

Code: 23ES1202

**I B.Tech - II Semester – Supplementary Examinations  
DECEMBER 2025**

**BASIC ELECTRICAL & ELECTRONICS  
ENGINEERING  
(Common for EEE, ECE, CSE)**

Duration: 3 hours

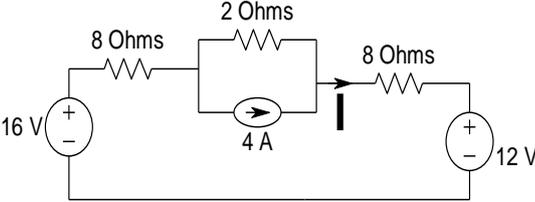
Max. Marks: 70

- Note: 1. This question paper contains two Parts: Part-A and Part-B.  
 2. Each Part contains:
- 5 short answer questions. Each Question carries 1 Mark and
  - 3 essay questions with an internal choice from each unit. Each question carries 10 marks.
3. All parts of Question paper must be answered in one place.

**PART – A**

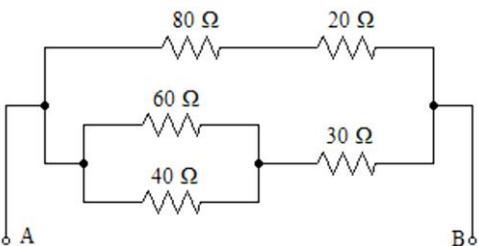
1.a)	Define Active Power and Reactive Power.
b)	Outline the applications of dc stunt motor.
c)	State the differences between moving iron instruments and moving coil instruments.
d)	Explain about Conventional Energy sources.
e)	What is the power rating of Air Conditioner and Fan?

		Max. Marks
<b>UNIT-I</b>		
2	<p>a) For the network shown in Fig. 1 find the mesh current <math>I_1</math>, <math>I_2</math> and <math>I_3</math>.</p> <div style="text-align: center;"> </div> <p style="text-align: center;"><b>Fig. 1</b></p>	5 M

	<p>b) Find the current 'I' through 2 Ω resistor using the superposition theorem for the circuit shown in Fig. 2 below as per the steps below:</p> <p>i) Calculate the current through 2Ω when 16V source alone is active.</p> <p>ii) Calculate the current through 2Ω when 4A source alone is active.</p> <p>iii) Calculate the current through 2Ω when 12V source alone is active.</p> <p>iv) Find the total or actual current through 8Ω resistor when all the sources are active using superposition theorem principle.</p> <div style="text-align: center;">  </div>	5 M
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**Fig. 2**

**OR**

3	<p>a) Find the equivalent Resistance between terminals A and B shown in Fig. 3.</p> <div style="text-align: center;">  </div>	5 M
	<p>b) Derive the average and RMS value of a sine wave and also explain about Peak Factor and Form Factor.</p>	5 M

**UNIT-II**

4	<p>a) Describe the Construction and working principle of a Transformer with a neat sketch.</p>	5 M
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	b)	Describe the construction and working of PMMC instrument.	5 M
<b>OR</b>			
5	a)	Describe the Construction and working principle of an Induction Motor with a neat sketch.	5 M
	b)	With a neat sketch, explain the construction and working of moving iron instrument. Give the torque equation.	5 M
<b>UNIT-III</b>			
6	a)	Explain the Layout and operation of Hydel power generating station.	5 M
	b)	How does a nuclear plant work? Explain with a neat sketch.	5 M
<b>OR</b>			
7	a)	Explain the working principle and construction of fuse and MCB.	5 M
	b)	Explain the different types of earthing systems with a neat diagram.	5 M

### PART – B

1.f)	How is a PN diode formed?
g)	Explain the operation of a PNP transistor.
h)	What is the necessary of the coupling capacitor?
i)	Compare parallel adder with serial adder.
j)	Write the names of basic logical operators.

			Max. Marks
<b>UNIT-I</b>			
8	a)	What is a list of key milestones in the evolution of electronics from vacuum tubes to nanoelectronics and their impact on technology?	5 M

	b)	Explain the operation of PN junction diode under forward bias and reverse bias conditions with the help of V-I characteristics curve.	5 M
<b>OR</b>			
9	a)	Distinguish between PN Junction diode and Zener diode.	5 M
	b)	With the neat sketch, Explain the operation of an NPN transistor and PNP transistor.	5 M
<b>UNIT-II</b>			
10	a)	Explain the Block diagram description of a dc power supply with a detailed explanation of all blocks.	5 M
	b)	With the help of a neat diagram explain the operations of positive and negative half cycles.	5 M
<b>OR</b>			
11	a)	What is a Voltage Regulator? How the Zener Diode works as a Voltage Regulator?	5 M
	b)	Draw the block diagram of Public Addressing System and explain the function of each block.	5 M
<b>UNIT-III</b>			
12	a)	Explain about Logic gates with symbols and truth table.	5 M
	b)	Convert the $(555)_{10}$ into binary, octal and Hexadecimal number systems.	5 M
<b>OR</b>			
13	a)	Explain a full adder circuit.	5 M
	b)	Design a 4 bit synchronous counter using JK flip flops.	5 M