Q. Code: 297824

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH. DEGREE EXAMINATIONS, MAY 2024

Fifth Semester

EE18009 – ENERGY MANAGEMENT AND AUDITING

(Electrical and Electronics Engineering)

(Regulation 2018 / 2018A)

TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Acquire the background required for engineers to meet the role of energy managers and to acquire the skills and techniques required to implement energy management.	**4**
CO 2	Learn about basic concepts of economic analysis and load management.	**4**
CO 3	Understand the energy management on various electrical equipment.	**4**
CO 4	Knowledge on the concepts of metering and factors influencing cost function.	**3**
CO 5	Learn about the concept of lighting systems, light sources and various forms of cogeneration.	**3**

PART- A (10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	An electric heater of 230 V, 5 kW rating is used for hot water generation in the industry. Find electricity consumption per hour at 200 V.	**1**	**4**
2.	Differentiate primary and secondary objectives of energy management.	**1**	**4**
3.	If Rs. 500 was deposited in an account that paid 10% interest annually, how much amount would be in the account at the end of five years?	**2**	**4**
4.	Sketch the hierarchical pyramid of various levels in utility monitoring and control systems for load management.	**2**	**2**
5.	Categorize the different types of losses in the electrical distribution system.	**3**	**3**
6.	Consider a 500 KVA transformer, with core loss of 2.7 kW and a full load coil loss at 60 degree Celsius of 5.7 kW. Calculate load KVA at which transformer operate at maximum efficiency?	**3**	**4**
7.	Compare and contrast utility meter and demand meter.	**4**	**4**
8.	What is meant by 'CT - burden' related to an instrumental transformer.	**4**	**2**
9.	Sketch and differentiate back pressure type turbine and condensing type turbine.	**5**	**4**
10.	Mention the advantages of electronic ballasts over electromagnetic ballasts.	**5**	**2**

PART- B (5x 14=70Marks)

			Marks	CO	RBT LEVEL
11. (a)		Describe the types of energy audits and ten-step methodology for conducting detailed energy audits.	**(14)**	**1**	**3**
		(OR)			
(b)	**(i)**	Interpret the steps involved in Designing an Energy Management Program.	**(8)**	**1**	**3**

	(ii)	Illustrate the energy monitoring, targeting, and reporting (MTR) process with suitable block diagram.	**(6)**	**1**	**3**
12. (a)		Demonstrate the utility rate structure and various demand control possibilities to perform load management.	**(14)**	**2**	**4**
		(OR)			
	(b)	With relevant mathematical equations apprise how No-load and load loss calculation carried out for both electric motor and transformer.	**(14)**	**2**	**4**
13. (a)		Categorize the different types of losses associated with transformers and explicate the transformer energy-saving recommendations.	**(14)**	**3**	**4**
		(OR)			
	(b)	Examine how capacitors banks and synchronous motors are used for power factor improvement from an energy conservation point of view.	**(14)**	**3**	**4**
14. (a)		Demonstrate the working of demand meters and formulate the expression for timing of meter disc for kilowatt measurement.	**(14)**	**4**	**4**
		(OR)			
	(b)	**(i)** Illustrate the functions of multitasking solid-state meters with a suitable block diagram in the aspect of energy management.	**(10)**	**4**	**4**
		(ii) Distinguish between the current transformer and potential transformer.	**(4)**	**4**	**4**
15. (a)		Critically analyze various types of light sources and also elaborate about its performance characteristics. Give your comment on the various light sources with the aspect of energy management.	**(14)**	**5**	**4**
		(OR)			
	(b)	With a neat sketch explain the concepts, needs and operation of cogeneration and also list out the points to be considered to check the feasibility of cogeneration.	**(14)**	**5**	**4**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	**CO**	**RBT LEVEL**
16.	A building has the following loads: fifty 100 Watt lamp operated 5 hours daily, forty 500 Watt lamps operated 5 hours daily, twenty 10 watt lamp operated 4 hours daily and twenty 40 watt fans operated 10 hours daily, all connected to a 230 Volt source. Estimate the following parameters (a) Total power consumed by the building, (b) Total current is drawn by the building, (c) Monthly electrical energy consumption, and (d) Monthly energy charges at Rs. 2 per unit.	**(10)**	1	**5**

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