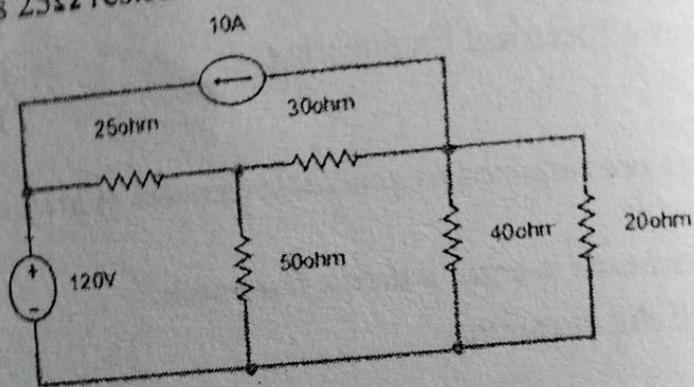
1. a) Explain present Energy scenario and role of electricity in context of Nepal. 7
- b) Obtain the equivalent resistance and use it to find source current for the circuit shown below. 8



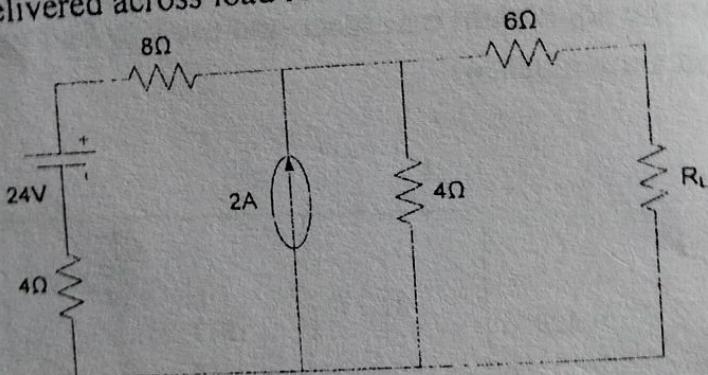
2. a) Explain KCL and KVL. Find the node voltage at each nodes using nodal analysis for the given circuit. 7



- b) Compare Thevenin's theorem with Norton's Theorem. Also find the current across 25Ω resistance by using Norton's theorem.



3. a) Calculate the value of R_L & power dissipated such that maximum power is delivered across load resistor.



- b) What is a phasor? Determine the current-voltage relationship for passive elements in phasor domain as well as time domain.

4. a) Two impedances $(20+j5)\Omega$ and $(30+j8)\Omega$ are connected in series across a 400V, 60Hz supply. Find current, active power, reactive power, apparent power and power factor of the whole circuit.
- b) Explain resonance in parallel RLC circuit.
5. a) Explain how the three phase voltage is generated. Write the advantages of three phase system over single phase.
- b) Three similar coils, each having a resistance of 100Ω and an inductance of $20mH$ are connected in i) star ii) delta to a 3-Φ, 50 Hz with 400V between lines. Calculate:
- Line current and phase current
 - Active, reactive and apparent power

at one cycle, it cancels it not zero. The current (d)

6. a) What are generators? Explain the types of excitation systems in a separately excited DC generator.

b) A transformer has 600 primary turns and 150 secondary turns. The primary and secondary resistances are 0.25Ω and 0.01Ω respectively and corresponding leakage reactance are 1.0Ω and 0.04Ω respectively. Determine a) the equivalent resistance and reactance referred to primary side b) Equivalent resistance and reactance referred to secondary side.

7. Write short notes on: (Any two)

- a) Star/Delta transformation
- b) Operation of transformer on-load
- c) Working principle of 3-Φ induction motor

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Basic Electrical Engineering

Semester: Spring

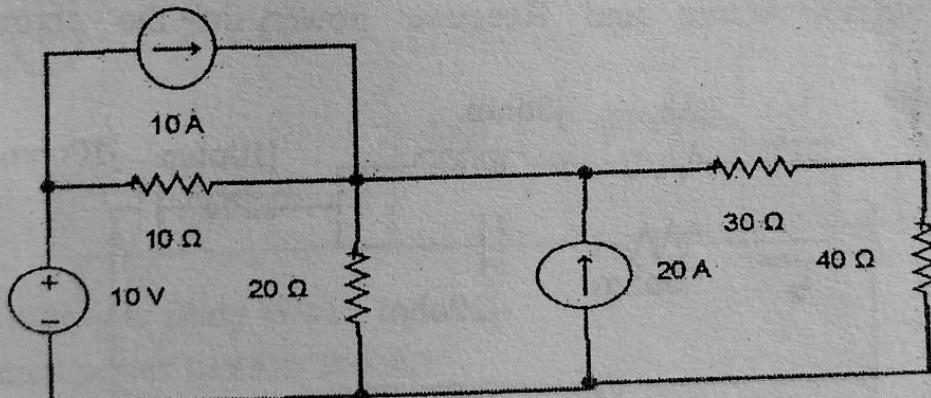
Year : 2018
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

