Ref. No. Ex/ME(M2)/ES/B/EE/T/114/2023

B.E. Mechanical Engineering 1ˢᵗ year, 1ˢᵗ semester EXAMINATION, 20 23

(1ˢᵗ/2ⁿᵈ Semester/~~Repeat~~/Supplementary/~~Annual/Bi-Annual~~)

SUBJECT.... Basic Electrical Engineering ....

(Name in full)

PAPER..

Full Marks 100

Time : ~~Two hours~~/Three hours/~~Four hours/Six hours~~

(50 marks for each part)

Use a separate Answer-Script for each part

No. of questions	Part-I Answer any three questions, two marks for organized answer (16 X 3=48 +2=50)	Marks
1. a)	What is the relation between permeability of a material and reluctance of the magnetic circuit?	4
b)	Explain the Hysteresis Curve (B-H) of a magnetic material from Domain-Theory of Magnetism point of view.	7
c)	An iron ring of mean length 30 cm has an air gap of 2 mm and winding of 200 turns. If the permeability of the iron core is 300 when a current of 1A flows though the coil, find the flux density.	5
2. a)	Compare the Electric Circuit with Magnetic Circuit.	8
b)	A steel magnetic circuit has a uniform cross-sectional area of 20 cm^2 and a length of 200cm. A coil of 1000 turns is wound uniformly over the magnetic circuit. When the current in the coil is 4A, the total flux is 1mWb , when the current is 6A, the total flux is 1.2 mWb. For each value of current, calculate the (a) magnetic field strength and (b) relative permeability of the steel.	8
3. a)	Explain the working principles of Moving Coil & Moving Iron type instruments? Also mention, how those two types of meters can be differentiated by visual inspection.	12
b)	How can you classify measuring instruments?	4

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Form A: Paper-setting Blank   Ref. No...Ex/ME(M2)/ES/B/EE/T/114/2023

B.E. Mechanical Engineering 1st year, 1st semester EXAMINATION, 20 23

(1st/2nd Semester /~~Repeat/Supplementary/Annual/Bi-Annual~~)

SUBJECT.... Basic Electrical Engineering ....
(Name in full)

PAPER...

Full Marks 100

Time : ~~Two hours~~/Three hours/~~Four hours/Six hours~~   **(50 marks for each part)**

No. of questions			Marks
4.	a)	What are the four fundamental parameters generally considered while characterizing a measuring instrument?	5
	b)	Give some examples of renewable and non-renewable energy sources.	3
	c)	What do you mean by deflecting (or operating) torque, Controlling (or restoring) torque; and damping torque for indicating type measuring instruments?	8
5.	a)	What are the fundamental components of power system?	3
	b)	Discuss how the electrical power is evacuated from a generating station to the distributor, with the help of a schematic diagram.	13

B.E. MECHANICAL ENGINEERING FIRST YEAR FIRST SEMESTER EXAMINATION, 2023
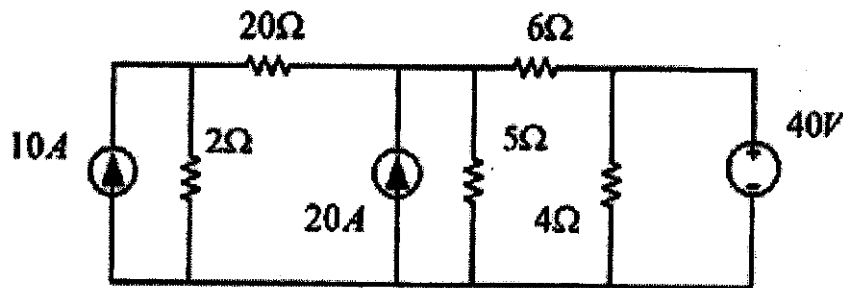
SUBJECT : BASIC ELECTRICAL ENGINEERING

Full Marks -100

Time : Three hours
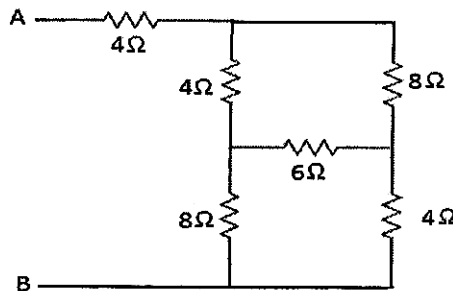
Use a separate Answer-Script for each part

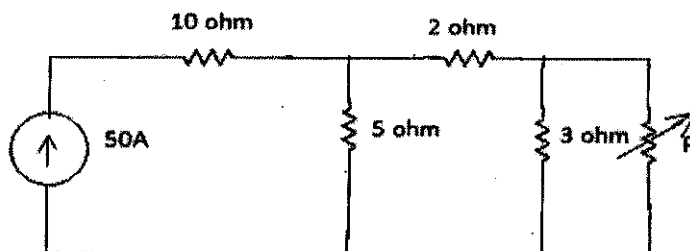| No. of question	Part II (50 Marks) **Answer any three questions**(*2 marks reserved for neat and well-organized answer*)	Marks
1. a)	What is the principle of superposition theorem? Discuss its limitations.	6
b)	Find the current through 20 ohm and 6 ohm resistances, in the network shown below. 	10
2. a)	Find the equivalent resistance between terminals A and B in the following circuit. 	6
b)	State maximum power transfer theorem. Find the value of resistance R (shown in the figure below) for which it will consume maximum power and also find the maximum power. 	10
3. a)	Find the values of the form factor and crest factor for a purely sinusoidal waveform.	4

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B.E. MECHANICAL ENGINEERING FIRST YEAR FIRST SEMESTER EXAMINATION, 2023

SUBJECT : BASIC ELECTRICAL ENGINEERING

Full Marks -100

Time : Three hours

Use a separate Answer-Script for each part

b)	Two impedances 14+j5 ohm and 18+j10 ohm are connected in parallel across a 200V, 50 Hz supply. Determine (a) the admittance of each branch and of the entire circuit; (b) the total current, power and power factor; and (c) the capacitance which, when connected in parallel with the original circuit will make the resultant power factor unity.	12
4. a)	A coil of power factor 0.6 is in series with a capacitance of 100 micro-farad. When connected to a 230V, 50 Hz supply, the potential drop across the coil is equal to the potential drop across the capacitor. Find the resistance and inductance of the coil.	6
b)	What is power factor in an AC circuit? Relate power factor with the circuit parameters of a circuit supplied by a purely sinusoidal single phase AC voltage source.	5
c)	A voltage of $e = 10\ sin(50\pi t)\ V$ has been applied to a circuit to deliver a current of $i = 3\ sin(50\pi t - 60^0)\ A$. Find the active and reactive power drawn by the circuit.	5
5. a)	Explain the phenomenon of electrical resonance in AC series R-L-C circuits.	6
b)	Find the r.m.s. and average values of current i in ampere as shown in the figure below.	10