Roll No. ..... Total Pages : 4

300111

December, 2019
B. TECH. 1st SEMESTER (UNDER CBS)
BASIC ELECTRICAL ENGINEERING (ESC-101)

Time : 3 Hours] [Max. Marks : 75

Note: 1. It is compulsory to answer the questions of Part-A. Limit your answers within 30-50 word in this part.

2. Answer any four questions from Part-B in detail.

3. Different parts of the same question are to be attempted adjacent to each other.

PART - A

1. (a) A 50 W resistance is connected across a 10 V battery. What is the current through the resistor? Find the energy consumed in 8 s. (1.5)

(b) The resistance of two wires is 25 W when connected in series and 6 W when joined in parallel. Calculate the resistance of each wire. (1.5)

(c) An alternating current is represented by i = 12 sin 314 t. Find out (a) Frequency (b) Instantaneous Value at t = 4 ms (c) Time taken to attain a value of 10 A for first time after passing through zero. (1.5)

(d) Define duality. What is the dual of capacitance and resistance? (1.5)

(e) A balanced star-connected load of (3-4j) Ω is connected to 400 V supply. What is the real power consumed by the load? (1.5)

(f) Draw and explain equivalent circuit of auto transformer. (1.5)

(g) Write the principle of operation of DC generator. (1.5)

(h) Differentiate between buck and boost converter. (1.5)

(i) Differentiate between MCB and MCCB. (1.5)

(j) Write down the various characteristics of batteries. (1.5)

PART - B

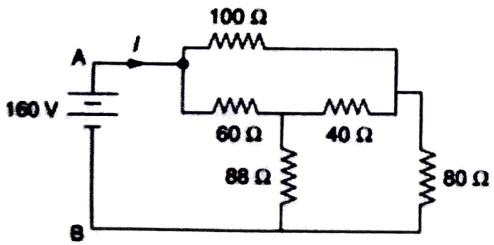


Figure 1(a)

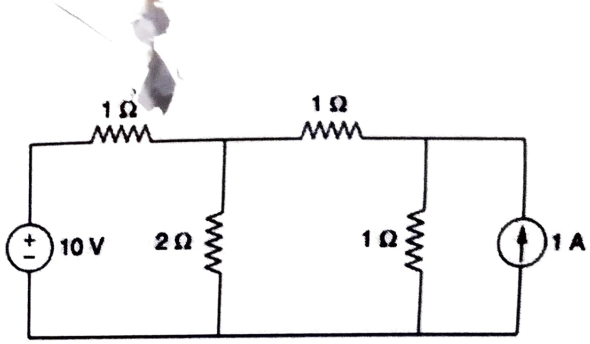
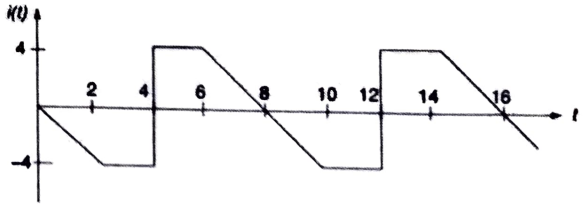


Figure 1(b)

(a) Determine the current I in the Figure 1(a). (7.5)

(b) Calculate the current through the 2Ω resistor in the circuit shown in Figure 1(b), using superposition theorem. (7.5)

3. (a) Find the RMS and Average Value of current wave form shown in figure below : (7.5)



(b) Derive the expression for power factor measurement by using two wattmeter method. Also discuss the various case related to it. (7.5)

4. (a) What is a B–H curve? Explain th ysteresis and eddy current loss. How are they minimized? (7.5)

(b) Describe efficiency and regulation of single phase transformer with various equations related to them. (7.5)

5. (a) Explain the different types of rotor in three phase induction motor. (7.5)

(b) What do you mean by synchronous motor? Differentiate synchronous motor from induction motor. (7.5)

6. Write a short note on single phase and three phase voltage source inverter in brief. (15)

7. (a) What do you mean by Earthing? Explain its various types in brief. (7.5)

(b) Define the term power factor. Write down the various benefits of power factor improvement. (7.5)

EL-Dec 18

2016

Roll No.....

Dec 2018

B.Tech. I SEMESTER

ELECTRICAL TECHNOLOGY (BEC/E-105)

Time: 3 Hours **Max. Marks:60**

Instructions: *1. It is compulsory to answer all the questions (2 marks each) of Part -A in short.*
2. Answer any four questions from Part -B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

Q1 (a) Differentiate unilateral and bilateral circuits. (2)

(b) What is the significance of 'j' operator. (2)

(c) A 60-Hz voltage of 230-V effective value is impressed on an inductance of 0.265 H. Write the time equation for the voltage and the resulting current. (2)

(d) Define the terms related to magnetic circuits : (*i*) reluctance (*ii*) flux density (*iii*) magnetomotive force (2)

(e) State Millman's theorem. (2)

(f) What are the effects of low power factor? (2)

(g) Define statically and dynamically induced emfs. (2)

(h) What are the advantages of three phase system over single phase system? (2)

(i) What is the function of Commutator in a d.c. machine? (2)

(j) Why transformer cores are laminated? (2)

PART -B

Q2 (a) Find the current in the branches of the network shown in figure-1 using nodal voltage method. (5)

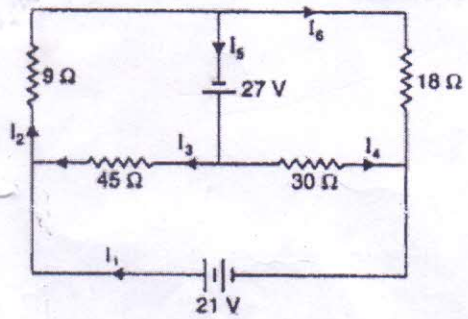


Figure-1

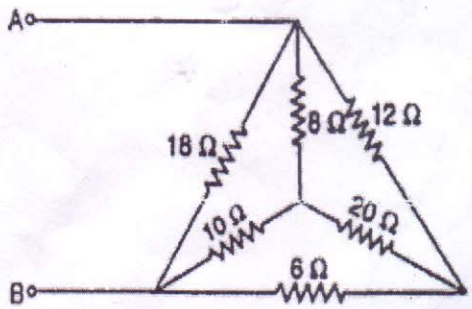


Figure-2

(b) Figure-2 shows a number of resistances connected in star and delta. Find the resistance across the terminals A and B. Use star/delta conversion method. (5)

Q3 (a) Find the average value, effective value, form factor and peak factor for the wave shape shown in figure-3 if the curves are parts of a sine wave. (5)

P.T.O.

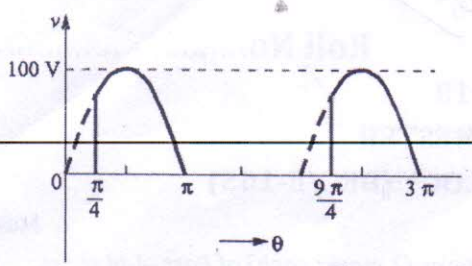


Figure-3

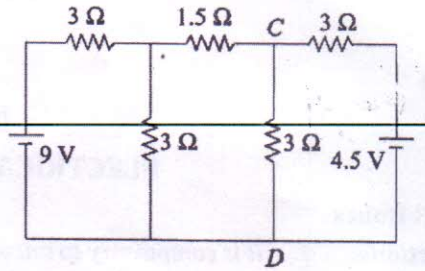


Figure-4

(b) State and explain maximum power transfer theorem. (5)

Q4 (a) Find the current through the 3Ω resistance connected between C and D in the circuit shown in figure-4 using superposition theorem. (5)

(b) Compare electric and magnetic circuits with respect to their similarities and dissimilarities. (5)

Q5 (a) Two circuits, the impedances of which are given by Z_1= 15 + j12 ohms and Z_2= 8 – j5 ohms are connected in parallel. If the potential difference across one of the impedance is 250 + j0 V, calculate: (i) total current and branch currents (ii) total power and power consumed in each branch and (iii) overall power-factor and power-factor of each branch. (5)

(b) What is meant by resonance in series a.c. circuit? Draw resonance curve. Define half power frequencies and quality factor for series resonant circuit. (5)

Q6 (a) Three identical coils are connected in star to a 400V, three phase, a.c. supply and each coil takes 300W. If the power factor is 0.8 lagging, calculate: (i) the line current (ii) impedance and (iii) resistance and inductance of each coil. (5)

(b) Explain two wattmeter method of power measurement in three phase system at balance load. What are the effects of power factor on wattmeters reading? (5)

Q7 (a) Explain the construction and working of three phase induction motor with neat sketches. (5)

(b) Explain working principle of transformer. Also, derive emf equation of single phase transformer. (5)

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Dec., 2018

B.Tech. Ist Semester

BASIC ELECTRICAL ENGINEERING

(EE 101 C)

Time : 3 Hours] [Max. Marks : 75

Instructions :

(i) It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.

(ii) Answer any four questions from Part-B in detail.

(iii) Different sub-parts of a question are to be attempted adjacent to each other.

