U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 19EE5PE2UP **Max Marks: 100**
Course: Utilization of Electric Power

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	CO	PO	Marks
1	a)	State and explain the laws of Illumination.	CO1	PO1	06
	b)	Define the following terms and mention their units i) Luminous flux ii) Luminous Intensity	CO1	PO1	06
	c)	Two similar lamps having uniform intensity of 500 candle power in all directions below the horizontal are mounted at a height of 4 meters. What must be the maximum spacing between the lamps so that the illumination on the ground midway between the lamps shall be at least one half the illumination directly under the lamps?	CO4	PO3	08
		UNIT - II			
2	a)	Explain ultra-sonic welding with neat sketch.	CO1	PO1	06
	b)	The power required for dielectric heating of a slab of resin 150 cm^2 in area and 2 cm thick is 200 W, frequency of 30 MHz. the material has a relative permittivity of 5 and pf of 0.05. Determine the voltage necessary and current flowing through the material. If the voltage is limited to 600 V, what will be the value of frequency to obtain the same heating?	CO4	PO3	08
	c)	With neat sketch, explain Ajax-Wyatt induction furnace.	CO1	PO1	06
		UNIT - III			
3	a)	With neat sketch explain the parts of electric train.	CO2	PO1	10
	b)	Speed time curve of a train consists of a) uniform acceleration of 5 kmphps for 20 sec. b) free running for 5 minutes. c) Uniform deceleration of 5 kmphps to stop the train. d) A stop of 10 minutes. Find the distance between the trains, average speed and scheduled speed.	CO3	PO3	10
		OR			
4	a)	Derive an expression for specific energy output using simplified speed time curve.	CO2	PO2	10

		b)	An electric train weighing 200 tonnes runs a uniform up gradient of 1% with the following speed time curve: i) Uniform acceleration of 2 kmphps for 30 seconds. ii) Coasting speed for 40 seconds. iii) Coasting for 30 seconds. iv) Braking at 2.5 kmphps to rest. v) Stop at stations for 15 seconds. If the tractive resistance is 40 N/tonne, rotational inertia effect 10% of dead weight and overall efficiency of transmission and motor is 75%, determine: a) Distance between two stations. b) Schedule speed. c) Specific energy consumption. Total energy consumption.	***CO3***	***PO3***	**10**
			UNIT - IV			
	5	a)	Explain in brief about any three protection schemes for electric drive systems.	***CO3***	***PO2***	**10**
		b)	Explain the operation of AC traction drive using PWM voltage source inverter induction motor drive with a provision for dynamic braking.	***CO2***	***PO2***	**10**
			UNIT - V			
	6	a)	Explain in detail the concept of hybrid electric drive trains.	***CO3***	***PO2***	**10**
		b)	Discuss in detail about various resistances that opposes the movement of a vehicle.	***CO3***	***PO2***	**10**
			OR			
	7	a)	With block diagram, explain series architecture of hybrid electric vehicle.	***CO2***	***PO2***	**10**
		b)	Discuss characteristics of a typical variable speed electric motor used in electric vehicle with a neat diagram.	***CO3***	***PO2***	**10**

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