

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous) Dundigal, Hyderabad-500043

Department of Electrical and Electronics Engineering

TUTORIAL QUESTION BANK

Course Name	:	ENERGY AUDIT AND MANAGEMENT
Course Code	:	AEE503
Class	:	VI Semester
Branch	:	ELECTRICAL AND ELECTRONICS ENGINEERING
Year	:	2019-2020
Course Coordinator	:	Dr. Mule Laxmidevi Ramanaiah, Associate Professor
Course Faculty	:	Dr. Mule Laxmidevi Ramanaiah, Associate Professor

COURSE OBJECTIVES:

The course should enable the students to:

I	Outline the principles and objectives of energy management.
II	Illustrate the techniques, procedures, evaluation and energy audit reporting.
III	Devise energy policy planning and implementation.
IV	Analyse energy balance sheet and management information System.

COURSE OUTCOMES:

The course should enable the students to:

I	Conceptual knowledge of the need and approach of energy audit and management.
II	Capability to integrate various options and assess the business and policy environment regarding energy conservation and energy auditing
III	Advocacy of strategic and policy recommendations on energy conservation and energy auditing
IV	Knowledge of energy balance and information management
V	Discuss the instruments required for energy auditing

COURSE LEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

AEE503.01	Demonstrate knowledge on auditing practices, management measures and economics of energy.
AEE503.02	Analyze auditing practices, management measures and economics of energy.
AEE503.03	Design an appropriate energy management measures in commercial and industrial applications.
AEE503.04	Provide feasible solutions for problems associated with energy auditing and management through proper investigation and interpretation of data.
AEE503.05	Use appropriate techniques for energy auditing and management.
AEE503.06	Solve energy auditing and management problems with societal relevance.
AEE503.07	Consider environment and sustainability in energy auditing and management.
AEE503.08	Follow relevant rules and regulations in practicing energy audit and management.
AEE503.09	Communicate effectively on energy audit in written and graphical forms.

AEE503.10	Consider financial issues in energy audit and management.
AEE503.11	Devise energy policy planning and implementation.
AEE503.12	Analyze energy balance sheet and management information System.
AEE503.13	Know about Instruments for audit and monitoring energy and energy savings, types and accuracy.
AEE503.14	Knowledge on marketing and communicating training and planning.
AEE503.15	Explore the knowledge and skills of employability to succeed in national and international level competitive examinations.