PART–A

1. (a) Differentiate dependent and independent sources. (1.5)

(b) Define hysteresis and eddy current losses. (1.5)

(c) State maximum power transfer theorem. (1.5)

(d) Define the terms: Q-factor and Bandwidth. (1.5)

(e) What is the significance of power factor in AC system? (1.5)

(f) Differentiate between phase and line voltages in three-phase system. (1.5)

(g) Define the term 'phase sequence'. (1.5)

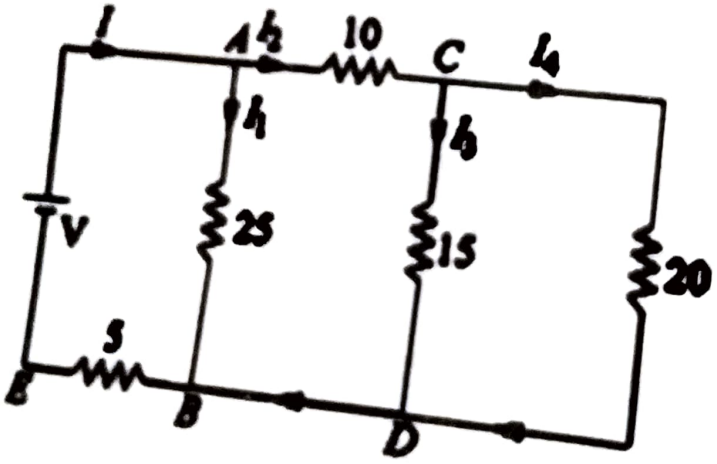
(h) Why the efficiency of transformer is higher as compared to other electrical machines? (1.5)

(i) Why brushes are made of carbon for dc machine? (1.5)

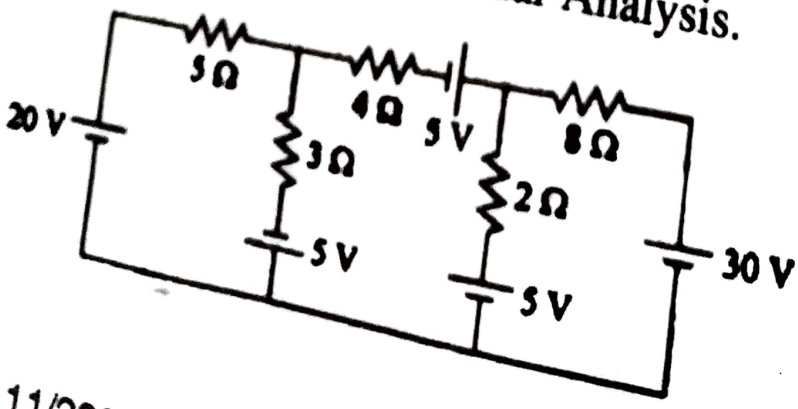
(j) Which type of synchronous generator is suitable for hydro power generation and why? (1.5)

PART–B

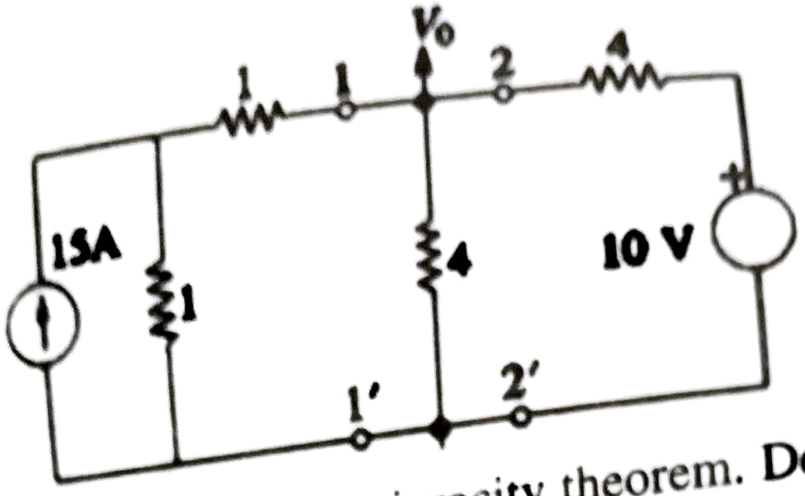
2. (a) In the given circuit, find the value of supply voltage V so that 20-Ω resistor can dissipate 180 W. (8)



(b) Determine current in each branch of the network shown in figure using Nodal Analysis. (7)



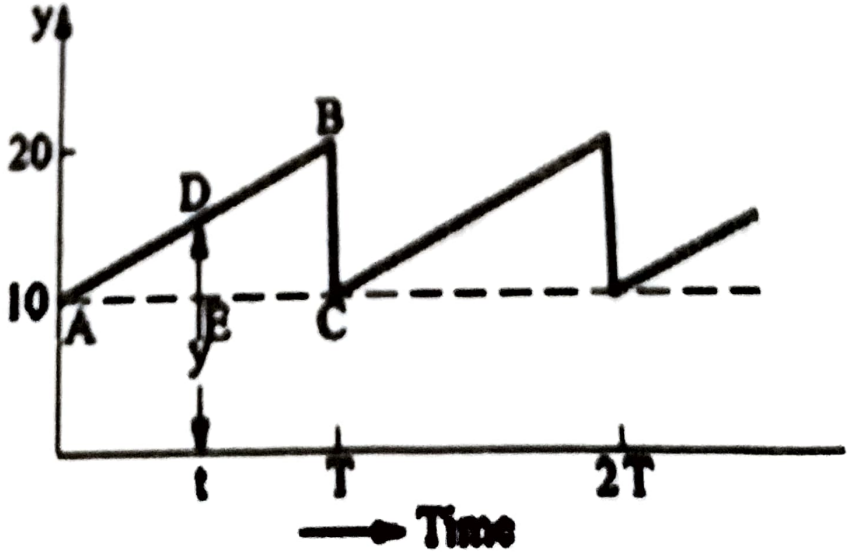
(a) With the help of Norton Theorem, find V_0 in the circuit shown in figure. All resistances are in ohms. (5)



(b) State and explain reciprocity theorem. Derive results for it. (5)

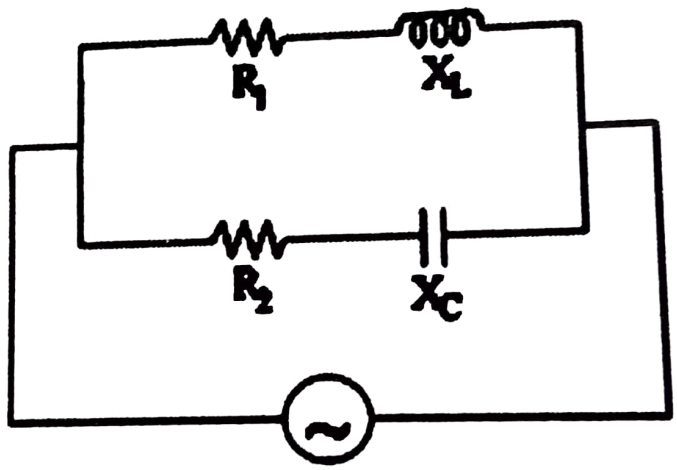
(c) Define: (i) Self inductance, and (ii) Mutual inductance. Mention their units and formula to calculate each of them. Derive an expression for the energy stored in an inductor of self inductance 'L' henry carrying the current of 'I' amperes. (5)

4. (a) What is the significance of the r.m.s. and average values of a wave? Determine the r.m.s. and average value of the waveform shown in figure. (7)



(b) Two impedances consist of (resistance of 15 ohms and series-connected inductance of 0.04 H) and (resistance of 10 ohms, inductance of 0.1 H and a capacitance of 100 μF, all in series) are connected in series and are connected to a 230 V, 50 Hz a.c. source. Find: (i) Current drawn, (ii) Voltage across each impedance, (iii) Individual and total power factor. Draw the phasor diagram. (8)

5. (a) Derive an expression for the resonant frequency of the parallel circuit shown in Fig. (8)



(b) Describe advantages and disadvantages of three-phase system over single-phase system. (7)

6. (a) A balanced 3-phase star-connected load of 8 + j 6 ohms per phase is connected to a three-phase 230 V supply. Find the line-current, power-factor, active-power, reactive-power, and total volt-amperes. (5)

(b) Explain two wattmeter method of power measurement in three-phase AC system at balanced load. What are the effects of power factor on wattmeter reading? (10)

7. (a) Derive emf equation of single-phase transformer. (5)

(b) Explain how the revolving flux is produced in stator of 3-phase induction motor. (5)

(c) With neat sketches explain the construction of three-phase salient pole synchronous generator. (5)

Sr. No..002904.

August/September 2022

B.Tech - II SEMESTER

Basic Electrical Technology (ESC-101-A)

Time: 3 Hours | Max. Marks:75

Instructions:
1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Any other specific instructions*

PART -A

Q1 (a) Enumerate various limitations of ohms law. (1.5)[CO1]

(b) Convert 4A source with its parallel resistance of 15Ω into its equivalent voltage source. (1.5)[CO1]

(c) Differentiate between active and passive components. (1.5)[CO1]

(d) Define dynamic impedance. Also write its unit. (1.5)[CO2]

(e) Explain why a series resonance is called voltage resonance. (1.5)[CO2]

(f) List various applications of autotransformer. (1.5)[CO3]

(g) In case of power measurement by two-wattmeter method for 3-phase balanced load, under what conditions: the one wattmeter will give zero reading and whole of the power will be measured by the other wattmeter. (1.5)[CO2]

(h) List various methods of starting a single-phase Induction motor. (1.5)[CO3]

(i) What is the function of commutator in dc machines? (1.5)[CO3]

(j) Why earthing is provided? (1.5)[CO4]

PART -B

Q2 (a) Determine i_1, i_2 and i_3 using Nodal analysis for a given circuit shown in Fig.1. (8)[CO1]

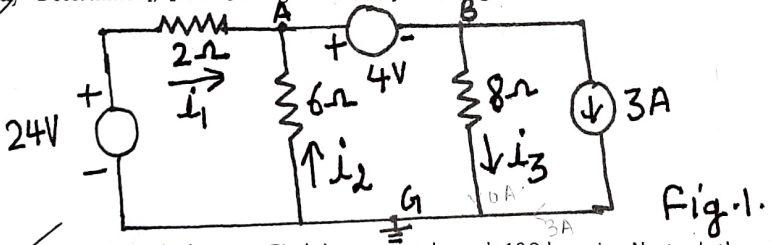


Fig.1.