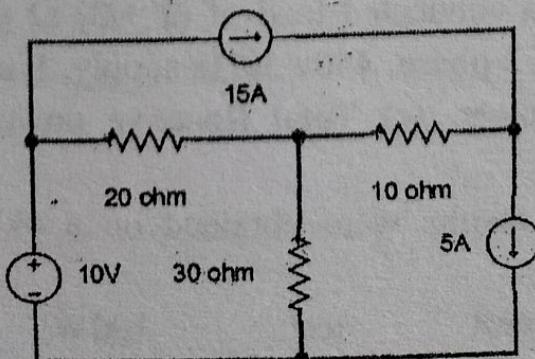
The figures in the margin indicate full marks.

Attempt all the questions.

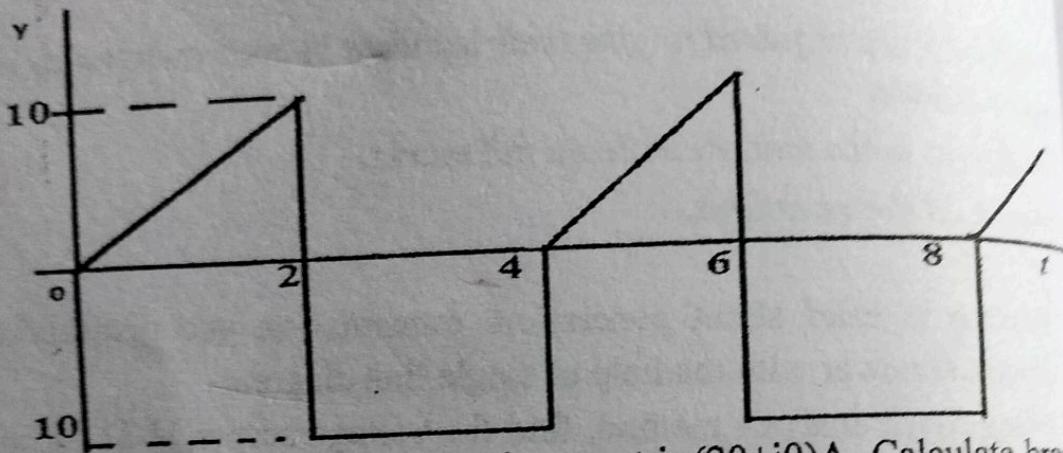
- a) Explain in brief about generation, transmission and distribution of electrical power with the help of single line diagram. 7
- b) Using Mesh analysis method, find the voltage across $10\ \Omega$ resistor of the circuit as shown below. 8



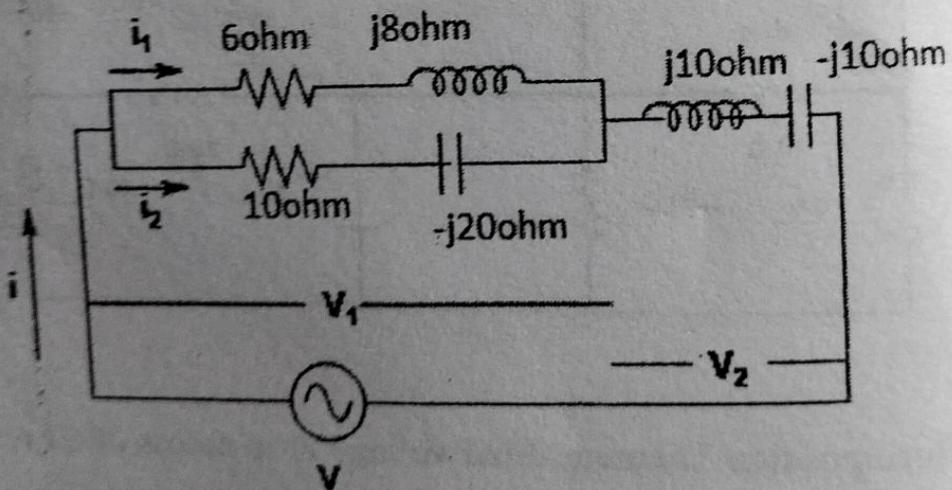
- a) State Superposition Theorem. Find voltage drop across $20\ \Omega$ resistor using Superposition Theorem. 8



- b) State and explain Norton's Theorem with an appropriate example.
3. a) Find the average value, rms value and form factor of the given triangular waveform?



- b) In the circuit given below, total current $i = (20 + j0)$ A. Calculate branch current i_1 and i_2 (ii) voltage V_1 and V_2 (iii) power factor of entire circuit (iv) Active and Reactive power in the entire circuit



4. a) A balanced delta connected load of $(2 + j3)$ Ω per phase is connected to the balanced 3-phase, 440V 50Hz supply. Find: (a) Line current (b) Total active power. (c) Total Reactive power. (d) Total apparent power.
- b) The following results were obtained on a 4kVA, 200/400V, 50Hz transformer.

