A Laboratory Manual for

RENEWABLE ENERGY TECHNOLOGY

(22661)

Semester- VI

Diploma in Mechanical Engineering Group

(ME)

Bharati Vidyapeeth Institute of Technology

Navi Mumbai

Bharati Vidyapeeth Institute of Technology

Navi Mumbai

Certificate

This is to certify that, Mr./ Ms. …….

Roll No. …… of Fourth Semester of Diploma in Mechanical engineering Bharati Vidyapeeth Institute of Technology Navi Mumbai (Inst. code:0027/1079 has satisfactorily completed the term work in the subject RENEWABLE ENERG TECHNOLOGY(22661) for the academic year 20…. to 20…. as prescribed in th MSBTE curriculum.

Place: ……... **Enrollment No. : ……**

Date: …… **Exam. Seat No. : …….**

Seal of Institution

Sign:

Name:

Subject Teacher **Head of the Department** **Principal**

LIST OF EXPERIMENTS AND PROGRESSIVE ASSESSMENT FORTERM WORK (TW) D-3

ACADEMIC YEAR 20 - 20

Course Code :- ME6I **Sub & Code : RET (22661)**

Name of Candidate : **Enrollment No :** **Roll No :**

Marks : **Max :** **Min :** **Name of Staff-**

Sr. No	Title of Experiment	Page No	Date of Performance	Date of Submission	Assessment Marks	I S t V I
1	Identify the components of Flat plate collector, Evacuated tube collector, and solar dryer	1-4				
2	Use pyrometer for measurment of solar radiation flux density.	5-6				
3	Assemble solar PV system with and without battery connection.	7-9				
4	Measure heat output, Maximum power, power output efficiency of solar PV panel	10-11				
5	Use vane Anemometer for measurement of different locations for site selection for wind mill.	12-14				
6	Assembly / Dismantle a horizontal axis small wind turbine	15-17				
7	Assembly / Dismantle a biogas power system	18-20				
8	Assembly / Dismantle a biomass gassifier power system	21-23				
9	Assembly / Dismantle a wind solar hybrid system	24-26				
Total marks out of 90						
Marks out of 50						

Name and Signature of Student **Name and Signature of Staff**

Experiment No. 1

1.0 Title: Identify the components of Flat plate collector, Evacuated tube collector, and solar dryer

1.1 Prior Concepts: Understand different types of renewable energies and its sources : Primary, Secondary, and tertiary energy.

1.2 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

1.3 Learning Objectives:

Intellectual skills:

- Understand the constructional details of various Renewable energy sources.
- Know the components and working principle of collectors .
- Understand, visualize and correlate different subsystems of the plant under study.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

1.4 Stepwise procedure:

1. Collect the information about the collectors .
2. List the types of collector and identify the components.
3. Draw neat figure of each .
4. State function of each component.

1.5 Draw neat figure of, , and.

A) Flat plate collector

B) Evacuated tube collector

C) Solar dryer

1.6 State and explain components of flat plate collector.-

1.7 State and explain components of evacuated tube collector.-

1.8 State and explain components of solar dryer.-

1.9 Conclusion: _____

Marks	Dated signature of teacher

Experiment No. 2

2.0 Title: Use pyrometer for measurment of solar radiation flux density.

2.1 Prior Concepts: Introduction, details of energy measurement instruments and its functions.

2.2 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

2.3 Learning Objectives:

Intellectual skills:

- Understand the details of various energy measurement instruments.
- Know the components and working principle of pyrometer .
- Understand, visualize and correlate different radiation flux density measurement devices of the plant under study.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

2.4 Stepwise procedure:

5. Collect the information about the energy measurement instruments .
6. List the types of energy measurement instruments.
7. Draw neat figure of pyrometer .
8. Explain detail procedure.