(b) State Norton's theorem. Find the current through 10Ω by using Norton's theorem for a given circuit shown in Fig.2. (7)[CO1]

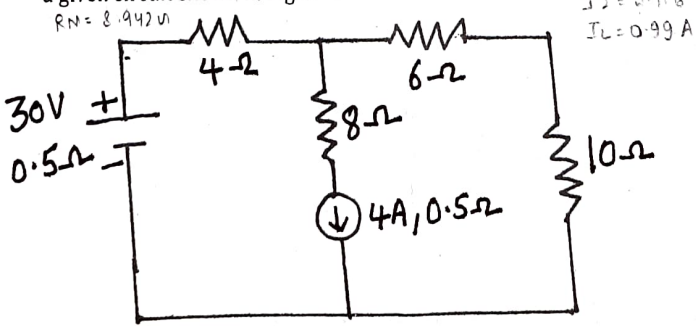


Fig.2

Q3 (a) Find the average and effective values of voltage for sinusoidal waveform shown in Fig.3. (5)[CO2]

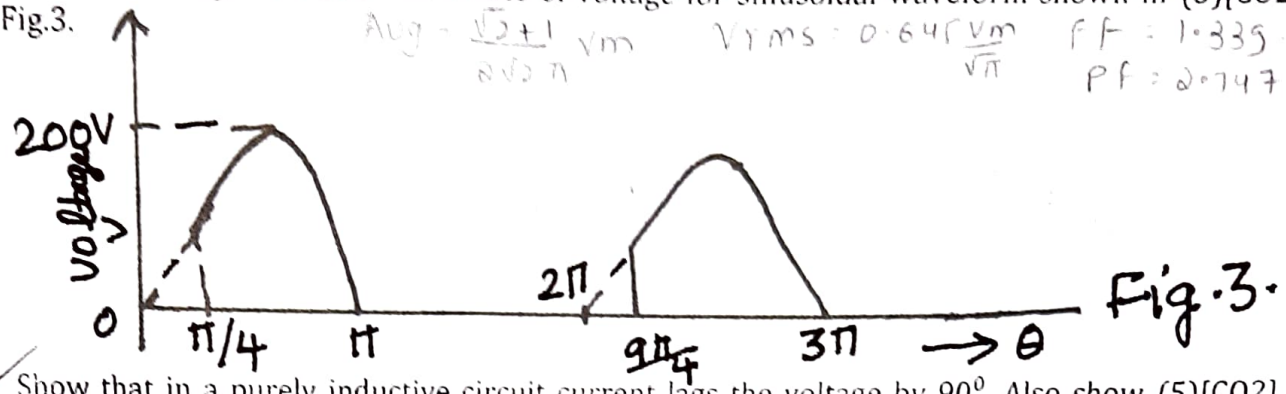


Fig.3.

(b) Show that in a purely inductive circuit current lags the voltage by 90^0. Also show that the average power consumed by it is always zero. (5)[CO2]

(c) Draw resonance curve. Also define selectivity and Quality factor. (5)[CO2]

Q4 (a) Discuss two-wattmeter method for power measurement in three-phase system feeding balanced load. Derive the expression for the power delivered and power factor. (8)[CO2]

(b) A balanced three-phase star load impedance of (5-j10) ohms per phase and is supplied from a balanced three-phase 400V, 50Hz ac supply. Calculate the values for (i) line voltages (ii) phase voltages (iii) line currents (iv) phase currents (v) total power consumption and power factor. (7)[CO2]

Q5 (a) Explain that "The main flux in a transformer remains practically invariable under all conditions of load". (5)[CO3]

(b) Define (i) Voltage regulation (ii) Efficiency and (iii) Eddy current and Hysteresis losses in case of transformer. (5)[CO3]

(c) Explain the working principle of dc motor. (5)[CO3]

Q6 (a) Explain why single-phase Induction Machine is not self-starting using the concept of double field revolving theory. (8)[CO3]

(b) Explain with neat diagram the construction details of three-phase Synchronous Machine. (7)[CO3]

Q7 Write short notes on the followings

(a) Earthing (5)[CO4]

(b) Earth-Leakage Circuit Breaker (ELCB) (5)[CO4]

(c) Power factor improvement methods (5)[CO4]

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October, 2020

B.Tech. - II SEMESTER (Reappear)

Basic Electrical Engineering (EE-101C)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Distinguish between active and passive components. (1.5)

(b) Define statically induced emf and dynamically induced emf. (1.5)

(c) State Millman's theorem. (1.5)

(d) The equation of an alternating current is $i = 282.8 \sin 377\ t$. What is rms value of current and frequency? (1.5)

(e) What are the active and reactive powers? Draw the power triangle. (1.5)

(f) Define quality factor in the resonant circuit. (1.5)

(g) What are the advantages of three phase system over single phase system? (1.5)

(h) Define voltage regulation of transformer. (1.5)

(i) Which type of rotor is used in high speed alternators and why? (1.5)

(j) Why is commutator employed in DC machines? (1.5)

PART - B

2. (a) Calculate the current in each branch of the circuit shown in Fig-1. (8)

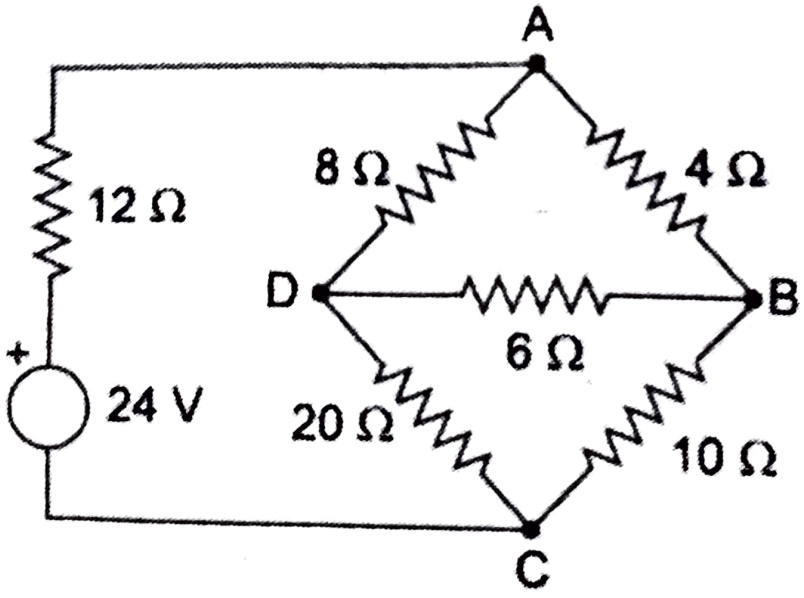

Fig-1

(b) How energy get stored in the magnetic field? Derive the expression for energy stored. (7)

3. (a) By using Thevenin theorem, find current through resistor 'R' connected between points 'a' and 'b' in the circuit shown in Fig-2. (8)

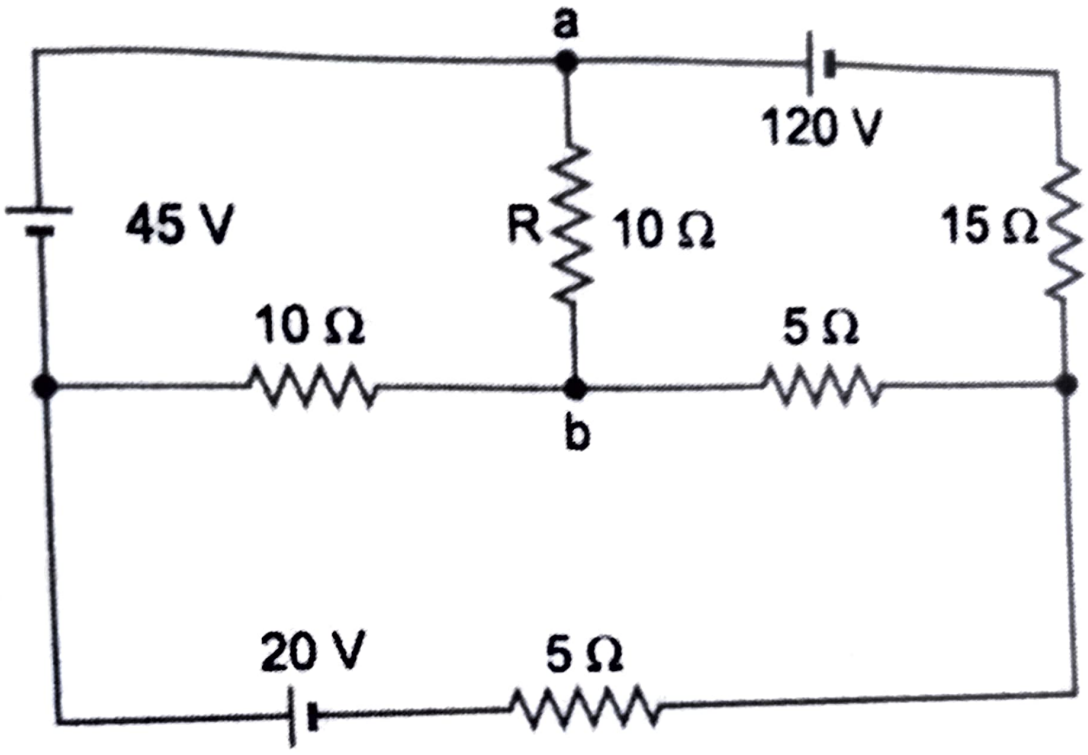

Fig-2

(b) State and explain maximum power transfer theorem. (7)