Open circuit		test:	100W,	1A,	200V
Short circuit	circuit	test:	85W,	10A,	15V
Determine equivalent circuit parameters referred to LV side and HV					

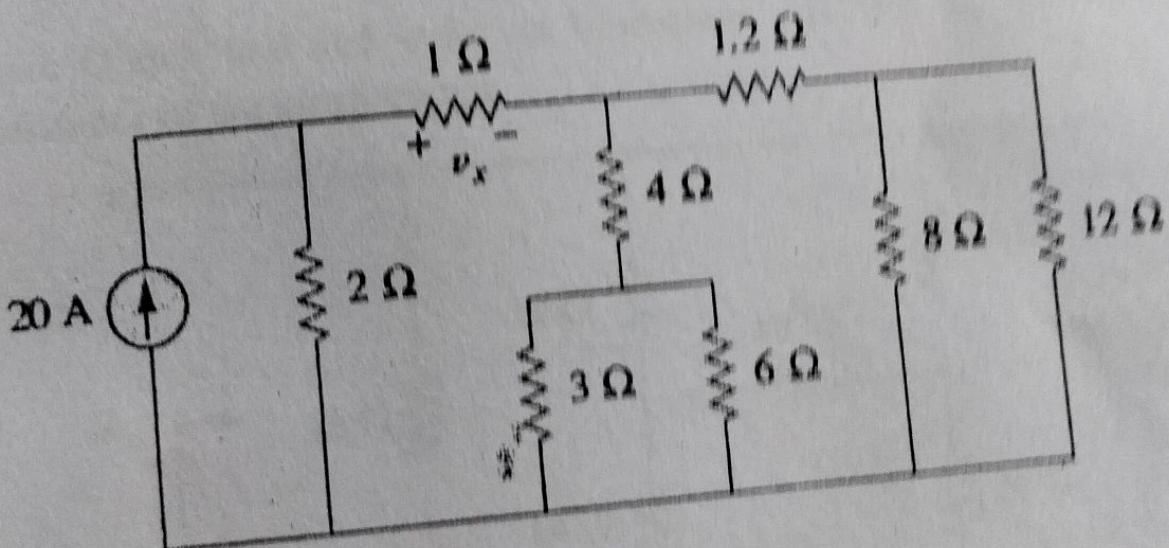
side.

A 220V, dc shunt motor draws a current of 50A at full load and runs with a speed of 1700rpm. Calculate the value of resistance to be inserted in the armature circuit so that the speed drops to 1200rpm at constant load. Given that armature resistance and field resistance are 0.04 ohm and 155 ohm respectively.

Explain the working principle of induction motor with neat diagram.

Show that bandwidth of RLC resonance ac series circuit is $W = \frac{R}{L}$, rad/sec, where symbols have their usual meanings.

Using Kirchoff's law, in the circuit shown below, determine v_x and the power absorbed by 12 Ohm resistor.



2x5

Write short notes on: (Any two)

- Maximum power transfer theorem
- Power factor and its significances
- Advantages of 3-phase system over 1-phase system

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Basic Electrical Engineering

Semester: Fall

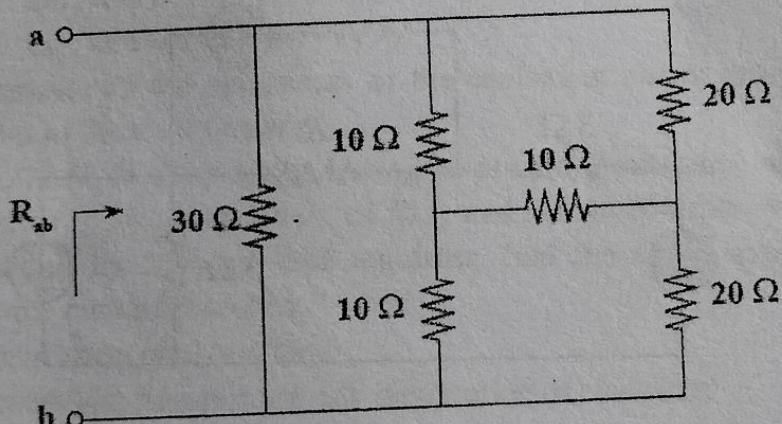
Year : 2019
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