TUTORIAL QUESTION BANK

	UNIT – I					
	GENERAL ASPECTS					
	Part – A (Short Answer Questions)					
	Blooms Course Course					
S No	QUESTION	Taxonomy	Outcomes	Learning		
5110	Q02011011	Level	o diconics	Outcomes		
1	Define energy audit.	Remember	CO 1	AEE503.01		
2	What is the key of decision making in the area of energy	Understand	CO 1	AEE503.01		
	management?					
3	Define energy.	Remember	CO 1	AEE503.01		
4	State is law of conservation of energy?	Understand	CO 1	AEE503.01		
5	What is audit?	Understand	CO 1	AEE503.01		
6	What is energy crisis?	Understand	CO 1	AEE503.03		
7	What is the need of energy audit?	Remember	CO 1	AEE503.02		
8	What is the objective of energy management?	Understand	CO 1	AEE503.01		
9	Expand BTU.	Remember	CO 1	AEE503.02		
10	BTU is unit for?	Remember	CO 1	AEE503.02		
11	Which is the most ecofriendly fuel of energy?	Understand	CO 1	AEE503.03		
12	What is the cleanest burning fuel?	Understand	CO 1	AEE503.02		
13	Which is the best fuel?	Remember	CO 1	AEE503.02		
14	Can we use alcohol instead of petrol?	Understand	CO 1	AEE503.03		
15	What fuel can be used instead of petrol and diesel?	Remember	CO 1	AEE503.01		
16	List the important principles of energy audit.	Understand	CO 1	AEE503.01		
17	What is ENCON?	Understand	CO 1	AEE503.01		
18	What are the different phases in detailed energy audit?	Understand	CO 1	AEE503.01		
19	What are the primary and secondary energy sources	Understand	CO 1	AEE503.01		
20	What are the harmful pollutants released from thermal power plants?	Understand	CO 1	AEE503.01		
	Part - B (Long Answer Q	Juestions)				
		Remember	CO 1	AEE502.01		
1	a. List down the objective of energy management.b. Discuss the role played by these objectives in audit?	Remember	COT	AEE503.01		
1	c. Did these objectives vary for different organizations?					
	a. List the needs of energy audit and management?	Understand	CO 1	AEE503.01		
2	b. Why energy auditing has become so important in recent	Onderstand	CO 1	7 KLL303.01		
	years?					
3	a. What are the principles of energy management?	Remember	CO 1	AEE503.01		
3	b. Will these objectives vary for different					
	organization/industries?					
4	a. Give the classification of energy audit.	Understand	CO 1	AEE503.02		
	b. What is the importance of preliminary, targeted and detailed audits?					
	a. What is preliminary energy audit methodology?	Understand	CO 1	AEE503.03		
5	b. Discuss the importance of preliminary audit?	Onderstand	COT	ALL505.05		
	a. Explain about understanding energy costs.	Remember	CO 1	AEE503.02		
6	b. How this help in auditing?			3 2 2 1 2 -		
7	a. Explain strategy or approach or phases in energy audit.	Remember	CO 1	AEE503.03		
	b. Why there are different strategies?					
8	a. Write about preliminary and targeted audit.	Remember	CO 1	AEE503.01		
G	b. What are their advantages and disadvantages?					
9	a. Explain bench marking.	Remember	CO 1	AEE503.02		
	b. What are different types in it?	**	~~.	1,555,55		
10	a. Write about plant energy performance.	Understand	CO 1	AEE503.02		
	b. What are different substitutions for fuel/energy?	\				
	Part – C (Analytical Qu	iestions)				