4. (a) An iron ring of mean length of 100 cm and cross-sectional area of 10 cm^2 has an air gap of 1 mm cut in it. It is wound with a coil of 100 turns. Assuming relative permeability of iron as 500, calculate the inductance of a coil. (8)

(b) Using superposition theorem, find voltage across 4 Ω resistance in Fig-3. (7)

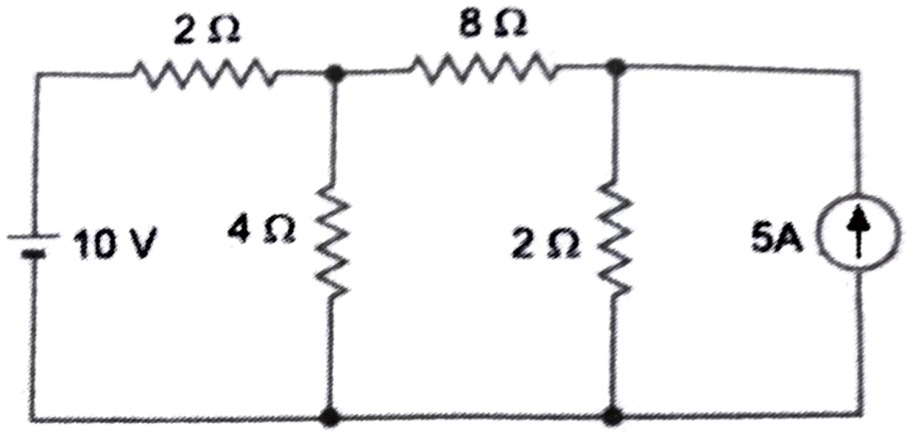

Fig-3

5. (a) Find the average and rms values of the sinusoidal waveform shown in Fig. 4. The maximum value is 100 V. (7)

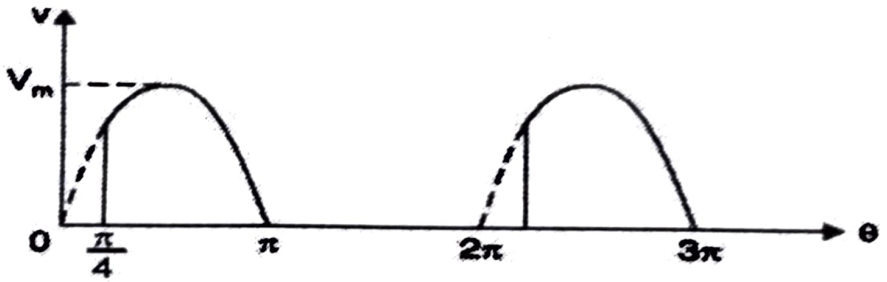

Fig-4

(b) In the circuit shown in Fig. 5, find the values of (i) the current I (ii) V1 and V2 and (iii) power factor. Draw the phasor diagram. (8)

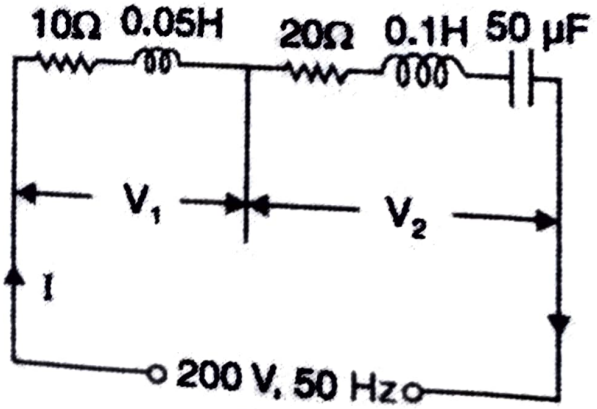

Fig-5

6. (a) Define resonance in parallel RLC circuit. Also, give the graphical representation of parallel RLC circuit in detail. (7)

(b) Three identical coils, each having a resistance of 8 Ω and a reactance of 6 Ω are connected in star, across 400 V, 3-phase supply. Find the line current and the readings on each of the two wattmeters connected to measure the power. (8)

7. (a) In a transformer explain how power is transferred from one winding to the other. Derive an expression for the emf induced in a transformer winding. (7)

(b) Why a starter is required to start a 3-phase induction motor? Explain the working of a direct-on-line starter with neat sketch. (8)

16/05/19 (M) EL-May-19 Duplicate

Sr. No.....

May 2019

B.Tech. 1/2 SEMESTER

Electrical Technology (E-105)

Time: 3 Hours | Max. Marks:60

Instructions:
1. *It is compulsory to answer all the questions (2 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART -A

Q1 (a) State limitations of ohm's law? (2)

(b) Define quality factor of a coil? (2)

(c) What are 1. Form factor 2. Peak factor (2)

(d) Explain reciprocity theorem? (2)

(e) Why double earthing is required for earthing of power equipment? (2)

(f) What is power factor? Discuss the practical importance of power factor? (2)

(g) What are the features of resonance in parallel circuits? (2)

(h) What are the advantages of three – phase system over single-phase system? (2)

(i) What is the function of commutator in DC machines? (2)

(j) Give three industrial uses of 3-phase induction motor? (2)

PART –B

Q2 (a) State and explain superposition theorem with its limitations? (10)

(b) Explain the difference between Nodal analysis and mesh analysis to solve a given network? (5)

Q3 (a) Differentiate between statically induced emf , and dynamically induced emf? (5)

(b) Determine rms value, average value, form factor and peak factor for full wave rectified sinusoidal voltage. (10)

Q4 (a) State and explain Millimens theorem using suitable example? (10)

(b) Deduce analogy between magnetic circuit and electric circuit. What are the major points of difference between them? (5)

Q5 (a) A coil of P.F. 0.8 is in series with a 100 microfarad capacitor. When connected to a 50 Hz supply the voltage across the capacitor is equal to the voltage across the coil. Find the resistance and inductance of the coil? (5)

(b) A parallel circuit consists of a coil having 15 ohm resistance and 300 mH inductance in parallel with a capacitor of capacitance 4 microfarad. Determine (1) the resonant frequency (2) Dynamic impedance of the circuit (3) Q-factor of the circuit at resonance. (10)

Q6 (a) Write down the relationship between line voltage and line current with phase voltage and phase current in star- connected circuits? (5)

(b) Three similar coils each having a resistance of 15 ohm and an inductance of 0.04 H are connected in star to a 3-phase 50HZ supply, 200 volts between the lines. Calculate the line current. If they are now connected in delta, calculate the phase current, line current and the total power absorbed in each phase. (10)

Q7 (a) Explain the construction, and working principle of single –phase transformer? (10)

(b) Explain why a synchronous motor is not self- starting and give one method of starting the synchronous motor? (5)

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Roll No. .....

80018

December, 2019
B.Tech. I SEMESTER Reappear
Basic of Electrical Engineering (EE-101C)

Time : 3 Hours

Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Assume the relevant data if required. Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Distinguish between unilateral and bilateral network. (1.5)

(b) Why transformer is also called the static transformer? (1.5)

(c) Give reason why power factor is important? (1.5)

(d) Define reactive power. (1.5)

(e) Explain the applications of Miliman's Theorem. (1.5)

(f) Draw slip-torque characteristics of three phase induction motor. (1.5)

(g) Make a comparison between magnetic and electric circuit. (1.5)

(h) Explain statically induced E.M.F. (1.5)

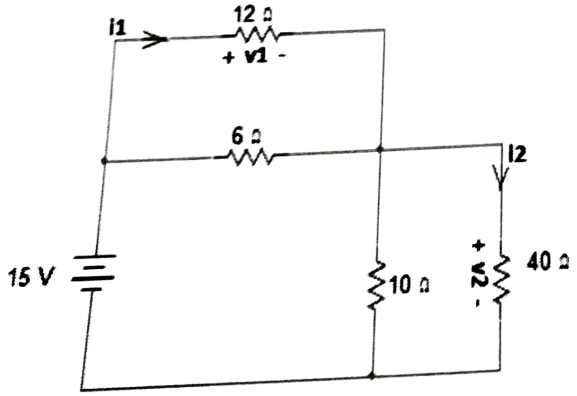
(i) Explain the advantages of three phase systems. (1.5)