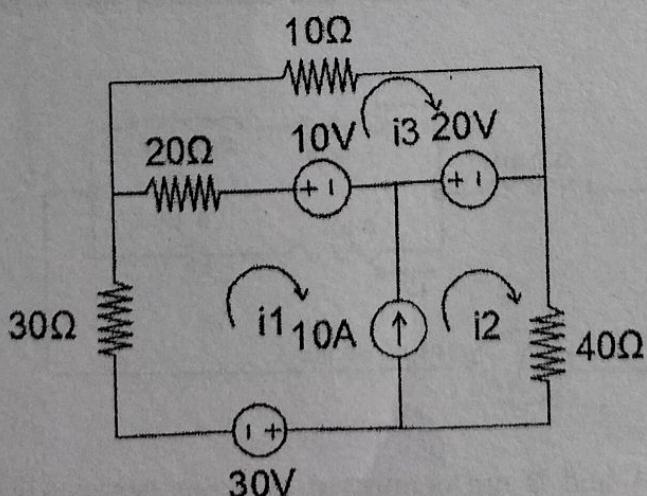
The figures in the margin indicate full marks.

Attempt all the questions.

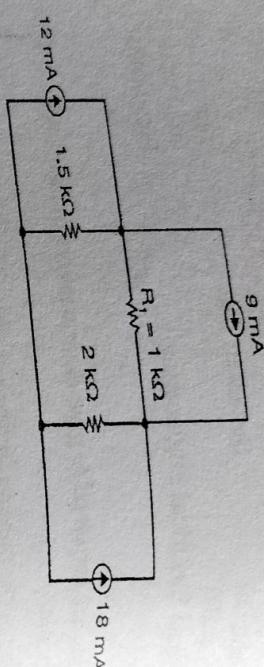
- a) State Ohm's law and write its limitations. Obtain the equivalent resistance of the given circuit. 8



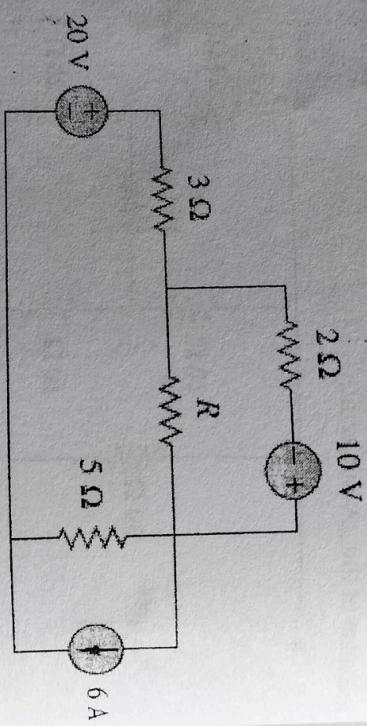
- b) Find i_1 , i_2 , i_3 current using mesh analysis method. 7



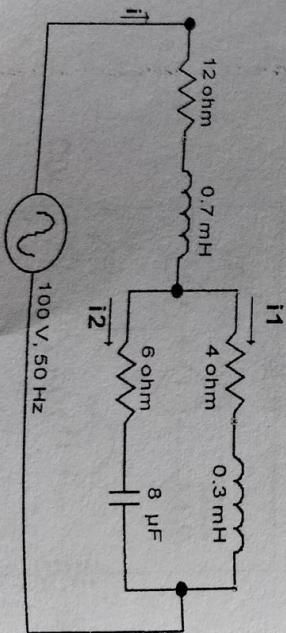
- a) Find the current through R_1 using superposition theorem. 7



- b) Find the maximum power that can be delivered to the resistor R in the below circuit.



3. a) Show that the peak factor of sine wave is equal to 1.41.
 b) Determine the total impedance and current in each branch of circuit below.



4. a) Two coils A and B are connected in series across a 240 V, 50 Hz supply. The resistance of A is 5Ω and the inductance of B is 0.015 H

- If the input of A and the With neat s meter meth a) A 220 V 3 of phase ir (i) Find (ii) Find (iii) Find (iv) Draw Explain 1 induction results OC test : SC test : Compute sides of t b) A 220 V carries ar reduced torque re Write short no a) Generati b) Color Co c) Analogy

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If the input from the supply is 3 KW and 2 KVAR, find the inductance of A and the resistance of B. Calculate voltage across each coil.

b) With neat sketch and appropriate phasor diagram explain two wattmeter method of 3-phase power measurement.

a) A 220 V 3Φ voltage is applied to a balanced delta connected 3Φ load

of phase impedances $(15+j20) \Omega$.

i) Find phase current in each line.

ii) Find power consumed in each phase

iii) Find the phasor sum of three line currents.

iv) Draw the phasor diagram.

b) Explain the construction and working principle of three phase induction motor.

a) A 50 KVA, 2200/110 transformer when tested gave the following results

OC test : 400W 10A 110V
SC test : 808W 20.5A 90V

Compute all the parameters of the equivalent circuit referred to LV sides of the transformer.

b) A 220 V dc shunt motor having an armature resistance of 0.25 ohm carries an armature current of 50 A and runs at 600 rpm. If the flux is reduced by 10% by field regulator, find the speed assuming load torque remains the same.

