



## NARASIMHA REDDY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad

Accredited by NAAC with A Grade, Accredited by NBA

### **DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

#### **QUESTION BANK**

**Course Title** : Basic electrical & electronics engineering  
**Course Code** : 23EE401  
**Regulation** : NR23 (NRCM – NR23 Autonomous Syllabus)

#### **Course Objectives**

1. To introduce the concepts of electrical circuits and its components.
2. To understand magnetic circuits, DC circuits and AC single & three phase circuits.
3. To study and understand the different types of DC/AC machines and Transformers.
4. To impart the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.

#### **Course Outcomes (CO's)**

<b>CO1</b>	To <b>Analyze</b> , and <b>solve</b> electrical circuits using network laws and theorems
<b>CO2</b>	To <b>understand</b> and <b>analyze</b> basic Electric and Magnetic circuits
<b>CO3</b>	To <b>study</b> the working principles of Electrical Machines
<b>CO4</b>	To <b>introduce</b> components of Low Voltage Electrical Installations

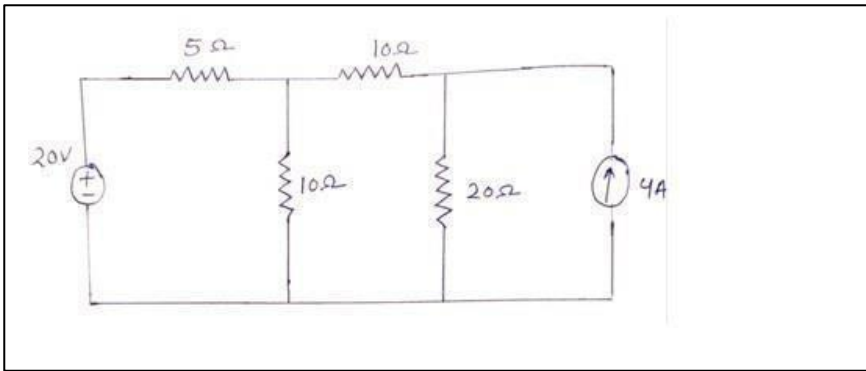
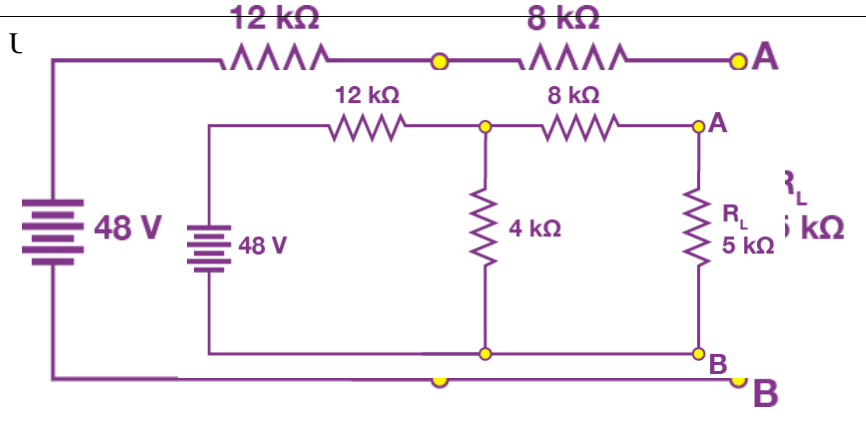
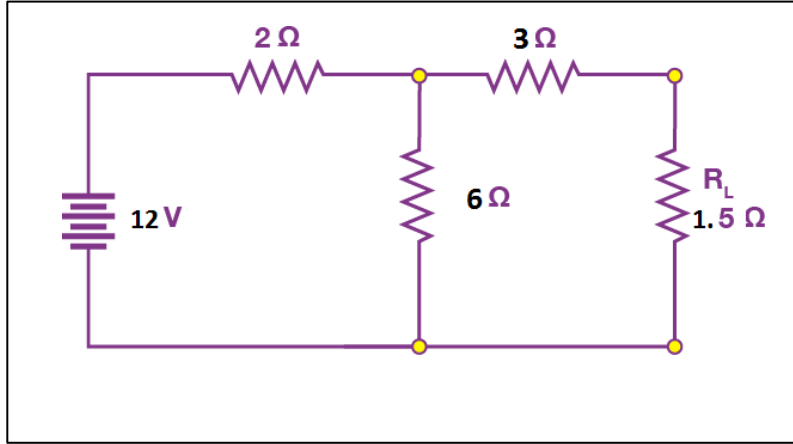