(j) Find the Form Factor and Peak Factor of the sinusoidal alternating current. (1.5)

PART - B

2. (a) Prove that the area within the loop of a B-H curve represents the hysteresis loop. (7)

(b) Find i_1, i_2, v_1, v_2 and power dissipated in 12 ohms resistor. (8)



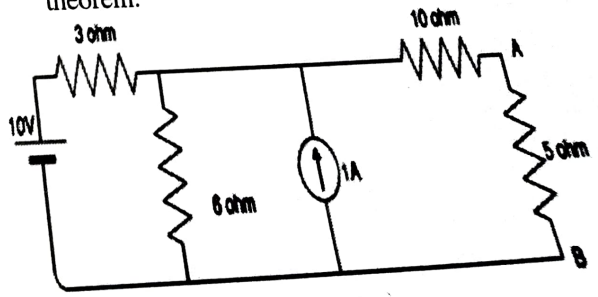
3. (a) A 230 V, 50 Hz ac supply is applied to a coil of 0.06 H inductance and 2.5 resistance connected in series with a 6.8 μF capacitor. Calculate (i) Impedance (ii) Current (iii) Phase angle between current and voltage (iv) Power factor. (8)

(b) Derive an expression for the average power consumed in resistive circuit. (7)

4. (a) Derive the expression of resonance frequency and impedance in case of parallel R-L-C circuit. (8)

(b) A coil of inductance 100 μH and of self-inductance 5 pF is magnetically coupled to another coil of inductance 200 μH and of self-inductance 10 pF. The co-efficient of coupling between the coil is 0.1. Calculate the effective mutual inductance between them at 1 MHz. (7)

5. (a) Find the current in the 5 ohms resistance using Norton's theorem. (8)



(b) State the maximum power transfer theorem. Show that the condition for maximum power transfer $R_L = R_{TH}$. Explain its importance. (7)

6. (a) Explain the various losses in d.c. machine. (8)

(b) Explain the open circuit and short circuit on single phase transformer with diagram and find the equation for regulation on transformer. (7)

7. Explain the Principle of operation, constructional features and applications of Synchronous Generator. (15)

Roll No. ..22021003123

Total Pages : 4

002202

July 2023

B.Tech. - II SEMESTER

Basic Electrical Technology (ESC-101-A)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) What is the significance of form factor and peak factor? (1.5)

   (b) What is the purpose of using laminated core in a transformer? (1.5)

   (c) State the Superposition theorem. (1.5)

   (d) Distinguish between active circuit and passive circuit. (1.5)

   (e) Define the voltage regulation of transformer. (1.5)

(f) What is the difference between dependent source and independent sources? (1.5)

(g) How do you make Single-Phase Induction Motor Self-Starting? (1.5)

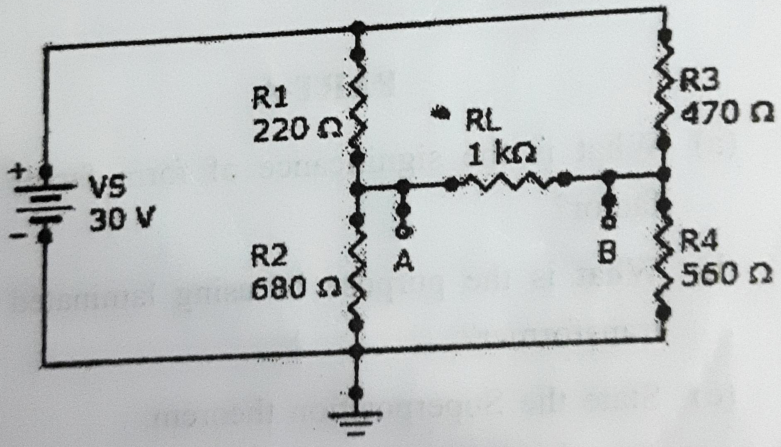
(h) How Back Emf is generated in a DC motor? What is the significance of back emf? (1.5)

(i) What are the advantages of three-phase system over single-phase system? (1.5)

(j) Explain the difference of fuse and MCB. (1.5)

PART–B

2. (a) Find the Thevenin equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given below. (7.5)



(b) A balanced three phase load consists of three coils each having resistance of 4 Ω and inductance 0.02 H. It is connected to a 415 V, 50 Hz, 3-phase ac supply. Determine the phase voltage, phase current,

power factor and active power when the loads are connected in (i) Star (ii) Delta. (7.5)

3. (a) Two wattmeters are connected to measure the total power in a three-phase balanced circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit, (i) When both the readings are positive. (ii) When the latter is obtained after reversing the connections to the current coil of one instrument. (7.5)

(b) State the maximum power transfer theorem. Derive the formula of maximum power for DC circuit. (7.5)

4. (a) Derive an expression for saving in conductor material in an autotransformer over two winding transformer of equal rating. State the advantages and disadvantages of Autotransformer over two winding transformer. (7.5)

(b) With the help of phasor diagram, explain the working of transformer at No-load condition. (7.5)

5. (a) Explain the constructional details and operating principle of DC motor. (7.5)

(b) Why synchronous motor is not self-starting. Explain it with suitable diagram. (7.5)

6. (a) A series circuit with R = 10 ohms, L = 0.1 H and C = 50 μF has an applied voltage V = 50 ∠ 0° V with a variable frequency. Find (i) the resonant frequency (ii) the value of frequency at which maximum voltage occur across inductor (iii) the quality factor of the coil. (7.5)

(b) Determine the RMS value, Average value, Form factor for a half wave rectified Sine wave. (7.5)

7. Write short note on :

(i) Earthing and its type.

(ii) Power factor Improvement. (7.5×2=15)

Roll No. .....

Total Pages : 4

300206

May 2019
B.Tech. IInd Semester
BASICS ELECTRICAL ENGINEERING
(ESC 101)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

(i) It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.

(ii) Answer any four questions from Part-B in detail.

(iii) Different sub-parts of a question are to be attempted adjacent to each other.

PART–A

1. (a) Differentiate dependent and independent sources with suitable example. (1.5) CO1

(b) Explain the duality between Thevenin's and Norton's equivalent circuits. (1.5) CO1

(c) Define power factor. (1.5) CO1

(d) What do you mean by phase and phase difference? (1.5) CO1

[P.T.O.

(e) Classify the losses in transformer. (1.5) CO2

(f) On what principle the synchronous generators operate? (1.5) CO2

(g) What is the function of commutator in DC machines? (1.5) CO2

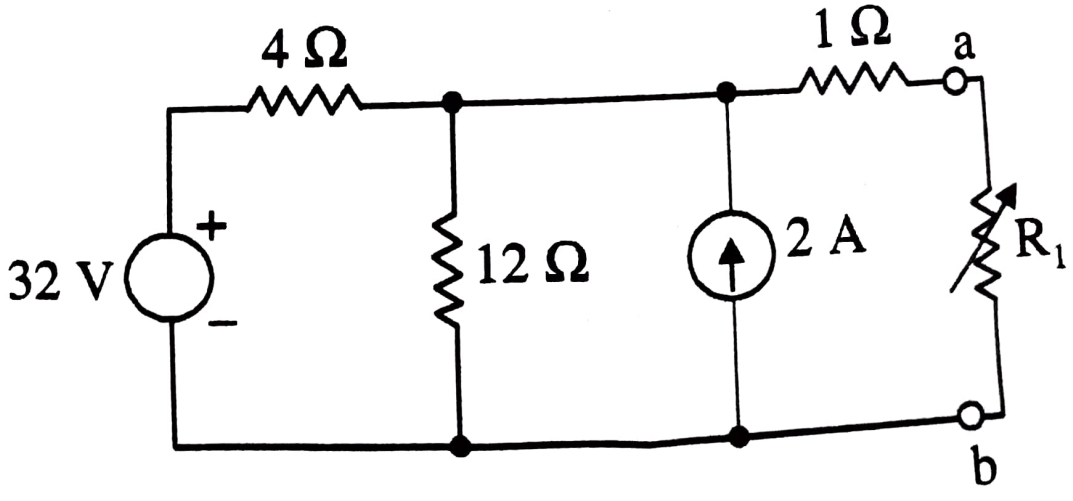
(h) What is sinusoidal Pulse width modulation? (1.5) CO2

(i) In what form is energy is stored in secondary battery. (1.5) CO3

(j) What is the purpose of earthing? (1.5) CO3

PART–B

2. (a) Find the current through R_L resistance using Norton's Theorem in figure 1. When R_L=16Ω. (7) CO1



(b) Find the current in each branch by using superposition theorem in figure 2. (8) CO1