2×5

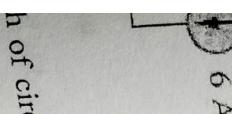
Write short notes on: (Any two)

- a) Generation, transmission and distribution of electricity
- b) Color Coding of resistance
- c) Analogy between magnetic and electric circuits

h of circuit

5

6



POKHARA UNIVERSITY

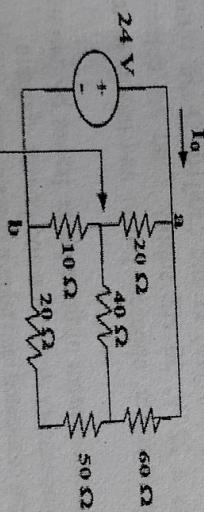
Level: Bachelor
Programme: BE
Course: Basic Electrical Engineering

Year : 2019
Full Marks: 100
Pass Marks: 45
Time : 3 hrs.

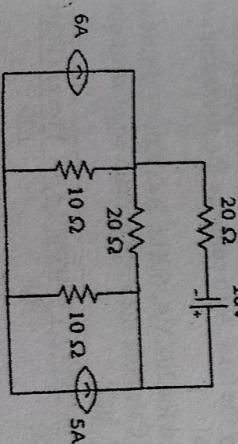
Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

- a) Explain with the help of a single line diagram about the generation, transmission and distribution of electric power. 7
- b) State and explain Ohm's law. Also write its limitation. Obtain the equivalent resistance and use it to find source current for the circuit shown below. 8



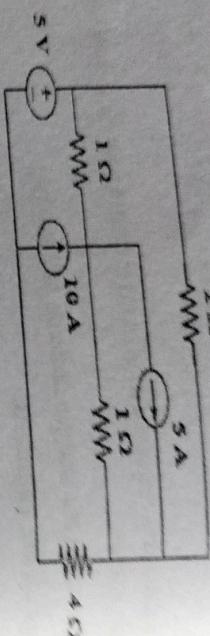
- a) Using Node voltage method, find the current through each 10Ω resistor of the circuit as shown below. 8



- b) State and explain Norton's Theorem with appropriate example. 8

3. a) State maximum power transfer theorem. What resistance value is required to deliver maximum power to the load?
- b) Should be used instead of 4 ohm to deliver maximum power transferred.

Also find the maximum power transferred.



Write short notes on:

- Power Factor and its applications.
- Analogy between AC and DC circuits.
- EMF equation of a DC generator.

- b) Calculate the average value, RMS (effective) value and form factor of the output of half wave rectifier when the input to the rectifier is a pure sinusoidal alternating current.

4. a) Differentiate between series resonance and parallel resonance. Show that for the series RLC circuit in resonance, the ratio of resonant frequency and the quality factor is the bandwidth.

- b) Two impedances $(60+j15) \Omega$ and $(30-j10) \Omega$ are connected in series across a 220V, 50 Hz supply. Find the current, active power, reactive power, apparent power and power factor of the circuit.

5. a) Explain the measurement of three phase power by two wattmeter method with necessary derivation and phasor diagram.

- b) A balanced delta connected load takes a phase current of 10 A at a power factor of 0.8(lagging) when connected to a 440 V, 50 Hz, three phase supply. Calculate the power drawn from the supply, phase impedance of each phase.

If the same phase impedance is connected in star connection what will be the power consumed by the load. Also compare the power consumed for both connection of load.

6. a) The test data were obtained for 20KVA, 50Hz, 2000/200 V distribution single phase transformer. Calculate the approximate equivalent circuit refer to both H.V. and L.V. side.

Test	Voltage(V)	Current(A)	Power(Watt)
OCC with H.V. open Circuited	200	40	120
SC with L.V. Short Circuited	60	10	300
Also determine the efficiency for half load of 0.8 pf lagging.			

- b) A 240 V shunt motor runs at 1000 rpm of full load with an armature current of 10 A. The total resistance of the armature and brushes is 0.6Ω . If the speed is to be reduced to 800 rpm with the same armature current, calculate the value of resistance to be connected in series with the armature.

Write short notes on: (Any two)

- a) Power Factor and its significance
b) Analogy between magnetic and electric circuit
c) EMF equation of transformer

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POKHARA UNIVERSITY

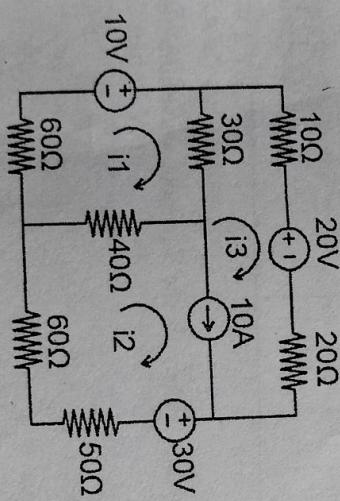
Level: Bachelor
Programme:B.E
Course: Basic Electrical Engineering

Semester:Fall
Year : 2020
Full Marks: 100
Pass Marks: 45
Time : 3 hrs.