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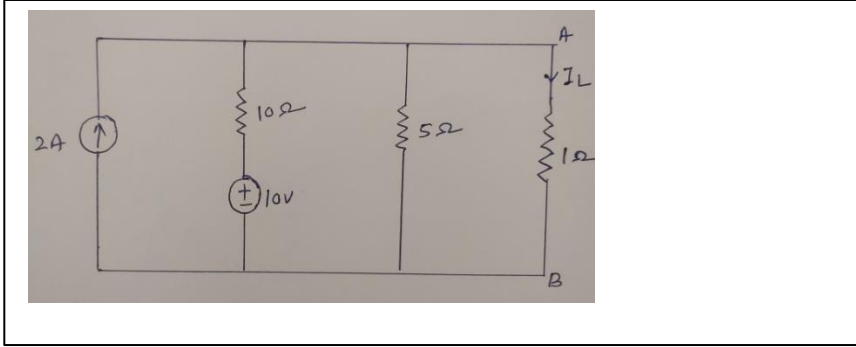
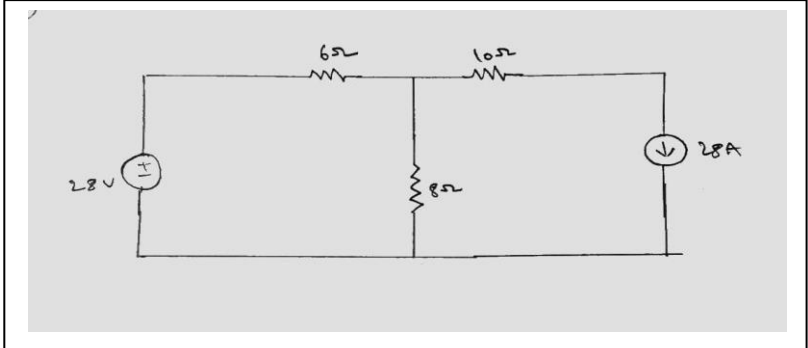
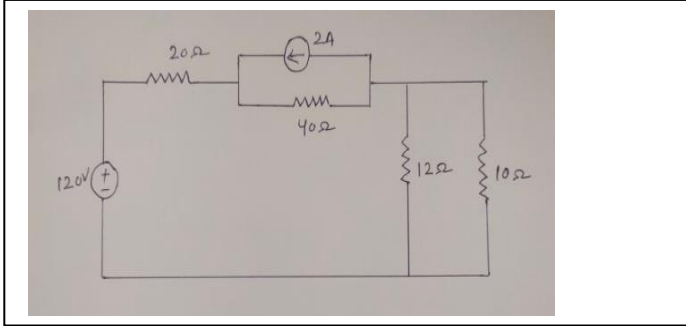
UNIT-1

**D.C. Circuits**

PART- A (SHORT ANSWER QUESTIONS)

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	Define charge, voltage, current ,power and circuit.	BT2	CO1	PO1
2	State Ohm's law?	BT1	CO1	PO1
3	State Kirchhoff's current law (KCL).	BT2	CO1	PO1
4	State Kirchhoff's voltage law(KVL).	BT2	CO1	PO1
5	Distinguish between a mesh and loop of a circuit.	BT3	CO1	PO2
6	State Thevenin's theorem.	BT3	CO1	PO2
7	State Norton's theorem.	BT2	CO1	PO2
8	State Superposition theorem.	BT2	CO1	PO1
9	What is the difference between linear circuit and non linear circuit ?	BT2	CO1	PO2
10	What are the limitations of Ohm's law?	BT3	CO1	PO1
<b>Part – B (Long Answer Questions)</b>				
11	a) Three resistors: $R_1=5\Omega$ , $R_2=10\Omega$ , $R_3=15\Omega$ are connected in parallel across a DC voltage source: 100V. Find the currents $I_1$ , $I_2$ , $I_3$ through $R_1$ , $R_2$ , $R_3$ and the total current supplied by 100V source?	BT3	CO1	PO2
	b) Discuss resistor, inductor, capacitor with relevant expression?	BT2	CO1	PO2