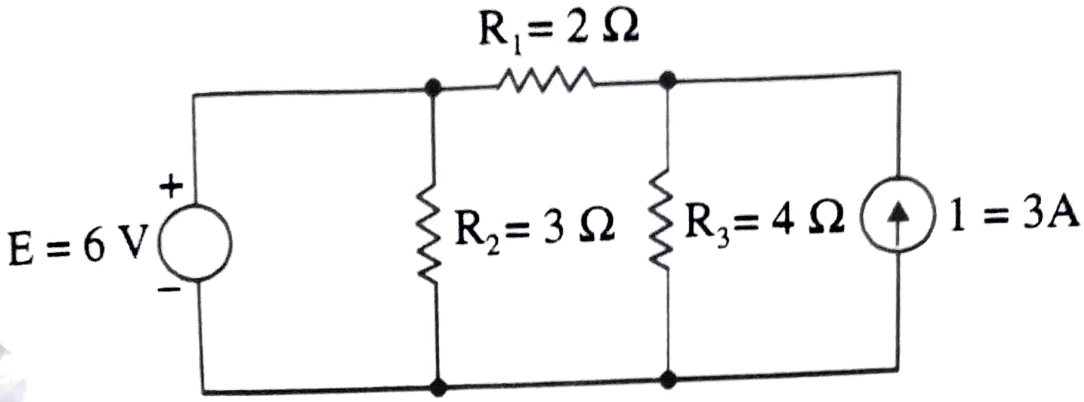


Figure 2

3. (a) Find the average value, rms value form factor and peak factor in case of half wave rectifier. (4) CO1

(b) A balanced delta connected load of $(12+j9)\Omega$ is connected to 3-phase 400 V supply. Find (i) Line current (ii) Power Factor (iii) Power drawn (iv) Reactive volt-amperes (v) Total volt-amperes. (5) CO1

(c) Explain working principle of autotransformer. What are its advantages, disadvantages and applications (6) CO2

4. (a) Derive the response of R-L-C series circuit with sinusoidal input. Also derive the condition for resonance for the same. (6) CO1

(b) Describe the working principle of transformer, and then derive the induced emf equation of a transformer. Define the efficiency and also draw the expression for maximum efficiency. (9) CO2

5. (a) Explain the construction and working of three phase induction motor. (7) CO2

(b) What is an inverter? Give the industrial application of inverters. Describe the working of single phase full bridge inverter with the help of voltage waveforms. (8) CO2

6. (a) Explain the working principle of power converters and discuss the control strategy for operation of converters. (7) CO2

(b) Explain the speed control methods of separately excited DC motor. (8) CO2

7. (a) Draw the circuit diagram of LT switchgear and explain each component in brief. (9) CO3

(b) Explain the operation of nickel-iron batteries and give its advantages and disadvantages. (6) CO3

Sr. No.001102

December 2023

B.Tech (AE/FAE) - I SEMESTER

Basic Electrical Engineering (EE-101C)

Time: 3 Hours **Max. Marks:75**

Instructions:

1. *It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Any other specific instructions*

PART -A

Q1 (a) Define dependent voltage source and draw the voltage dependent voltage source. (1.5)

(b) Discuss the Lenz's law. (1.5)

(c) Define coefficient of coupling in a magnetic circuit. (1.5)

(d) State the application of superposition theorem. (1.5)

(e) Describe the Millman's theorems. (1.5)

(f) Define the term bandwidth and selectivity. (1.5)

(g) Differentiate between balanced and unbalanced load (1.5)

(h) Write the application of DC motor. (1.5)

(i) Define the efficiency. (1.5)

(j) Write the relation between line current and phase current in delta connected load. (1.5)

PART -B

Q2 (a) State the faraday law of electromagnetic induction and explain the statically and dynamically induced emf with suitable example. (7.5)

(b) State and explain the Maximum power transfer theorem. (7.5)

Q3 (a) Explain the Kirchoff s voltage and current law with some suitable example. (7.5)

(b) State and explain the reciprocity theorem with suitable example. (7.5)

Q4 (a) A resistance R is connected in series with a parallel circuit comprising two resistances of 12 Ω and 8Ω respectively. The total power dissipated in the circuit is 70 W when the applied voltage is 20V. Calculate R. (7.5)

(b) Find the current following through 1Ω resistance using Thevenin,s theorem in figure(1) (7.5)

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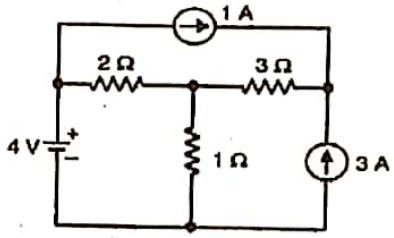

Figure (1)

Q5 (a) What is series resonance? Derive the expression for resonant frequency in R-L-C series circuit. (7.5)

(b) Explain working of auto transformer. What are the advantages of auto transformer over two winding transformers? (7.5)

Q6 (a) A 3-phase, 400 V, 50 Hz a.c. supply is feeding a 3-phase delta-connected load with each phase having a resistance of 25 Ω, an inductance of 0.15 H and a capacitor of 120 μF in series. Find line current, volt-amp, active power and reactive volt-amp. (7.5)

(b) Explain the principle of operation and constructional features of synchronous generator. (7.5)

Q7 (a) A resistance of 20 Ω and a coil of inductance 31·8 mH and negligible resistance are connected in parallel across 230 V, 50 Hz supply. Find (i) the line current (ii) power factor and power consumed by the circuit (7.5)

(b) Write the name of starting method of Induction motor and explain any one with suitable circuit diagram (7.5)

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Roll No. .....

Total Pages : 4

013102

December 2023

B.Tech. 1st SEMESTER

Basic Electrical Technology (ESC-101-A)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Assume data if missing.*

PART–A

1. (a) Differentiate independent and dependent sources. CO1 (1.5)

(b) What are the limitations of Ohm's law? CO1 (1.5)

(c) Define unilateral and bilateral circuits. CO1 (1.5)

(d) Define resonance in series RLC circuit. CO2 (1.5)

(e) Add $V_1 = (-10 + j\ 50)$ volts to $V_2 = (30 + j\ 20)$ volts and express the result in polar form. CO2 (1.5)

(f) What are the advantages of a three-phase AC system over single-phase? CO2 (1.5)

(g) What are the applications of auto-transformers? CO2 (1.5)

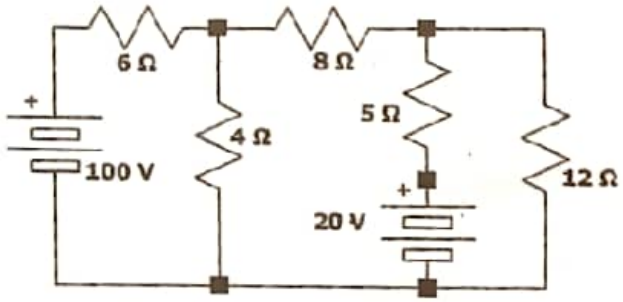
(h) Why brushes are made of carbon in a DC machine? CO3 (1.5)

(i) What is the function of a fuse in electrical installation? CO4 (1.5)

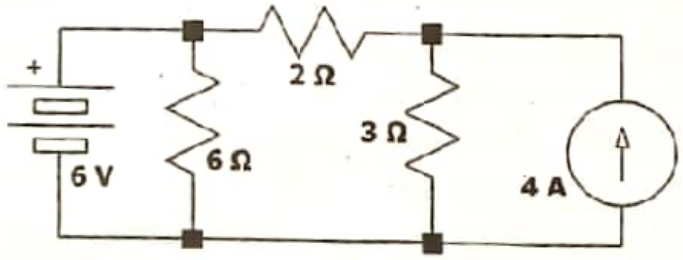
(j) Why earthing is necessary for electrical installations? CO3 (1.5)

PART–B

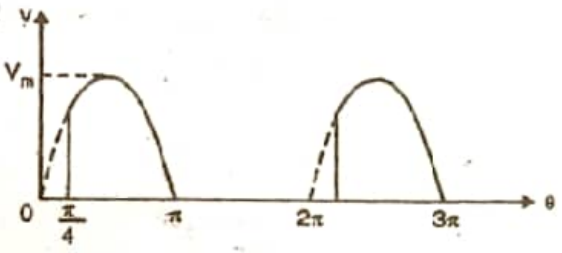
2. (a) Using node analysis determine the current in each resistor for the given circuit. CO1 (7.5)



(b) In the circuit shown in the figure, find the current in 2Ω resistor using the principle of superposition. CO1 (7.5)



3. (a) Find the average and effective values of the sinusoidal waveform shown in Figure. The maximum value is 100 V. CO2 (7.5)



(b) A 230V, 50 Hz a.c. supply is applied to a coil of 0.06 H inductance and 6-ohm resistance connected in series with a 6.8 μF capacitor. Calculate (i) impedance (ii) current (iii) phase angle between current and voltage (iv) power factor and (v) power consumed. CO2 (7.5)

4. (a) Derive the relationship between line and phase voltage and line and phase current for a star-connected three-phase system with suitable connection and phasor diagrams. CO2 (7.5)

(b) The power input to a 400 V, 3-phase, 50 Hz induction motor is measured by the two-wattmeter method. The readings of the two wattmeters are 40 kW and -10 kW. Calculate (i) the input power (ii) the power factor and (iii) line current. CO2 (7.5)

5. (a) Define the term magnetic circuit. What are the similarities and dissimilarities between magnetic and electric circuits? CO3 (7.5)

(b) Explain the working principle of a transformer. What are the properties of an ideal transformer? Draw and explain the phasor diagram of the single-phase transformer at no load condition. CO3 (7.5)

6. (a) Why is a synchronous motor not self-starting? What are the starting methods of synchronous motor? CO3 (7.5)

(b) Explain the construction and working of the miniature circuit breaker (MCB) with suitable diagram. CO4 (7.5)

7. (a) Define the term power factor. What are the effects of the low power factor? What are the methods of power factor improvement? CO4 (7.5)

(b) Define the maximum power transfer theorem. Derive the condition for maximum power transfer. CO1 (7.5)

Roll No. .....