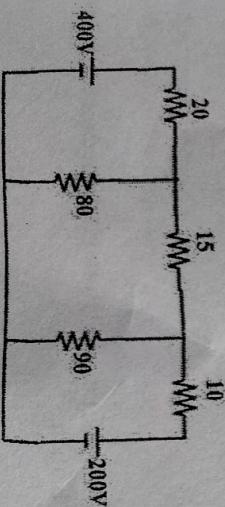
Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

- a) Describe in brief the generation, transmission, distribution, and consumption of electrical energy with the help of single line diagram. 7
- b) Find i_1 , i_2 , i_3 current using mesh analysis method. 8



- a) Find the power dissipation in the 15Ω resistor. Use superposition theorem to find the current flowing through it. All resistances are in ohms. 8



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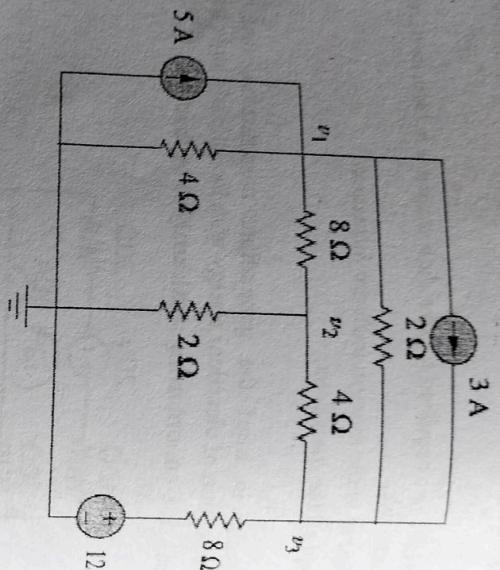
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b) Find v_1 , v_2 and v_3 in the following circuit using nodal analysis.



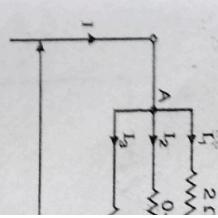
3. a) Find the rms and average values of the sawtooth waveform shown below



Determine:
 i) Equivalent res
Secondary side.
 ii) Regulation at 0.8
 iii) Efficiency on ha

A 220v dc shunt
of 50A. The val
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Use superposition to
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i) Find the phasor cur
ii) What is the power

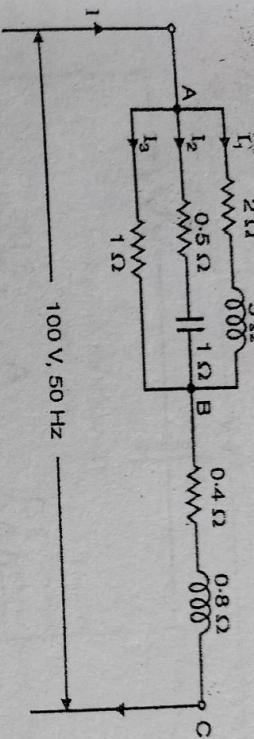
value? Explain
Derive the relative
connection with the
phase system.

A 20 KVA, 2200/
efficiency and regu
OC test: 220 V, 4

SC test: 86 V, 10

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- a) A balanced delta connection connected load of impedance $(15+j20)\Omega$ per phase is connected to a 3-phase 440 V, 50 Hz supply.

- i) Find the phasor current in each line.
ii) What is the power consumed per phase?

Ω

- iii) What is the phasor sum of three line currents? Why does it have this value? Explain

b) Derive the relationship between phase and line voltage in a star connection with the help of neat and clean phasor diagram in three phase system.

12 V

- a) A 20 KVA, 2200/220 V, 50 Hz distribution transformer is tested for efficiency and regulation.

OC test: 220 V, 4.2 A, 148 W on LV side
SC test: 86 V, 10.5 A, 360 W on HV side.

