

First semester

2012

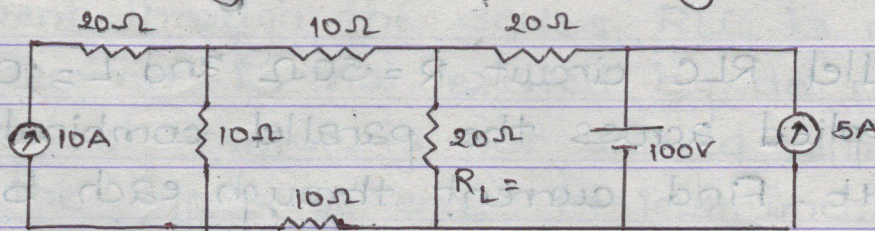
Electrical Engineering

Group 'A'

Answer three questions

3X10=30

Write the statement of Thevenin's theorem. Find current through R_L in the given network using thevenin theorem.



Find the complete expression for current through RLC series circuit when $V = V_m \sin(?)t$ is applied where $(?) = 2\pi f$, find resonance frequency and write the expression for bandwidth. Discuss resonance with suitable graph.

Discuss the working principle of single phase transformer under load condition and draw equivalent circuit. What are the parameters determined by short circuit test on single phase transformer.

Discuss the principle of torque production in DC machine and derive the expression for Torque.

Explain various methods of speed control for DC shunt motor.

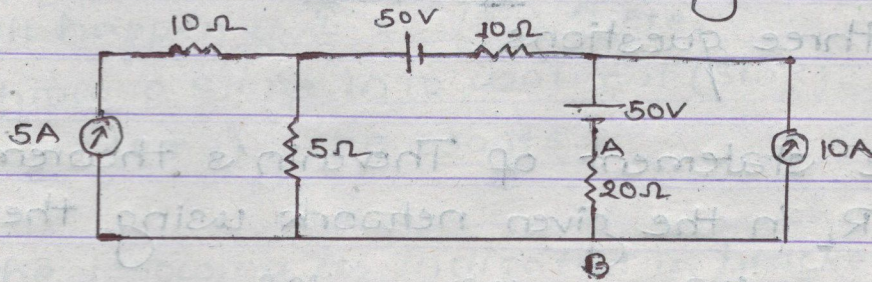
Group 'B'

Answer four questions

4X5=20

Calculate the direction and magnitude of the current through

20- Ω resistance between A and B using mesh analysis method.



6. For parallel RLC circuit $R = 50\Omega$ and $L = 10H$ and $C = 100\mu F$ and V applied across the parallel combination is $V = 100 \sin 314t$. Find current through each branch and total current and p.f.
7. A dc shunt generator delivers 100A at 220V. The armature winding resistance is 0.005Ω and field winding resistance is 100Ω . Calculate the emf generated by the armature.
8. Discuss the basic principle of induction type ammeter and voltmeter.
9. The parameter of a 230/230V 50Hz transformer are given below:
 $R_1 = 0.286\Omega$; $R_2' = 0.319\Omega$; $R_0 = 250\Omega$
 $X_1 = 0.73\Omega$; $X_2' = 0.73\Omega$; $X_0 = 1250\Omega$
 The secondary load impedance $Z_L = 0.387 + j0.29$.
 Solve the exact equivalent circuit with normal voltage across the primary.
10. What is hysteresis loss? Explain with suitable graph.

Group 'c'

Answer five questions

5x2=10

11. State Ohm's law.
12. What do you mean by temperature coefficient of resistance?
13. What happens when dc is applied across inductor?
14. When current through the series RLC is maximum.
15. Why transformer is not excited by dc mains.
16. Why dc shunt motor is not started with load.
17. What are the types of error in instruments.
18. Why laminated sheets of iron core are used in electrical machines.

First semester

2013

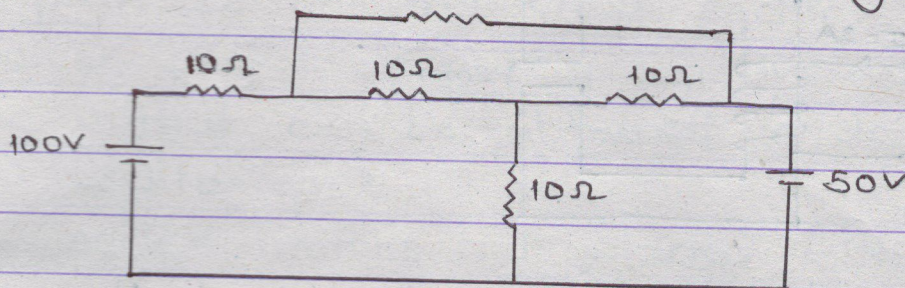
Electrical Engineering

Group 'A'

Answer three questions

$3 \times 10 = 30$

1. Find the current flowing through $6\ \Omega$ resistor by using mesh current analysis. Also find voltage drop across it.



