U.S.N.										

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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: V**

Branch: Electrical & Electronics Engineering **Duration: 3 hrs.**

Course Code: 19EE5PE1EA **Max Marks: 100**

Course: Electrical Energy Conservation and Auditing

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

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Define Tariff. Mention the objectives of tariff. Explain the desirable characteristics of a tariff.	CO1	PO1	10
	b)	(i) A generating station has a maximum demand of 10MW and the daily load on the station is as follows: **Time** / **KW**: 11 PM-6AM: 2000; 6 AM-8AM: 3500; 8 AM-12 Noon: 8000; 12 Noon-1 PM: 3000; 1 PM-5 PM: 7500; 5 PM-7 PM: 8500; 7 PM-9 PM: 10000; 9 PM- 11 PM: 4500 Choose the size and number of generator units. What reserve plant would be necessary. Find the load factor, plant factor and plant use factor of the station. Also draw up the operating schedule.	CO1	PO2	10
		OR			
2	a)	Define the following terms: i) Capacity factor. ii) Average load. iii) Load Curve. iv) Load Factor. v) Group diversity factor.	CO1	PO1	10
	b)	(i) A 100 MW power station delivers 100 MW for 2 hours, 50 MW for 6 hours and is shut down for the rest of each day. It is also shut down for maintenance for 45 days each year. Calculate its annual load factor.	CO1	PO2	04
	c)	List and explain various energy sources available. What are the percentage of energy distribution in India.	CO2	PO1	06

			UNIT - II			
	3	a)	Define Energy Management. Explain the importance and role of energy management.	**CO2**	**PO7**	**10**
		b)	Classify and explain methods for energy conservation methods.	**CO2**	**PO7**	**10**
			OR			
	4	a)	Mention the various measures taken in motivation for energy conversation.	**CO2**	**PO1**	**05**
		b)	Explain the environmental consideration strategy for energy conservation and importance of global need to save energy.	**CO2**	**PO7**	**10**
		c)	Explain the Energy management importance.	**CO2**	**PO7**	**05**
			UNIT - III			
	5	a)	Explain the energy conservation in i) Transport sector. ii) Agriculture sector.	**CO2**	**PO7**	**10**
		b)	Analyse the power consumption and savings for the following data: i) Total number of Tube lights with 60W is: 8 no. and 3 hours daily usage. ii) Total number of fans with 70W rating is 6 no. and 12 hours daily usage. iii) Refrigerator (Single door), 230 liters capacity=800W and 24 hours daily usage. iv) Other Appliances: Mixer grinder =900W and 2hrs daily usage. **By using Energy Efficient Equipment** i) Total number of Tube lights with 25 W is: 8 no. and 3 hours daily usage. ii) Total number of Energy Efficient fans with 40W rating is 6 no. and 12 hours daily usage. iii) Refrigerator reduce the number of openings of fridge door and using Energy Efficient (5 star rating) = 500W and 24 hours daily usage. iv) Other Appliances: Mixer grinder =300W and 2hrs daily usage. **Find the total energy savings in number of units.**	**CO2**	**PO2**	**10**
			OR			
	6	a)	Identify as well as suggest Energy Conservation measures adopted for i) Sugar industry ii) Cement industry	**CO2**	**PO7**	**10**

		b)	Analyse the power consumption and savings for the following data: i) Total number of Tube lights with 80W is: 8 no. and 3 hours daily usage. ii) Total number of fans with 90W rating is 6 no. and 12 hours daily usage. iii) Refrigerator (Single door), 230 litres capacity=1000W and 24 hours daily usage. iv) Other Appliances: Mixer grinder =1100W and 2hrs daily usage. **By using Energy Efficient Equipment** i) Total number of Tube lights with 30 W is: 8 no. and 3 hours daily usage. ii) Total number of Energy Efficient fans with 35W rating is 6 no. and 12 hours daily usage. iii) Refrigerator reduce the number of openings of fridge door and using Energy Efficient (5 star rating) = 600W and 24 hours daily usage. iv) Other Appliances: Mixer grinder =500W and 2hrs daily usage. **Find the total energy savings in number of units.**	**CO2**	**PO2**	**10**
			UNIT - IV			
	7	a)	Analyse the power consumption and savings for the following Domestic sector: i) Heating: Electric Iron: 1500W, 3 hours daily usage. ii) Entertainment: Television=300 W, 13 hours daily usage. iii) Water Pump 1 HP=1500W and 2 hours daily usage iv) Air conditioner 1.5 Ton=3000W and 7hrs per day. By using Energy Efficient Equipment i) Heating: Electric Iron 1000W, 3 hours daily usage. ii) Energy efficient Plasma TV, 130W, 13 hours daily usage. iii) With controllers and sensors in water pump = 800W , 2 hours daily iv) 5 star AC=1800 W and 7hrs per day.	**CO3**	**PO2**	**10**
		b)	Define Energy Audit. Why energy audit is necessary and what are their types. Explain any one in detail.	**CO3**	**PO1**	**10**
			OR			
	8	a)	Briefly explain the objectives of periodic progress review for optimization of energy use.	**CO3**	**PO1**	**06**
		b)	Describe the energy audit procedure followed for a HVAC system. How can heat recovery system help energy conservation?	**CO3**	**PO1**	**08**

		c)	Explain Instruments used in Energy Audit. (i) Lux meters (ii) Speed Measurement device.	**CO3**	**PO1**	**06**
			UNIT - V			
	9	a)	The total demand of an area keeps changing depending on the time of day and season. With the help of load management concept, explain the various load control techniques adopted for the same.	**CO4**	**PO1**	**08**
		b)	Explain the application of load control methods for optimum use of energy.	**CO4**	**PO1**	**06**
		c)	Describe the steps involved in Demand side Management.	**CO4**	**PO1**	**06**
			OR			
	10	a)	Explain Demand side Management (DSM) Through Time of day and power factor Tariff.	**CO4**	**PO1**	**10**
		b)	Define Demand side Management. What are the factors that influence customer acceptance of DSM..	**CO4**	**PO1**	**10**

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