12	<p>a) Using the superposition theorem calculate the total current in the given circuit?</p> 	BT4	CO1	PO2
	<p>b) Explain about different types of energy sources?</p>	BT3	CO1	PO3
13	<p>a) State and explain Thevenin's theorem?</p>	BT3	CO1	PO2
	<p>b) </p>	BT2	CO1	PO2
14	<p>a) State and explain Norton's theorem?</p>	BT3	CO1	PO2
	<p>b) Using the Norton's theorem calculate <math>I_N</math>, <math>R_N</math> &amp; Voltage across 1.5ohm resistor?</p> 	BT3	CO1	PO3
15	<p>a) Explain expression for time domain analysis of 1st order series RL circuit?</p>	BT2	CO1	PO2

	b)	Write about difference between Voltage source & Current source?	BT3	CO1	PO2
16	a)	State and explain Kirchhoff's laws?	BT2	CO1	PO2
	b)	Explain Ohm's law with limitations?	BT2	CO1	PO2
17	a)	Using the Thevenin's theorem calculate the current in 1ohm resistor?	BT3	CO1	PO3
					
	b)	Using the superposition theorem calculate the current in 8 ohm resistor?	BT3	CO1	PO3
					
18		Using the Norton's theorem calculate Voltage across 10 ohms resistor?	BT3	CO1	PO3
					
19)	(a)	Explain expression for time domain analysis of first order series RC circuit.			
	(b)	State and explain superposition theorem.			

		Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>					
1		What is phasor diagram?	BT2	CO2	PO2
2		What is reactance and inductive reactance?	BT1	CO2	PO1
3		What is the relation between resistance ,reactance and impedance?	BT3	CO2	PO2
4		What is resonance?	BT3	CO2	PO2
5		What is resonant frequency and write the expression for it?	BT2	CO2	PO3
6		Define resonance and parallel resonance.	BT2	CO2	PO1
7		Define real power and reactive power.	BT1	CO2	PO1
8		What are advantages of 3 phase system over 2 phase system?	BT3	CO2	PO2
9		Define apparent power and power factor.	BT3	CO2	PO2
10		Explain the concept of balanced load.	BT2	CO2	PO3
<b>Part – B (Long Answer Questions)</b>					
11	a)	Explain following terms1)frequency 2) maximum power 3) time period 4)power factor	BT3	CO2	PO2
	b)	Explain active, reactive, apparent power with relevant equations?	BT3	CO2	PO3
12	a)	A voltage of 50v with 50HZ frequency is applied to a series RLC circuit with R=100 ohm, L=0.5H and C=40microfarad. Determine i) impedance ii) current iii) power factor iv) phase angle between voltage and current	BT3	CO2	PO2
	b)	Explain about Series Resonance and derive an expression for its bandwidth	BT3	CO2	PO2
13	a)	An alternate current is given by $i=141.4\sin(314t)$ . find i)maximum value ii)frequency iii)Time period	BT2	CO2	PO2
	b)	Write the difference between series & parallel Resonance?	BT3	CO2	PO3
14	a)	Explain about three phase balanced circuits?	BT3	CO2	PO2
	b)	Explain behavior of series RLC circuit?	BT2	CO2	PO1
15	a)	Explain behaviour of series RL circuit and write the expression for voltage,current,power and phasor diagram.	BT3	CO2	PO2
	b)	Explain about series RC circuit and derive expression for voltage,current,power and draw phasor diagram.	BT2	CO2	PO2
16	a)	Explain about balanced & un balanced system ?	BT2	CO2	PO3
	b)	Explain advantages of three phase system over single phase system?	BT2	CO2	PO2