Total Pages : 03

007201

May 2024

B.Tech. (EL/ECE/ENC/EEIOT) (Second Semester)

Basic Electrical Technology (ESC-101-A)

Time : 3 *Hours*] [*Maximum Marks* : 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Define Superposition Theorem. **1.5**

   (b) Write the formula for star to delta and delta to star conversion. **1.5**

   (c) Differentiate between instantaneous and RMS value of any signal. **1.5**

   (d) Why efficiency of transformer is high than machine ? **1.5**

   (e) Write the formula for Synchronous speed. **1.5**

   (f) Why rotor speed is less that synchronous speed ? **1.5**

(g) Write few examples of reactive loads. 1.5

(h) Define Switchgear. 1.5

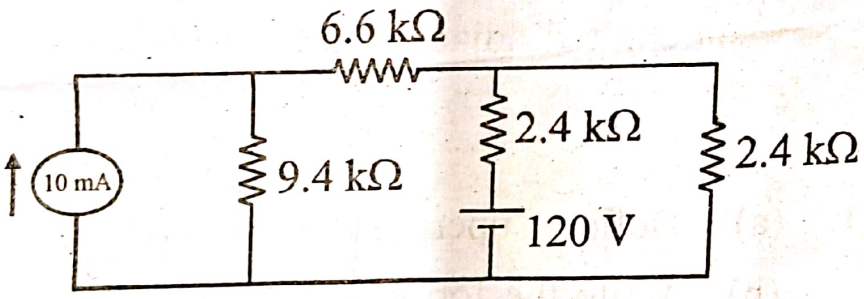
(i) How many winding are there in single-phase auto transformer ? 1.5

(j) Write few examples of capacitive loads. 1.5

Part B

2. (a) State the maximum power transfer theorem and explain its importance. 5

(b) For the network shown below find the current in 24 kΩ resistance : 10



3. (a) What do you mean by Power factor of a network ? Explain it in different terms. 5

(b) The two element series circuit is connected across an A.C. source of $v = 200\sqrt{2} \sin (314t + 20°)$ volt and the current flows through the circuit is $i = 10\sqrt{2} \cos (314t - 20°)$. Determine the parameters of the circuit. 10

(a) Why is Earthing required ? What are various type of earthings used for earthing of buildings ? Explain any *one*. 10

(b) Describe the following in brief :

Fuses, MCB, ELCB, MCCB. 5

5. (a) Define Transformer. Describe the applications of transformers. 5

(b) A single-phase 50 Hz transformer has rating of 80 kVA and voltage ratio of 3200/400 volt. It is known that there are 11 turns on the secondary winding. Calculate number of primary turns, full load primary current and maximum value of mutual flux in the core. 10

6. (a) Describe the method of measurement of 3-phase power by 2 wattmeter method. 10

(b) A balanced star connected load of $(8 + 6j)$ ohm per phase is connected to a 3-phase, 230 V, 50 Hz supply. Find the current and Power factor. 5

7. (a) Describe the construction and working of DC machine. 10

(b) Describe the magnetic locking principle of synchronous machine. 5

Sr. No.....

Sessional II

B.Tech./II SEMESTER

Basic Electrical Technology (ECE, EEIOT, ENC)

Time: 3 Hours | Max. Marks:30

Instructions:
1. *It is compulsory to answer all the questions (2 marks each) of Part -A in sho*
2. *Answer any two questions from Part -B in detail*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART -A

Q1 (a) What do you understand by Half power Bandwidth for a series Resonating circuit. (2)

(b) Why core of the transformer is laminated? (2)

(c) Write the advantages of a Three phase AC circuit over a single phase AC circuit. (2)

(d) What is the application of a parallel A C circuit. (2)

(e) How the transformer is called a static device? (2)

PART -B

Q2 (a) Describe the principle of operation of a single phase transformer using suitable diagram. (5)

(b) Draw the phasor diagram of a single phase transformer on load condition for inductive load. (5)

Q3 (a) Describe the condition of Parallel resonance using appropriate circuit diagram and waveforms. (5)

(b) A series R-C circuit consists of a resistance of 110 ohms and a capacitance of 50 micro farads is connected across 220 V,50Hz mains, calculate (i) Impedance, phase angle and power factor (ii) the current in the circuit. (iii) Voltage across resistance and capacitance (5)

Q4 (a) Explain the Two Wattmeter method of power measurement in a three phase AC circuit. (5)

(b) The load connected to a 3 phase supply comprises of three similar coils connected in star. The line current is 25 A. The KVA and KW inputs are 20 and respectively. Find the line and phase voltage and KVAR input. (5)

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J C Bose University of Science and Technology

Department of Mathematics

Second Sessional Test – September 2022

Subject: Mathematics I (BSC103E)

Course: B. Tech (Civil) **Semester: 1st**

Time allotted: 90 minutes **Maximum marks: 15**

Attempt all questions:

Each question carry equal marks.

1. Solve $y''-5y'+6y=e^{4x}$

J. C. Bose University of Science & Technology, YMCA Faridabad
Sessional-1st (B-Tech 2nd Semester Civil)
BASIC ELECTRICAL TECHNOLOGY (ESC 101A)

Time: 1:30 hrs M. Marks: 15

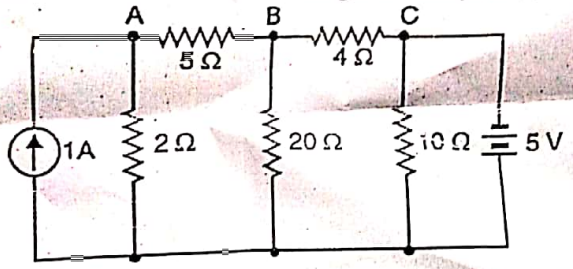
Note: Part –A is compulsory. Attempt any two questions from part-B

Part-A

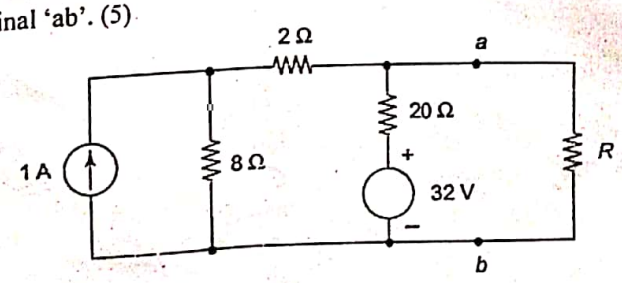
Q.1.a) Distinguish between bilateral and unilateral networks. (1)
b) State applications of maximum power transfer theorem? (1)
c) What are the limitations of ohm's law? (1)
d) Define dependent and independent sources. (1)
e) State superposition theorem. (1)

Part-B

Q.2.) Determine current in each branch using nodal analysis. (5)



Q.3) State and explain Thevenin's theorem with suitable example.(5)
Q.4) Find the Thevenin and Norton equivalents of the given circuit at terminal 'ab'. (5)

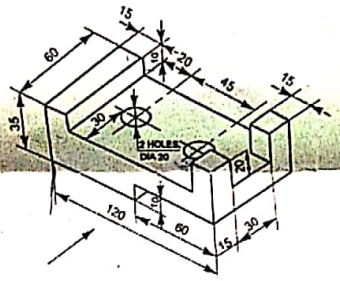


B.tech First semester ECE

Note : Attempt any four questions. Each question carries 10 marks

Time : 2hrs MM:40

1. A 70 mm long line PQ has an end P at 20 mm above the HP and 30 mm in front of the VP. The line is inclined at 45 degree to the HP. Draw the projections of line.
2. A cylinder with a 50 mm base diameter and a 65mm long has generator in the VP and is inclined at 45 degree to HP. Draw its projections.
3. Draw the orthographic projections of the figure given below in first angle projections.



4. Draw the isometric projections of the figure given below

August/September 2022

B.Tech - II SEMESTER

Basic Electrical Technology (ESC-101-A)

Time: 3 Hours | Max. Marks:75

Instructions:
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
2. Answer any four questions from Part -B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.
4. Any other specific instructions

PART -A

Q1 (a) Enumerate various limitations of ohms law. (1.5)[CO1]

(b) Convert 4A source with its parallel resistance of 15Ω into its equivalent voltage source. (1.5)[CO1]

(c) Differentiate between active and passive components. (1.5)[CO1]

(d) Define dynamic impedance. Also write its unit. (1.5)[CO2]

(e) Explain why a series resonance is called voltage resonance. (1.5)[CO2]

(f) List various applications of autotransformer. (1.5)[CO3]

(g) In case of power measurement by two-wattmeter method for 3-phase balanced load, under what conditions: the one wattmeter will give zero reading and whole of the power will be measured by the other wattmeter. (1.5)[CO2]

(h) List various methods of starting a single-phase Induction motor. (1.5)[CO3]

(i) What is the function of commutator in dc machines? (1.5)[CO3]

(j) Why earthing is provided? (1.5)[CO4]

PART -B

Q2 (a) Determine i_1, i_2 and i_3 using Nodal analysis for a given circuit shown in Fig.1. (8)[CO1]

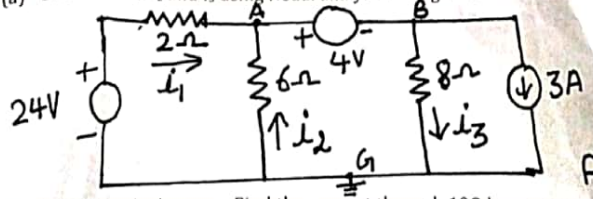


Fig.1.