b. Explain the importance of energy audit. a. Discuss the objectives of energy management. b. Specify the principles of energy audit b. Dultherstand core of energy audit b. Specify the principles of energy audit b. Specify the energy audit b. Specify the energy audit b. Dultherstand b.					
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13 List the 3 types of heat transfer? Remember CO 2 AEE50 14 List the 4 types of heat transfer? Remember CO 2 AEE50 15 Discuss the purpose of material and energy balance? Understand CO 2 AEE50 16 List the two main components of incremental cost Understand CO 2 AEE50 17 What is meant by marginal operating cost? Understand CO 2 AEE50 18 What do you mean by marginal outage cost? Understand CO 2 AEE50 19 What is meant by thermal energy storage? Understand CO 2 AEE50 20 What is the importance of energy audit report Understand CO 2 AEE50 10 List the two main components of incremental cost? Understand CO 2 AEE50 11 B. What do you mean by marginal outage cost? Understand CO 2 AEE50 12 Discuss the purpose of material and energy barrian cost? Understand CO 2 AEE50 13 Discuss the purpose of material and energy barrian cost? Understand CO 2 AEE50 14 Discuss the purpose of material and energy barrian cost? Remember CO 2 AEE50 15 Discuss in detail about incremental cost with an example. 16 Discuss in detail about incremental cost with an example. 17 Discuss in detail about incremental cost with an example. 18 Discuss in detail about incremental cost with an example. 19 Discuss in detail about incremental cost with an example. 20 Discuss in detail about incremental cost with an example. 21 Discuss in detail about incremental cost with an example. 22 Discuss in detail about incremental cost with an example. 23 Discuss in detail about incremental cost with an example. 24 Discuss in detail about incremental cost with an example. 25 Discuss in detail about incremental cost with an example. 26 Discuss in detail about incremental cost with an example. 27 Discuss in detail about incremental cost with an example. 28 Discuss in detail about incremental cost with an example. 29 Discuss in detail about incremental cost with an example. 20 Discuss in detail about incremental cost with an example. 20 Discuss in detail about incremental cost with an example. 20 Discuss in detail about incremental cost with an	11	What does load mean in electricity?	Understand	CO 2	AEE503.05
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15 Discuss the purpose of material and energy balance? Understand CO 2 AEE50 16 List the two main components of incremental cost Understand CO 2 AEE50 17 What is meant by marginal operating cost? Understand CO 2 AEE50 18 What do you mean by marginal outage cost? Understand CO 2 AEE50 19 What is meant by thermal energy storage? Understand CO 2 AEE50 20 What is the importance of energy audit report Understand CO 2 AEE50 Part - B (Long Answer Questions) 1 a. Write about different energy sources. b. How these sources played role in different revolutions? 2 a. Write any basic energy basic energy facts. B. How this is important now in crisis? 3 a. Write about electrical load characteristics. b. How these characteristics vary according to season? 4 a. Discuss in detail about incremental cost with an example. b. Explain the importance of incremental cost b. How this helps for company to get profits? 5 a. What are the energy conservation opportunities ?? Remember CO 2 AEE50 B. How this helps for company to get profits? Remember CO 2 AEE50	13	List the 3 types of heat transfer?	Remember	CO 2	AEE503.05
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What is meant by marginal operating cost?	15	Discuss the purpose of material and energy balance?	Understand	CO 2	AEE503.04
18 What do you mean by marginal outage cost?	16	List the two main components of incremental cost	Understand	CO 2	AEE503.04
19 What is meant by thermal energy storage?	17	What is meant by marginal operating cost?	Understand	CO 2	AEE503.04
Part - B (Long Answer Questions) 1 a. Write about different energy sources. b. How these sources played role in different revolutions? 2 a. Write any basic energy basic energy facts. c. b. How this is important now in crisis? 3 a. Write about electrical load characteristics. b. How these characteristics vary according to season? 4 a. Discuss in detail about incremental cost with an example. b. Explain the importance of incremental cost 5 a. What are the energy conservation opportunities? Remember CO 2 AEE50 a. What are the energy conservation opportunities? Remember CO 2 AEE50 b. How this helps for company to get profits? Remember CO 2 AEE50	18	What do you mean by marginal outage cost?	Understand	CO 2	AEE503.04
Part - B (Long Answer Questions) 1	19	What is meant by thermal energy storage?	Understand	CO 2	AEE503.04
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a. What are the energy conservation opportunities'? b. How this helps for company to get profits? Remember CO 2 AEE50	4	example.	Understand	CO 2	AEE503.05
a. Explain about energy audit report. Remember CO 2 AEE50	5	a. What are the energy conservation opportunities?b. How this helps for company to get profits?	Remember		AEE503.06
b. How this report helps for management?	6		Remember	CO 2	AEE503.04