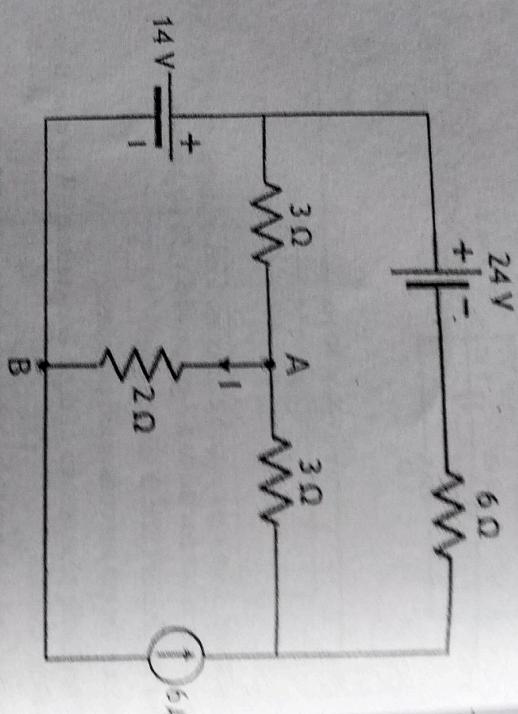
Determine:

- i) Equivalent resistance and reactance referred to Primary and Secondary side.
ii) Regulation at 0.8 pf lagging.
iii) Efficiency on halfload at 0.8 pf lagging.

- b) A 220v dc shunt motor runs with 1200rpm with an armature current of 50A. The value of armature resistance is 0.2Ω . Calculate the value of resistance to be connected in series with the armature so that the speed drops to 1000rpm

-) Use superposition theorem to find the current through and voltage drop across the 2 ohms resistor.

ii) power



- b) A voltage $v = 141.4 \sin(314t)$ is applied to a coil having inductance of 0.1 H and resistance 10Ω find
- expression for instantaneous current
 - rms value of voltage and current
 - power factor
 - power consumed in the coil.
- Write short notes on: (Any two)
- Norton's Theorem
 - Resistor colour coding
 - Phase sequence and its significance

2 M 3

Ans:
 1. $I = 141.4 / (10 + j0.1) = 14.14 \angle -0.57^\circ \text{ A}$
 2. $V_{rms} = 141.4 / \sqrt{2} = 100 \text{ V}$
 3. $P = 141.4^2 / (10 + j0.1) = 14140 \text{ W}$

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6 A

QUESTION PAPER

POKHARA UNIVERSITY

Semester - Spring

Year: 2020

Full Marks: 70

Pass Marks: 31.5

Time: 2 hrs.

Level: Bachelor
Program: BE
Course: Basic Electrical Engineering.

Candidates are required to answer in their own words as far as practicable.
The figures in the margin indicate full marks.

Attempt all the questions.

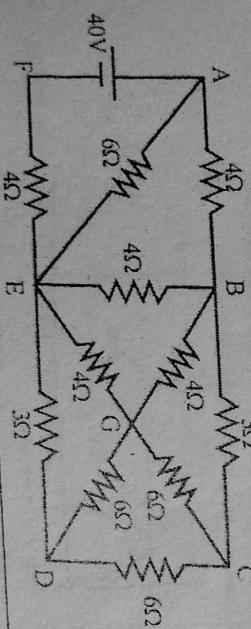
Section - A: (5×10=50)

Q. N. 1 Describe the energy sources and explain the Role of electricity in modern society. Draw generation, transmission and distribution of electrical energy layout diagram.

Q. N. 2 State the maximum power transfer theorem. Determine the current supplied by source of the given circuit below using delta-star transformation.

Q. N. 3 State the threevenin's theorem. Apply the Norton's theorem to calculate power absorbed in 50 ohm resistor for the network of figure below.

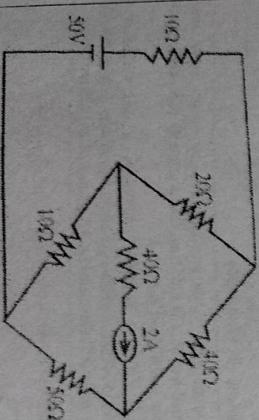
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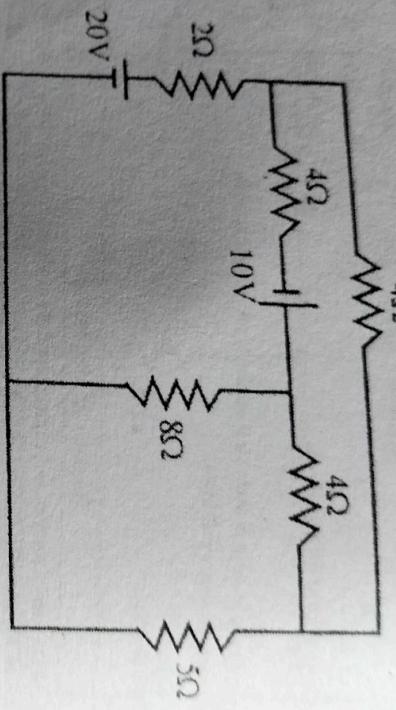
3+3+4

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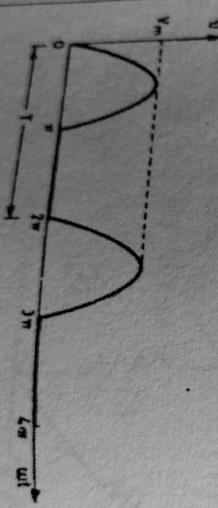
2+8



Q.N.4 Determine the current through $5\ \Omega$ resistor of the given network shown below using superposition theorem. Verify by mesh current method.



