

Code: 23ES1103

I B.Tech - I Semester – Supplementary Examinations - JULY 2024

**BASIC ELECTRICAL & ELECTRONICS
ENGINEERING
(Common for CE, ME, IT, AIML, DS)**

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 Inductance.
1.b)	What is RMS (Root Mean Square) Value?
1.c)	Express the Torque Equation of a PMMC.
1.d)	Mention the principle of motor.
1.e)	Calculate the electricity bill amount for a month of 31 days, if 1 fridge of 300 watts for 24 hours is used. Given the rate of electricity is Rs. 2 per unit.

		Max. Marks
UNIT-I		
2	a) Find the current i using superposition theorem for the circuit shown in Fig. <div style="text-align: center; margin: 10px 0;"> </div>	5 M

	b)	In a series circuit containing pure resistance and a pure inductance, obtain the voltage and current relationship with phasor diagram and explain how to calculate the average power drawn by the circuit and power factor?	5 M
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OR

3	a)	Calculate the r.m.s. value, the form factor and peak factor of a periodic voltage having the following values for equal time intervals changing suddenly from one value to the next : 0, 5, 10, 20, 50, 60, 50, 20, 10, 5, 0, -5, -10 V etc. What would be the r.m.s value of sine wave having the same peak value?	5 M
	b)	The lamps in a set of decoration lights are connected in series. If there are 20 lamps and each lamp has resistance of 25Ω , calculate the total resistance of the set of lamp and hence calculate the current taken from a supply of 230 volts.	5 M

UNIT-II

4	a)	Explain the principle of operation of transformer.	5 M
	b)	Illustrate the construction and working principle of Attraction type Moving Iron (MI) Instruments.	5 M

OR

5	a)	Describe the construction and principle of operation of a 3-phase induction motor with neat sketch.	5 M
	b)	Discuss the working principle of Wheat Stone Bridge.	5 M

UNIT-III			
6	a)	Distinguish between conventional and non-conventional sources of energy.	5 M
	b)	Explain the working principle of Fuse. Mention its merits and demerits.	5 M
OR			
7	a)	Outline the Solar power generation.	5 M
	b)	Analyze significance of Earthing and its types.	5 M

PART – B

	1.f)	What is cut in voltage of a PN diode?	
	1.g)	Define Active region of a BJT.	
	1.h)	Mention the difference between rectifier and regulator.	
	1.i)	What is public address system?	
	1.j)	State the applications of flip-flops.	

			Max. Marks
UNIT-I			
8	a)	Explain the input and output characteristics of NPN transistor when operated in Common Emitter mode.	5 M
	b)	What do you understand by avalanche breakdown process in reverse bias PN junction diode?	5 M
OR			
9	a)	What is Zener diode? Explain its VI characteristics in forward and reverse bias.	5 M
	b)	Compare CB, CE, CC configurations of a BJT.	5 M

UNIT-II			
10	a)	Illustrate the block diagram of Regulated Power supply with waveforms.	5 M
	b)	Explain the working of Full wave rectifier with capacitor input filter with relevant diagrams.	5 M
OR			
11	a)	Illustrate the block diagram of an electronic instrumentation system.	5 M
	b)	Outline the basic components of a public address system.	5 M
UNIT-III			
12	a)	Implement the full adder using half adders and OR gate.	5 M
	b)	Distinguish between registers and counters.	5 M
OR			
13	a)	Outline the error correcting codes with suitable examples.	5 M
	b)	Analyze about the AND, OR, NOR & NAND logic gates with respective truth tables.	5 M