7	a. Explain about mass and energy balance.b. What are the laws influencing this balance?	Remember	CO 2	AEE503.05
8	a. Explain about heat transfer. b. What are the different methods of heat transfer?	Remember	CO 2	AEE503.06
9	a. Discuss about facts, figures and impression of energy or	Remember	CO 2	AEE503.05
	fuel. b. Give details of past and present energy scenario.			
10	a. Write about process and energy system simulation.	Remember	CO 2	AEE503.06
	b. Define the questionnaire of data gathering? Part – C (Analytical Question)	stions)		
1	a. Discuss the concept of heat transfer. Illustrate the different	Understand	CO 2	AEE503.04
1	types of heat transfer. b. Explain conduction heat transfer method.			
2	a. Discuss the concept of heat transfer.	Understand	CO 2	AEE503.04
2	b. Explain convection heat transfer method.a. Discuss the concept of heat transfer.	Understand	CO 2	AEE503.04
3	b. Describe radiation heat transfer method.			
4	a. Discuss excess air control method. b. Describe the processes which benefit from excess air control method	Understand	CO 2	AEE503.05
5	a. Explain the importance of energy conservation measures. b. List some of the common energy conservation measures	Understand	CO 2	AEE503.05
	adopted in a plant.			
		Γ–III		
	ENERGY POLICY PLANNING AND		TION	
	Part – A (Short Answer (<u> </u>	00.2	A ED 500 07
1	Define force field analysis?	Remember	CO 3	AEE503.07
2	What is a national energy policy?	Understand	CO 3	AEE503.08
3	What is the Energy Policy Act of 2005?	Understand	CO 3	AEE503.08
4	Which one is the key element for successful energy management?	Remember	CO 3	AEE503.08
5	What is the role of energy manager?	Understand	CO 3	AEE503.07
6	List out 4 basic management functions?	Understand	CO 3	AEE503.07
7	What are managerial tasks?	Understand	CO 3	AEE503.08
8	Deduce the importance of force field analysis.	Understand	CO 3	AEE503.07
9	What is Energy Conservation Act 2001?	Understand	CO 3	AEE503.08
10	Explain the need of energy policy.	Understand	CO 3	AEE503.07
11	What is employee motivation in HRM?	Remember	CO 3	AEE503.08
12	Why do you motivate employees?	Understand	CO 3	AEE503.07
13	Define a marketing communication plan?	Understand	CO 3	AEE503.07
14	What are marketing communication strategies?	Understand	CO 3	AEE503.07
15	What marketing communication means?	Remember	CO 3	AEE503.09
16	What is the role of communication in marketing?	Remember	CO 3	AEE503.09
17	List marketing communication tools?	Remember	CO 3	AEE503.09
18	Illustrate the hurdles in implementation of energy policy.	Understand	CO 3	AEE503.09
19	Discuss the importance of employee motivation.	Understand	CO 3	AEE503.09
20	Detail the need of training for employees in energy action planning.	Understand	CO 3	AEE503.09
	Part – B (Long Answer C	Questions)		
1	a. Explain about force field analysis.b. Why this force field analysis is required?	Remember	CO 3	AEE503.08

2	a. Write about energy policy planning in India.	Understand	CO 3	AEE503.09
3	b. Why this is important for a nation?a. What is energy management policy?b. Why this varies for different sectors?	Remember	CO 3	AEE503.07
4	a. What is the prospective of energy audit? b. Discuss the importance of energy audit.	Remember	CO 3	AEE503.07
5	a. Explain about location of energy manager. b. How this helps in energy conservation?	Understand	CO 3	AEE503.09
6	a. Explain about top management commitment and support. b. What is the policy of management on employees?	Remember	CO 3	AEE503.09
7	a. Explain the role of planning in energy management program.	Understand	CO 3	AEE503.08
8	b. Detail the steps involved in effective planning.a. What are the requirements of an effective energy policy?b. List out the important points an energy policy should contain.	Understand	CO 3	AEE503.08
9	a. Write the advantages of setting up an energy audit team.b. Write the disadvantages of setting up an energy audit team.	Understand	CO 3	AEE503.08
10	a. Write about energy policy planning in India. b. What is the policy of management on employees?	Understand	CO 3	AEE503.08
				,
11	a. Write about responsibilities and duties of energy manager.b. What if these are not fulfilled properly?	Understand	CO 3	AEE503.07
12	a. Write about motivation of employees.b. How this is required for management?	Understand	CO 3	AEE503.09
13	a. Explain about market communication skills. b. How this helps for the company?	Understand	CO 3	AEE503.08
14	a. Explain about communication plans.b. What is the productivity of this planning?	Understand	CO 3	AEE503.07
15	a. How to train marketing?b. Why marketing is so important for companies?	Understand	CO 3	AEE503.08
16	a. How to train in communications?b. Why these are important for company?	Understand	CO 3	AEE503.09
17	a. Explain the importance of training in energy audit.b. Discuss the sources for giving training to energy team.	Understand	CO 3	AEE503.08
18	a. Explain about communication plansc. Outline the methods to provide training in communications?	Understand	CO 3	AEE503.08
19	a. How planning affects productivity?b. How marketing affects productivity?	Understand	CO 3	AEE503.08
20	a. What are the important components of employee training?b. Explain the role of training in energy audit.	Understand	CO 3	AEE503.08
	Part – C (Analyt			
1	a. What is meant by field analysis?b. Explain the importance of force field analysis.	Understand	CO 3	AEE503.08
2	a. Discuss the pros and cons of forming an energy audit team.b. Explain the importance of setting up an energy policy program	Understand	CO 3	AEE503.08
3	a. Discuss the strategies of energy management.b. What are the requirements of an effective energy policy?	Understand	CO 3	AEE503.09
4	a. Explain the importance of training in energy audit.b. Explain the importance of communication in energy audit.	Understand	CO 3	AEE503.08
5	a. Assess the need of employee training.b. Assess the need of management training.	Understand	CO 3	AEE503.08
6	a. Describe the usefulness of audit report in energy management program.b. Discuss the term motivation of employees.	Understand	CO 3	AEE503.08
	UNIT-IV			
	ENERGY BALANCE A	ND MIS		
	ENERGI DALANCE A	מוואו מווי		