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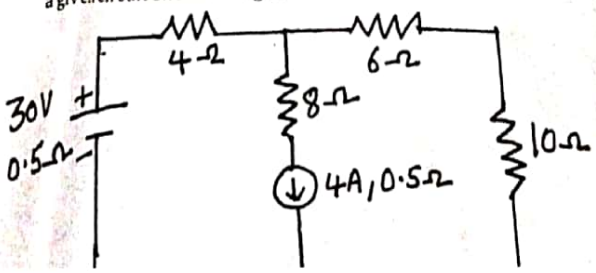
(b) State Norton's theorem. Find the current through 10Ω by using Norton's theorem for a given circuit shown in Fig.2. (7)[CO1]



Q3 (a) Find the average and effective values of voltage for sinusoidal waveform shown in Fig.3. (5)[CO2]

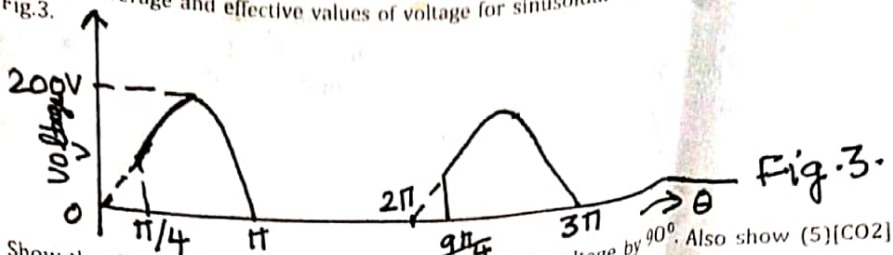


Fig.3.

(b) Show that in a purely inductive circuit current lags the voltage by 90°. Also show that the average power consumed by it is always zero. (5)[CO2]

(c) Draw resonance curve. Also define selectivity and Quality factor. (5)[CO2]

Q4 (a) Discuss two-wattmeter method for power measurement in three-phase system feeding balanced load. Derive the expression for the power delivered and power factor. (8)[CO2]

(b) A balanced three-phase star load impedance of (5-j10) ohms per phase and is supplied from a balanced three-phase 400V, 50Hz ac supply. Calculate the values for currents (v) total (7)[CO2]

J.C. Bose University of Science and technology, YMCA, Faridabad
B. Tech 2nd semester Civil Engineering
Sessional 2nd (Basic Electrical Technology)

Note: - attempt any three.

Q1. A three phase star connected load consists of three identical inductive coils of resistance 50Ω and inductance 0.3H. The supply voltage is 415V, 50 Hz. Calculate, (i) phase current, (ii) line current, (iii) power factor, and (iv) Total power consumed. (5)

Q2. Draw and explain the two wattmeter method of power measurement in a three phase circuit. (5)

Q3. Explain working of auto transformer. What are the advantages of auto transformer over two winding transformer? (5)

Q4. A coil in parallel with a 200μF is connected across a 200V, 50Hz supply. The coil takes 8A a loss in the coil is 960W.Calculate the following- (i) The resistance of the coil, (ii) The uctance of the coil, and (iii) Power Factor of the entire circuit. (5)

J. C. Bose University of Science & Technology, YMCA Faridabad

Sessional-1st (B.Tech 1st Semester Electronics)

BASIC ELECTRICAL TECHNOLOGY (ESC 101A)

Time: 1:30 hrs **Max. Marks: 15**

Note: Part-A is compulsory. Attempt any two questions from Part-B

Part-A

Q. 1. a) Define Cycle, Time period, Frequency and Phase difference in alternating quantity. (1)

b) Define Power triangle, Impedance triangle and Power factor? (1)

c) Derive condition of maximum power regarding Maximum power transfer theorem? (1)

d) What is the difference between active and passive elements & ideal current and ideal voltage sources? (1)

e) Define current division rule and voltage division rule with examples. (1)

Part-B

Q. 2) Derive RMS value (I_{rms}) and Average value (I_{av}) for Full and Half Sinusoidal waves. (5)

Q. 3) Find Thevenin and Norton models from Fig. 1 and hence find current flowing through 10 Ω resistor. (5)

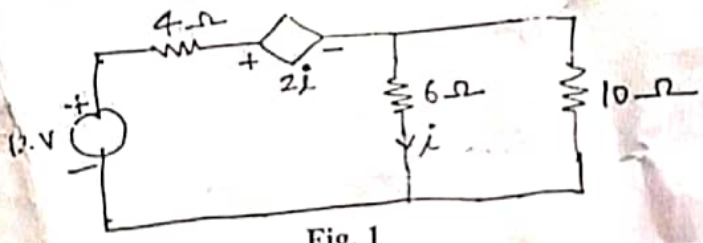


Fig. 1

Q. 4) From Fig. 2, find: (1) R_L such that maximum power will be transferred to R_L, (2) Value of this maximum power, (3) Power supplied by source under this condition and (4) maximum efficiency. (5)

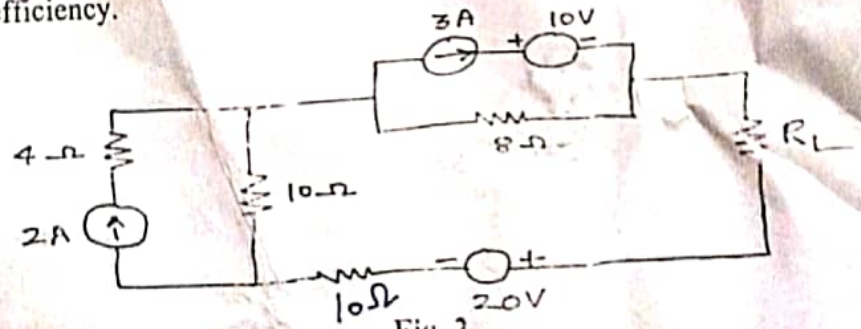


Fig. 2

Q. 5) State and define Superposition Theorem. Using Superposition Theorem find "I" in Fig. 3. (5)

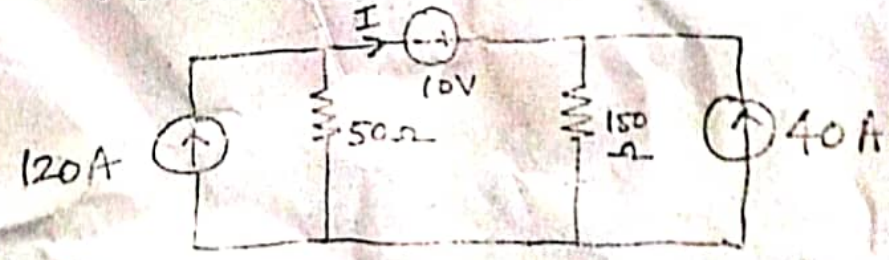


Fig. 3

Descriptive Questions

Sr. No.	Question	Unit
1.	Demonstrate Superposition, Thevenin and Nortons, Maximum Power Transfer Theorem	1
2.	Explain Ohm's law and write the properties of resistance (limitation)	1
3.	State and explain KVL, KCL With Example	1
4.	Explain Nodal And mesh analysis	1
5.	Define Average Value, RMS Value, Form Factor and Peak Factor	2
6.	Classify the types of AC Waveform.	2
7.	Explain why transformer rating in KVA but not KW.	4
8.	Define efficiency and regulation of a transformer.	4
9.	Write the principle of a Transformer and define turns ratio.	4
10.	Classify the types of losses in a transformer.	4
11.	Define ideal, practical and auto transformer.	4
12.	Explain the construction of a single phase transformer.	4
13.	Discuss in the detail the difference between the core type and shell type transformer.	4
14.	Derive emf equation of a Transformer.	4
15.	Define slip of induction motor.	5
16.	How can the direction of three phase induction motor be reversed.	5
17.	Why single phase induction motor are not self starting.	5
18	Draw torque slip characteristic's of induction motor.	5
19.	Explain the construction, working and principle of 3 phase induction motor.	5
20	Explain the construction, working and principle of DC Machines.	5
21	Explain the construction, working and principle of DC Generator.	5
22	List the various losses that take place in induction motor.	5
23	Explain the causes and effects of low power factor.	6
24	Define MCB, MCCB and ELCB.	6
25	Define fuse and its types.	6
26	Explain earthing and its importance.	6
27	Types of Earthing.	6
28	Difference Between phase and line voltages in three phase system	3
29	Define the terms phase sequence.	3
30	Explain single and two wattmeter method of power measurement in three phase AC system at balanced load. What are the effects of power factor on wattmeter reading.	3
31	Explain the advantages of three phase system.	3
32	What do you understand by active and passive elements, give examples.	1
33	What do you understand by unilateral and bilateral elements, ive examples.	1
34	Derive expression of resonance frequency for series R-L-C Circuit.	2

35	Explain power factor. What are the causes of low power factor. Explain methods of power factor improvements	2
36	Derive the relation between line current & phase current in case of three phase delta connected balanced load.	3
37	Give the advantage and disadvantage of three phase system.	3