Q.N.5 Define average values and RMS or effective value of any types of alternating voltage or current waveform. For the given output voltage waveform:
Determine: Form factor and peak factor.



OR
How do you differentiate single phase with three phase system and write the advantages of three phases system over single phase system. Explain how we can measure three phase power by two wattmeter method.

Q.N.6 Section - B: (1×20=20)

- a) A 600KVA, single phase transformer when working at unity power factor has 92% efficiency at full load and also at half load. Determine its efficiency when it operates at unity power factor and 60% of full load.
- b) 240 V dc shunt motor and 60% of full load speed when the motor draws 5 A while running at 800 rpm on load. Calculate the torque. Assume armature and field resistance as 0.3 Ω and 2.46 Ω respectively.

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POKHARA UNIVERSITY

Level: Bachelor Semester: Fall

Year : 2021
Full Marks: 100
Pass Marks: 45
Time : 3 hrs.

Programme: BE
Course: Basic Electrical Engineering

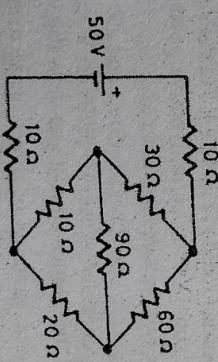
Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

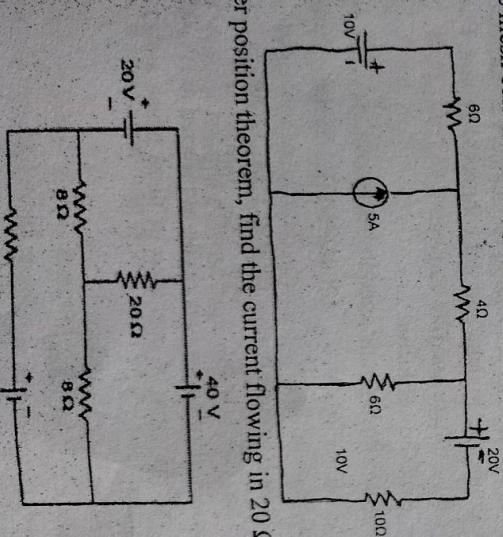
Attempt all the questions.

- a) Describe in brief the generation, transmission, distribution and role of Electricity in Morden society. 7
- b) What is resistor? Obtain the equivalent resistance and total current flowing in the circuit given below. 8

ng voltage or



- a) Find all the mesh currents in the given circuit. 7



- b) Using super position theorem, find the current flowing in 20Ω resistor. 8

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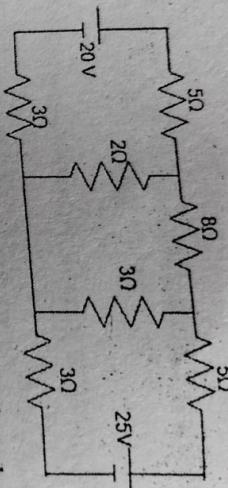
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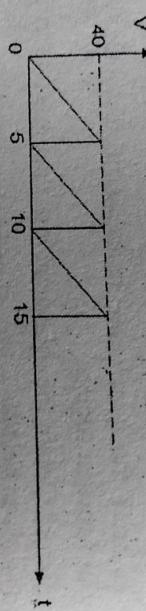
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3. a) Find the current across 8Ω resistor using thevenin's theorem.



- b) Compute the average and effective values and peak factor of given form



4. a) Two impedances $(15+j8)\Omega$ and $(3-j15)\Omega$ are connected in series across 230V, 50Hz supply. Find current, active power, reactive power, apparent power and power factor of the circuit.

- b) Two impedances given $Z_1=(10+j5)\Omega$ and $Z_2=(8+j6)\Omega$ are in joined parallel and connected across $V=(200+j0)V$. calculate the circuit current its phase and the branch current and draw the vector diagram.

5. a) What are the advantages of three- phase over single- phase ac system
Explain the measurement of three phase power by two wattmeter method
b) Three equal impedances having resistance 8Ω and inductive resistance Ω are connected in delta and star connected system. Find;

- (i) Phase and line current

- (ii) Power factor

- (iii) Power consumed in both cases

6. a) A single phase 10KVA , 1200/2400 V, 50Hz, transformer gave the following test results:

O.C test (HV side open): 1200V, 1.3A, 120W
S.C test (LV side S.C.): 22V, 30A, 200W

- Find the parameters of equivalent circuit as referred to HV side
b) Explain the principle of operation of three phase induction motor and Applications

7. Write short notes on: (Any two)

- a) Resistor Color Coding.
b) Power factor and its significance
c) Maximum Power Transfer theorem

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