UNIT-2

**Electrical Installations**

S.No	Questions	BT	CO	PO
<b>Part – A (Short Answer Questions)</b>				
1	What is the difference between wire and cable?	BT2	CO5	PO2
2	What is earthing?	BT2	CO5	PO2
3	What is the difference between earthing and grounding?	BT1	CO5	PO3
4	What are the types of circuit breaker?	BT1	CO5	PO2
5	What is battery back up?	BT2	CO5	PO2
6	What is miniature circuit breaker(MCB)?	BT1	CO5	PO2
7	Why fuse is used in a circuit?	BT2	CO5	PO2
8	What are the disadvantages of using fuses?	BT2	CO5	PO1
9	What is earth leakage circuit breaker(ELCB) and what are the types of ELCB?	BT2	CO5	PO2
10	What is the main objective of earthing?	BT3	CO5	PO2
<b>Part – B (Long Answer Questions)</b>				
11	a) What are the types of earthing used in electrical wiring?	BT 2	CO5	PO3
	b) Compare MCB with MCCB?	BT 2	CO5	PO2
12	a) Explain construction and working principle of MCB?	BT 1	CO5	PO2
	b) State various types of batteries and their applications?	BT 2	CO5	PO2
13	a) What are the drawbacks of low power factor, describe how it is improved?	BT 1	CO5	PO2
	b) Mention advantages and disadvantages and applications of MCB?	BT 3	CO5	PO2
14	a) What are the different types of wires and cables? Explain.	BT 2	CO5	PO1
	b) Explain important characteristics of batteries?	BT 1	CO5	PO2
15	a) Briefly explain about fuse?	BT 1	CO5	PO2
	b) Explain working of ELCB?	BT 1	CO5	PO3
16	a) Explain about Power factor measurement using two watt meter method?	BT 3	CO5	PO2
	b) A consumer uses 10 KW geezer, 6 KW electric furnace & five 100 W bulbs for 15 hours .How many units (KWHr) of electrical energy have	BT 3	CO5	PO2

UNIT-3

**Electrical Machines**

<b>Part – A (Short Answer Questions)</b>					
1		What are the advantages of three phase motor over single phase motor?	BT1	CO4	PO1
2		what are the advantages of induction motor?	BT2	CO4	PO2
3		What happens when induction motor run at synchronous speed?	BT2	CO4	PO2
4		What is synchronous speed?	BT2	CO4	PO2
5		Draw the equivalent circuit of induction motor.	BT2	CO4	PO3
6		Describe the methods of starting of three phase induction motor?	BT1	CO4	PO2
7		What is direct-on-line starting of induction motor?	BT2	CO4	PO2
8		What are the advantages of slip ring induction motor over squirrel cage motor?	BT2	CO4	PO2
9		Why can not three phase induction motor run at synchronous speed?	BT1	CO4	PO1
10		Define voltage regulation of alternator.	BT2	CO4	PO2
<b>Part – B (Long Answer Questions)</b>					
11	a)	Explain construction of 3-phase induction motor.	BT2	CO4	PO2
	b)	Explain the working principle of 3-phase induction motor.	BT1	CO4	PO2
12	a)	Explain the construction, working principle of single phase Induction motor.	BT2	CO4	PO2
	b)	Define significance of torque slip characteristics of 3-phase induction motor.	BT2	CO4	PO3
13	a)	Explain speed control of induction motor.	BT2	CO4	PO2
	b)	Explain different methods of starting of squirrel cage induction motor.	BT2	CO4	PO3
14	a)	Explain torque, full load torque, starting torque and no load torque.	BT1	CO4	PO2
	b)	State starting methods of three phase induction motor and explain any of them in details.	BT1	CO4	PO2
15	a)	Explain equivalent circuit for single phase induction motor.			
	b)	Explain working of double cage induction motor and its equivalent circuit.			
16	a)	Derive the EMF equation for the alternator?			
	b)	Explain construction and working of synchronous generator.			

## Program Outcomes (PO)

1	<b>Engineering knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
2	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.



12	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
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Prepared By: E.SATEESH

Asst prof, **EEE**



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