	Part – A (Short Answer Q	Questions)		
1	Define First Law efficiency?	Remember	CO 4	AEE503.10
2	How is thermal efficiency measured?	Understand	CO 4	AEE503.10
3	Define second law efficiency?	Understand	CO 4	AEE503.12
4	How do you calculate boiler efficiency?	Understand	CO 4	AEE503.12
5	What is the formula for efficiency?	Remember	CO 4	AEE503.13
6	What is integrated energy system?	Remember	CO 4	AEE503.13
7	What is included in a process flow diagram?	Understand	CO 4	AEE503.12
8	Define process flow document?	Remember	CO 4	AEE503.12
9	What is identification of losses in energy audit?	Remember	CO 4	AEE503.11
10	What is opportunity for improvement?	Remember	CO 4	AEE503.13
11	What is MIS and how it works?	Understand	CO 4	AEE503.12
12	Discuss the roles of MIS?	Remember	CO 4	AEE503.13
13	What is energy modeling?	Remember	CO 4	AEE503.13
14	What is on a balance sheet example?	Remember	CO 4	AEE503.11
15	Explain good balance sheet?	Remember	CO 4	AEE503.11
16	What is condensate loss?	Remember	CO 4	AEE503.11
17	What is meant by payback period?	Remember	CO 4	AEE503.10
18	Outline the different measures of worth for investment projects	Understand	CO 4	AEE503.10
19	Define efficiency	Understand	CO 4	AEE503.10
20	What is meant by energy modeling and optimization?	Understand	CO 4	AEE503.10
	Part – B (Long Answer Q	Questions)		-
1	a. Explain about energy efficiency.b. What are different laws used here?	Understand	CO 4	AEE503.11
2	a. Write about first law of energy efficiency.b. How it contributes for efficiency?	Understand	CO 4	AEE503.13
3	a. Explain about second law of energy efficiency.b. How it helps for efficiency?	Understand	CO 4	AEE503.13
4	a. Write about process flow.b. How this helps in understanding energy flow?	Remember	CO 4	AEE503.12
5	a. Write about energy flow. b. Why it is depended on process flow?	Understand	CO 4	AEE503.13
6	a. Write about material and energy balance. b. How did this helps in saving?	Remember	CO 4	AEE503.12
7	a. Explain about energy balance sheet.b. What are the benefits of maintaining energy balance sheet?	Remember	CO 4	AEE503.12
8	a. Write about Management Information System. b. How the losses are identified?	Understand	CO 4	AEE503.13
9	a. Give an example for balance sheet. b. Explain the details in a balance sheet.	Understand	CO 4	AEE503.11
10	a. Explain about energy modeling. b. What are the possibilities of improvements?	Understand	CO 4	AEE503.11
	Part – C (Analytical Que	stions)		l
1	a. What are process flow diagrams b. Explain any one method in detail	Understand	CO 4	AEE503.11
2	a. What is meant by energy balance diagram b. Explain the importance of energy balance diagram	Understand	CO 4	AEE503.11
3	a. Outline the loss reduction methods in boiler systems b. Outline the waste heat recovery methods	Understand	CO 4	AEE503.11