2. Two coils having impedances of $(4 + 6j)\ \Omega$ and $(2 - 3j)\ \Omega$ are connected in parallel. If the combination is supplied by 230V voltage source. Calculate: (a) current through each branches, (b) the supply current, (c) total active and reactive power, (d) draw the phasor diagram showing voltage, branch currents and supply current.
3. Describe the losses and efficiency of transformer no loaded condition. Derive the relation in which efficiency of transformer is maximum.
4. What are the factors affecting the speed control under dc motor. Explain speed control of dc shunt motor.

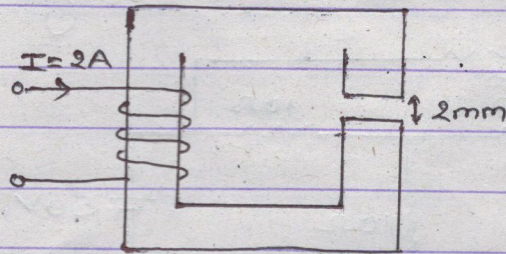
Group 'B'

Answer four questions.

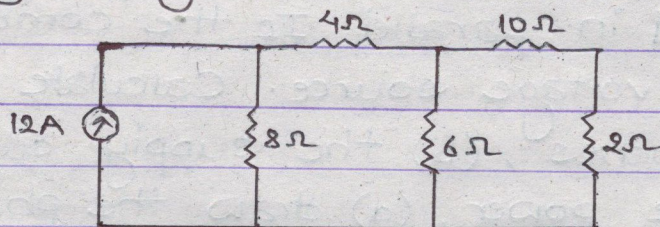
$4 \times 5 = 20$

1. Rectangular magnetic core shown in figure, has square

cross section area of $4\text{cm} \times 4\text{cm}$, air gap length is 2mm and length of the core is 80cm . Find the air gap flux when 2A current is fed to coil having 1000 number of turns. Given: the relative permeability of core is 2000.



6. For the network, calculate the current through 6 ohm resistor by using thevenin theorem.



7. Derive the necessary expression for rms value of sinusoidal waveform.
8. Explain the working principle transformer with loads.
9. Briefly discuss the operating principle of dc generator and explain the voltage build-up process in dc shunt generator.
10. How do you control the speed of dc shunt motor? Explain in detail.

Group 'C'

5X2=10

Answer five questions:

1. Why transformer core is made laminated
2. State Kirchoff's Voltage law.
3. Define form factor and crest factor
4. Why power factor of purely resistive load is one?
5. How dc output can be obtained in dc generator?
6. What is oscilloscope?
7. Why is series motors not started without load?
8. What do you mean by AC bridge?

PURBANCHAL UNIVERSITY

2016

Bachelor of Technology in Biotechnology / First Semester / Final

Time: 03:00 hrs.

Full Marks: 60 / Pass Marks: 24

BT120EL: Electrical Engineering (New/Old Course)

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

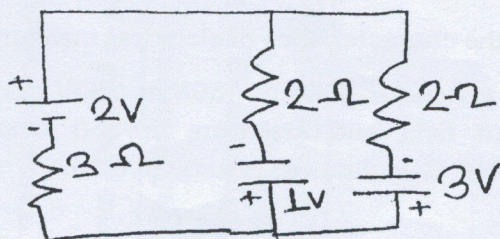
Figures in the margin indicate full marks.

Group A

Answer **THREE** questions.

3×10=30

- 1(a) State super position theorem with an example. Using super position theorem, find the current following through 3Ω resistor.



2. Discuss the phenomenon of magnetic hysteresis and hence find the expression for energy lost in one complete cycle. Why transformer is rated in KVA?
3. Derive the expression for series RLC circuit with necessary figures and mathematical expression. A resistor and capacitor are connected in a series across a 150 volt ac supply. When frequency is 40Hz, circuit draws 5A but when it is increase to 50Hz, it draws 6A. Find the values of resistance and capacitance.
4. Explain the operating principle of induction motor? Explain the characteristics of dc motor.

Group B

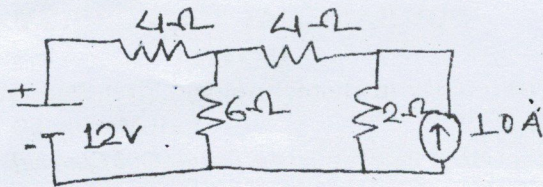
Answer **FOUR** questions.

4×5=20

5. State Thevenin theorem. Find the current following through 4Ω resistor.

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(2)



6. State and explain faradays laws of electromagnetic induction. Compare electric circuit and magnetic circuit.
7. Explain speed control of DC motor.
8. Explain the EMF equation of transformer? 1000/200V. transformer takes 0.3A at power factor of 0.2 on open circuit. Find the magnetizing and iron loss component of no load primary current.
9. Explain the characteristics of electrical measuring instruments.
10. A shunt generator delivers 450A at 230V and the resistance of the shunt field and armature are 50 Ohm and 0.03 Ohm respectively. Calculate the generated e.f.m.

Group C

Answer FIVE questions.

