



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)				
S No	QUESTION	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes
1	Define energy audit.	Remember	CO 1	AEE503.01
2	What is the key of decision making in the area of energy management?	Understand	CO 1	AEE503.01
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 Questions)				
1	a. List down the objective of energy management. b. Discuss the role played by these objectives in audit? c. Did these objectives vary for different organizations?	Remember	CO 1	AEE503.01
2	a. List the needs of energy audit and management? b. Why energy auditing has become so important in recent years?	Understand	CO 1	AEE503.01
3	a. What are the principles of energy management? b. Will these objectives vary for different organization/industries?	Remember	CO 1	AEE503.01
4	a. Give the classification of energy audit. b. What is the importance of preliminary, targeted and detailed audits?	Understand	CO 1	AEE503.02
5	a. What is preliminary energy audit methodology? b. Discuss the importance of preliminary audit?	Understand	CO 1	AEE503.03
6	a. Explain about understanding energy costs. b. How this help in auditing?	Remember	CO 1	AEE503.02
7	a. Explain strategy or approach or phases in energy audit. b. Why there are different strategies?	Remember	CO 1	AEE503.03
8	a. Write about preliminary and targeted audit. b. What are their advantages and disadvantages?	Remember	CO 1	AEE503.01
9	a. Explain bench marking. b. What are different types in it?	Remember	CO 1	AEE503.02
10	a. Write about plant energy performance. b. What are different substitutions for fuel/energy?	Understand	CO 1	AEE503.02
Part – C (Analytical Questions)				

1	a. Explain detailed energy audit with its ten steps. b. Explain the importance of energy audit.	Understand	CO 1	AEE503.01
2	a. Discuss the objectives of energy management. b. Specify the principles of energy management.	Understand	CO 1	AEE503.03
3	a. Discuss the types of energy audit b. Elaborate the importance of energy audit	Understand	CO 1	AEE503.01
4	a. Explain the term benchmarking and its importance in energy audit. b. Illustrate the types of benchmarking methods	Understand	CO 1	AEE503.03
5	a. Detail the pros and cons of different strategies implemented in energy audit b. Outline the different types of fuels and explain their importance	Understand	CO 1	AEE503.03

UNIT - II

PROCEDURES AND TECHNIQUES, EVALUATION OF SAVING OPPORTUNITIES AND ENERGY AUDIT REPORTING

Part – A (Short Answer Questions)

1	Why data gathering is needed?	Remember	CO 2	AEE503.04
2	What are the different energy sources?	Remember	CO 2	AEE503.04
3	What is the use of energy?	Remember	CO 2	AEE503.05
4	Write any basic energy one basic energy fact.	Remember	CO 2	AEE503.06
5	Write whether data sheet is required in energy audit?	Understand	CO 2	AEE503.04
6	Why data gathering plays a significant role?	Remember	CO 2	AEE503.04
7	What is incremental cost?	Understand	CO 2	AEE503.05
8	Define load?	Understand	CO 2	AEE503.06
9	Define load curve?	Remember	CO 2	AEE503.06
10	Write about heat transfer.	Remember	CO 2	AEE503.05
11	What does load mean in electricity?	Understand	CO 2	AEE503.05
12	What are the three types of electrical load?	Remember	CO 2	AEE503.06
13	List the 3 types of heat transfer?	Remember	CO 2	AEE503.05
14	List the 4 types of heat transfer?	Remember	CO 2	AEE503.04
15	Discuss the purpose of material and energy balance?	Understand	CO 2	AEE503.04
16	List the two main components of incremental cost	Understand	CO 2	AEE503.04
17	What is meant by marginal operating cost?	Understand	CO 2	AEE503.04
18	What do you mean by marginal outage cost?	Understand	CO 2	AEE503.04
19	What is meant by thermal energy storage?	Understand	CO 2	AEE503.04
20	What is the importance of energy audit report	Understand	CO 2	AEE503.06

Part - B (Long Answer Questions)

1	a. Write about different energy sources. b. How these sources played role in different revolutions?	Remember	CO 2	AEE503.04
2	a. Write any basic energy basic energy facts. b. How this is important now in crisis?	Remember	CO 2	AEE503.04
3	a. Write about electrical load characteristics. b. How these characteristics vary according to season?	Understand	CO 2	AEE503.04
4	a. Discuss in detail about incremental cost with an example. b. Explain the importance of incremental cost	Understand	CO 2	AEE503.05
5	a. What are the energy conservation opportunities? b. How this helps for company to get profits?	Remember	CO 2	AEE503.06
6	a. Explain about energy audit report. b. How this report helps for management?	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 fuel. b. Give details of past and present energy scenario.	Remember	CO 2	AEE503.05
10	a. Write about process and energy system simulation. b. Define the questionnaire of data gathering?	Remember	CO 2	AEE503.06

Part – C (Analytical Questions)

1	a. Discuss the concept of heat transfer. Illustrate the different types of heat transfer. b. Explain conduction heat transfer method.	Understand	CO 2	AEE503.04
2	a. Discuss the concept of heat transfer. b. Explain convection heat transfer method.	Understand	CO 2	AEE503.04
3	a. Discuss the concept of heat transfer. b. Describe radiation heat transfer method.	Understand	CO 2	AEE503.04
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 adopted in a plant.	Understand	CO 2	AEE503.05

UNIT – III

ENERGY POLICY PLANNING AND IMPLEMENTATION

Part – A (Short Answer Questions)

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 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. b. Why this is important for a nation?	Understand	CO 3	AEE503.09
3	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. b. Detail the steps involved in effective planning.	Understand	CO 3	AEE503.08
8	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 plans c. 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 (Analytical Questions)				
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 AND MIS				

Part – A (Short Answer 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 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 Questions)				
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). b. Discuss the term energy modeling.	Understand	CO 4	AEE503.11

UNIT-V

ENERGY AUDIT INSTRUMENTS

Part - A (Short Answer 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
16	Differentiate between contact and non-contact thermometers	Understand	CO 5	AEE503.13
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 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? d. What are the parameters in selection of meters?	Understand	CO 5	AEE503.13
4	a. Explain about Contact thermometer? b. Define energy driver?	Understand	CO 5	AEE503.13
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? b. Define infrared rays?	Remember	CO 5	AEE503.13
8	a. Discuss about Pitot Tube. b. Write about manometer?	Remember	CO 5	AEE503.14
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. b. Explain the role of permanent installed instruments in carrying out energy audit.	Understand	CO 5	AEE503.13
2	a. Discuss the role of Flow meters b. Discuss the role of condensate meters	Understand	CO 5	AEE503.13
3	a. Describe the application of velocity meter b. Discuss the application of area meter	Understand	CO 5	AEE503.13
4	a. Write in detail the use of head meters b. Write about combustion measurements	Understand	CO 5	AEE503.13
5	a. Detail the process energy measurements b. Discuss the measurement of coal energy	Understand	CO 5	AEE503.13

Prepared By:

Dr. Mule Laxmidevi Ramanaiah, Associate Professor, EEE

HOD, EEE