U.S.N.										

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

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VIII**

Branch: Institutional Elective **Duration: 3 hrs.**

Course Code: 22EE8OE3EC **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.

		UNIT - I	*CO*	*PO*	Marks
1	a)	A power station is to supply three regions of load whose peak loads are 20MW, 15MW and 25MW. The annual load factor is 50% and group diversity factor is 1.5. Determine the following i) Maximum Demand on station ii) Installed capacity suggesting number of units iii) Annual energy supplied	*CO1*	*PO2*	**06**
	b)	Define i) Demand Factor ii) Plant Utilization Factor	*CO1*	*PO1*	**04**
	c)	Draw the typical load curve for the various types of energy consumer sectors. With examples, mention the Demand factor in each case.	*CO1*	*PO2*	**10**
		OR			
2	a)	Electrical energy supply and demand in India has been a great challenge from recent past. What are the main reasons for power crisis in India? What are initiatives taken up to solve these issues?	*CO1*	*PO1*	**10**
	b)	Compute the monthly bill and unit energy cost for a total consumption of 1050kWh and a M.D. of 15kw using Hopkinson's Demand rate: **Demand rates:** First kW of M.D is Rs.14per kWper month Next 3 kW M.D is Rs.11 per kWper month Next 5 kW M.D is Rs.10 per kWper month Over and above this M.D is Rs.9per kWper month **Energy rates:** First 50kWh at 20p/kWh Next 60kWh at 18p/kWhr Next 300kWh at 17 p/kWh Next 390 kWh at 15p/kWh Excess over this is at 12p /kwh	*CO1*	*PO2*	**06**

		c)	Define Tariff. Mention the types of Tariff.	*CO1*	*PO1*	**04**
			UNIT - II			
	3	a)	Enumerate the Energy Management techniques adopted for conservation of energy to implement the energy management processes? Mention the importance of the EMS.	*CO2*	*PO1*	**10**
		b)	Explain the methods that may be adopted for energy conservation in i) Commercial sector ii) Transport sector	*CO2*	*PO2*	**10**
			OR			
	4	a)	Energy management plays a key role to save energy for future. According to you what are the major problems Globally to implement the conservation programs? Enumerate the Energy Management Strategies adopted for conservation of energy to implement the energy management processes?	*CO1*	*PO1*	**10**
		b)	Explain the methods that may be adopted for energy conservation in i) Agriculture sector ii) Household sector	*CO2*	*PO1*	**10**
			UNIT - III			
	5	a)	Analyze the power consumption and savings for the following: i) Total number of Ceiling fans with 65W rating is 4 no. and 5 hours daily usage. ii) Total number of T12Tube lights with 60W is: 8 no. and 10 hours daily usage. iii) Desktop computer=250W, 10 hours daily usage iv) Water pump 1 HP 1.5 hours daily v) Entertainment: Television= 180W, 8 hours daily usage. **By using Energy Efficient Equipment** i) Total number of Energy Efficient Ceiling fans with 40 W rating 4 no. and 5 hours daily usage. ii) Total number of T5Tube lights with 20W is: 8 no. and 10 hours daily usage. iii) Desktop computer by laptop =65W, 10 hours daily usage iv) Water pump 1 HP 1.5 hours daily v) Energy efficient Plasma TV, 126W,8 hours daily usage.	*CO2*	*PO2*	**06**
		b)	Cement industry is an energy intense industry. What are the measures taken to conserve energy in cement industry? Explain briefly.	*CO2*	*PO1*	**06**
		c)	Explain briefly, the principles of Energy conservation	*CO2*	*PO1*	**08**
			OR			
	6	a)	What are the Issues and Remedy, Protection and Safety, Mitigating energy losses?	*CO2*	*PO1*	**06**
		b)	Analyze the power consumption and savings for the following: i) Total number of T12Tube lights with 60W is: 8 no. and 9 hours daily usage. ii) Total number of Ceiling fans with 65W rating is 6 no. and7 hours daily usage. iii) Iron box=85W, 0.5 hours daily usage iv) Water pump 1 HP 2 hours daily	*CO2*	*PO2*	**06**

			v) Entertainment: Television= 180W, 6 hours daily usage. **By using Energy Efficient Equipment** i) Total number of T5Tube lights with 20W is: 8 no. and 9 hours daily usage. ii) Total number of Energy Efficient Ceiling fans with 50 W rating 6 no. and7 hours daily usage. iii) Energy efficient iron box =65W, 0.5 hour daily usage. iv) Water pump 1 HP 2 hours daily v) Energy efficient Plasma TV, 126W,6 hours daily usage			
		c)	Explain the process of energy conservation in small scale industries	*CO2*	*PO1*	**08**
			UNIT - IV			
	7	a)	i) Explain the various techniques followed for energy auditing of a HVAC system. ii) List and briefly explain the various heat recovery system possible for HVAC system	*CO3*	*PO2*	**10**
		b)	Energy audit is a part of overall energy management program headed by an energy manager. Elaborate the duties carried out by the Energy management team.	*CO3*	*PO2*	**06**
		c)	List the instruments used for i) Lighting ii) Humidity iii) Chemical measurements	*CO3*	*PO1*	**04**
			OR			
	8	a)	Explain the various techniques followed for energy auditing of a compressed air system. What are the measures taken to conserve energy?	*CO3*	*PO2*	**10**
		b)	Identify and explain the process of Energy Audit for illumination system as it is a significant requirement for making people aware of energy conservation	*CO3*	*PO2*	**06**
		c)	List the instruments used for i) Mechanical measurements ii) Electrical measurements	*CO3*	*PO1*	**04**
			UNIT - V			
	9	a)	According to you what measures have to be taken in Environmental considerations and Green energy concepts to encourage spread awareness in public about DSM and energy conservation?	*CO4*	*PO2*	**10**
		b)	Explain how load management concept can be used to understand various control techniques of load control.	*CO4*	*PO2*	**10**
			OR			
	10	a)	Explain the various applications of load control as applied to DSM.	*CO4*	*PO2*	**10**
		b)	Enumerate evolution of Concept and the scope of DSM? What are the Tariff options of DSM?	*CO4*	*PO2*	**10**

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