4	a. Explain the need of energy balance sheet.b. Give one example of energy balance sheet	Understand	CO 4	AEE503.11
5	a. Write the importance of management information system (MIS).	Understand	CO 4	AEE503.11
	b. Discuss the term energy modeling.			
	UNIT-V			
	ENERGY AUDIT INSTR	UMENTS		
	Part - A (Short Answer C	Questions)		
1	What is Combustion analyzer?	Remember	CO 5	AEE503.13
2	What are the different types of measuring instruments?	Remember	CO 5	AEE503.14
3	What is electrical instrument?	Remember	CO 5	AEE503.13
4	What are the desirable qualities of measuring instrument?	Understand	CO 5	AEE503.14
5	What is used to measure electricity?	Understand	CO 5	AEE503.13
6	What is Fuel Efficiency Monitor?	Remember	CO 5	AEE503.13
7	Define Fyrite?	Remember	CO 5	AEE503.14
8	What is Contact thermometer?	Remember	CO 5	AEE503.13
9	What is Infrared Thermometer?	Remember	CO 5	AEE503.14
10	What are WPitot Tube and manometer?	Understand	CO 5	AEE503.13
11	Define flow meter?	Remember	CO 5	AEE503.13
12	What is Tachometer?	Remember	CO 5	AEE503.13
13	Explain Stroboscope?	Remember	CO 5	AEE503.15
14	What are Leak Detectors?	Understand	CO 5	AEE503.13
15	What are Lux meters?	Understand	CO 5	AEE503.15
		Understand	CO 5	AEE503.13
16	Differentiate between contact and non-contact thermometers			
17	Define accuracy of an instrument.	Understand	CO 5	AEE503.13
18	Define sensitivity of an instrument.	Understand	CO 5	AEE503.13
19	List the instruments used for measuring pressure.	Understand	CO 5	AEE503.13
20	Give important characteristics of measuring instruments.	Understand	CO 5	AEE503.13
	Part - B (Long Answer Q	Questions)		•
1	a. Explain about different types of measuring instruments.b. How these contribute for energy management?	Understand	CO 5	AEE503.13
2	a. Discuss desirable qualities of measuring instrument. b. How to select a good measuring instrument?	Remember	CO 5	AEE503.14
3	c. Explain about Fyrite?	Understand	CO 5	AEE503.13
	d. What are the parameters in selection of meters?a. Explain about Contact thermometer?	Understand	CO 5	AEE503.13
4	b. Define energy driver?			
5	a. Explain about Lux meters?b. What is the sector of importance of these meters?	Remember	CO 5	AEE503.14
6	a. Explain about Stroboscope?b. Write about the effectiveness of stroboscope?	Understand	CO 5	AEE503.13
7	a. Explain about Infrared Thermometer?	Remember	CO 5	AEE503.13
	b. Define infrared rays?a. Discuss about Pitot Tube.	Remember	CO 5	AEE503.14
8	b. Write about manometer?			
9	a. Explain about energy savings.b. Write about energy savings in domestic fields.	Remember	CO 5	AEE503.13
10	a. Write about accuracy of measurement instruments.b. Explain savings in commercial fields.	Understand	CO 5	AEE503.13

	Part – C (Analytical Questions)				
1	a. Explain the role of portable instruments in carrying out energy audit.	Understand	CO 5	AEE503.13	
	b. Explain the role of permanent installed instruments in carrying out energy audit.				
2	a. Discuss the role of Flow metersb. Discuss the role of condensate meters	Understand	CO 5	AEE503.13	
3	a. Describe the application of velocity meterb. Discuss the application of area meter	Understand	CO 5	AEE503.13	
4	a. Write in detail the use of head metersb. Write about combustion measurements	Understand	CO 5	AEE503.13	
5	a. Detail the process energy measurementsb. Discuss the measurement of coal energy	Understand	CO 5	AEE503.13	

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