5×2=10

11. State KCL and Kvl.
12. How does capacitor and inductor behaves with DC source?
13. What are the significance of back EMF?
14. Thermal type instruments are better than induction type instruments for measuring voltage and current". Justify.
15. Explain armature reaction in DC generator.
16. Explain current divider rule with an example.
17. Define resonant frequency. What are the condition for series circuit resonant?
18. Derive the expression of maximum efficiency of transformer.

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PURBANCHAL UNIVERSITY

2018

Bachelor of Technology in Biotechnology / First Semester / Final

Time: 03:00 hrs.

Full Marks: 60 / Pass Marks: 24

BT120EL: Electrical Engineering (New/Old Course)

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

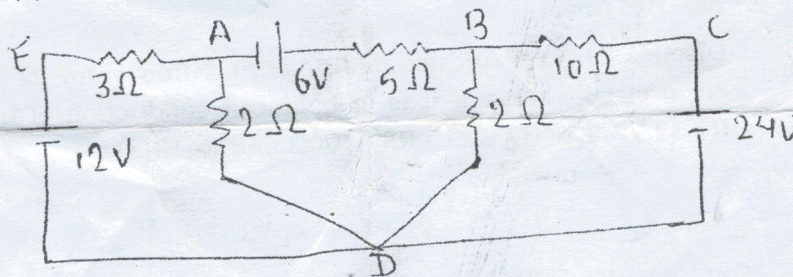
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Group A

Answer **THREE** questions.

3×10=30

- 1(a) Describe nodal analysis for network and hence use it to find 4+6
(i) Current through 3Ω and 10Ω resistors
(ii) Voltage across AB



2. Find the complete expression for current through RLC series circuit when $V = V_m \sin \omega t$ applied where $\omega = 2\pi f$. Find the resonant frequency and write the expression for bandwidth. Discuss resonance with suitable diagram. **5+5**
3. Discuss the working of single phase transformer under no load condition and draw equivalent circuit. What are the parameters determined by short circuit test on single phase transform? 3+7
4. Discuss briefly, about the working of dc generators and its types in detail. **4+6**

Group B

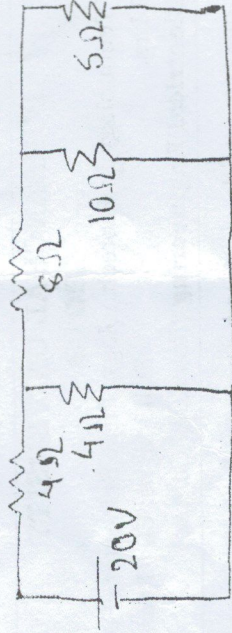
Answer **FOUR** questions.

4×5=20

5. State Norton's theorem of Network analysis and use it to find current through 5Ω resistor.

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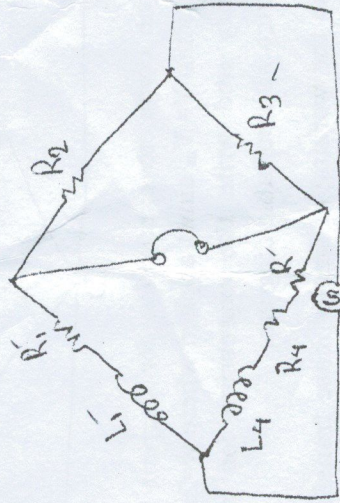
(2)



6. Derive the necessary expression for rms value of sinusoidal wave form.

7. A ring composed of three sections of cross-sectional area 0.001m^2 each. The mean arc length $l_a = 0.3\text{m}$, $l_b = 0.2\text{m}$ and $l_c = 0.1\text{m}$. An air gap of length 0.1 is cut in the ring. μ for sections a, b, & c are 5000 , 1000 and $10,000$ respectively. Flux in the air gap is 7.5×10^4 wb. Find (i) mmf (ii) exciting current if the coil has 100 turns.

8. Discuss Maxwell induction bridge and find value of L_a in the given circuit below if it is in balanced conduction of bridge and $R_1 = 32.72$, $L_1 = 47.8\text{mH}$, $R_3 = 100\Omega$ and $R = 136\Omega$.



9. How do you control the speed of shunt motor? Explain in detail.
10. Consider a 20 kva , $2200/220\text{ V}$, 50 Hz transformer. The $0.5/\text{S.C.}$ test results are as follows.

O.S test: 220V , 4.2A , 148 watt (low voltage side)

S.C. test: 86V , 10.5A , 360 Watt . (High voltage side)

Determine the regulation of 0.8 Pf tagging and at full load..What is P.f. on short circuit?

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(3)

Group C

Answer FIVE questions.

$5 \times 2 = 10$

11. Which type of resonant circuit is used in tanning of radio and why?
12. What do you mean by eddy current? Write its one application.
13. What is oscilloscope? Explain in short.
14. Which type of iron either soft or hard is used to make electromagnet and why?
15. State motor effect and Flemings left hand rule.
16. Draw sketch of capacitive reactance and inductive reactance versus frequency for comparison.
17. The algebraic sum of voltages across inductor, capacitor and resistor in LCR series circuit is not equal to supplied voltage, Why?
18. In what aspect series wound generators differs from shunt wound generators?