2.5 Aim: To write the detail procedure and functioning of energy measurement instruments.

2.6 Neat figure of pyranometer:

2.7 Explain detail procedure :

2.8 Conclusion: _____

Marks	Dated signature of teacher

Experiment No. 3

3.1 Title: Assemble solar PV system with and without battery connection.

3.2 Prior Concepts: Solar photovoltaic system, solar cells, solar arrey, solar panel, solar grid.

3.3 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

3.4 Learning Objectives:

Intellectual skills:

- Understand the constructional details of various PV systems.
- Know the components and working principle of PV systems .
- Understand, visualize and correlate different PV subsystems of the plant under study.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

3.5 Stepwise procedure:

9. Collect the information about the solar PV system .
10. List the types of PV system.
11. Draw neat figure of different types of solar PV system .
12. Explain detail procedure.

3.6 Aim: To write the detail procedure to assemble solar PV system.

3.7 Neat block diagram of PV system with battery :

3.8 Explain detail procedure

3.9 Neat block diagram of PV system without battery :

3.10 Explain detail procedure

3.11 Conclusion:

Marks	Dated signature of teacher

Experiment No. 4

4.1Title: Measure heat output, Maximum power, power output efficiency of solar PV panel

4.2Prior Concepts: Introduction of solar photovoltaic system, output parameters, and its importance.

4.3 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

4.4 Learning Objectives:

Intellectual skills:

- Understand the constructional details of various output parameters of PV systems.
- Know the components and working principle of PV systems .
- Understand, visualize and correlate output parameters of different PV subsystems of the plant under study.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

4.5 Stepwise procedure:

1.Collect the information about the output parameters of solar PV system .

2.List the output parameters of PV system..

3.Explain detail procedure to measure output parameters of solar PV system.

4.6 Aim: To collect output parameters achieved from solar PV system .

4.7 Detail stepwise procedure for measurement of every output parameter of solar PV system.

4.8 Conclusion: _____

Marks	Dated signature of teacher

Experiment No. 5

5.1 Title: Use vane Anemometer for measurement of different locations for site selection for wind mill..

5.2 Prior Concepts: Understand the working of wind mills, Introduction, site selection methods, site selection criteria. Different instruments used for measure velocity of wind mill.

5.3 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

5.4 Learning Objectives:

Intellectual skills:

- Understand the constructional details of various site selection parameters for wind mill.
- Know criteria of various site selection parameters for wind mill.
- Understand, visualize and correlate measurement output instrument for site selection parameters for wind mill.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

5.5 Stepwise procedure:

1.Collect the information about the vane anemometer .

2.List site selection parameters for wind mill.

3.Explain detail procedure to measure different location for site selection parameters of wind mill.

5.6 Site selection criteria for wind mill.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

5.7 Velocity measurement devices for wind :

Neat fig of vane anemometer:

5.8 Procedure for measurement of different location for site selection of wind mill: -

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5.9 Conclusion:

Marks	Dated signature of teacher

Experiment No. 6

6.1 Title: Assembly / Dismantle a horizontal axis small wind turbine

6.2 Prior Concepts: Details of component of small horizontal axis wind turbine.

6.3 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

6.4 Learning Objectives:

Intellectual skills:

- Understand the constructional details of horizontal axis wind mill.
- Know components of horizontal axis wind mill.
- Understand, visualize and correlate horizontal axis wind mill.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

6.5 Stepwise procedure:

1.Collect the information about horizontal axis wind mill.

2.List components of horizontal axis wind mill.

3.Explain details of components of horizontal axis wind mill.

6.6 Neat fig. horizontal axis wind turbine:

6.7 Components of horizontal axis wind mill turbine:

Marks	Dated signature of teacher

Experiment No. 7

7.1 Title: Assembly / Dismantle a biogas power system

7.2 Prior Concepts: Details of component of biogas power system.

7.3 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

7.4 Learning Objectives:

Intellectual skills:

- Understand the constructional details of biogas power system.
- Know components of biogas power system.
- Understand, visualize and correlate biogas power system.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

7.5 Stepwise procedure:

1.Collect the information about biogas power system.

2.List components of biogas power system.

3.Explain details of components of biogas power system.

7.6 Neat fig. biogas power system:

7.7 Components of biogas power system:

Marks	Dated signature of teacher

Experiment No. 8

8.1 Title: Assembly / Dismantle a biomass gassifier power system

8.2 Prior Concepts: Details of component of biomass gassifier power system.

8.3 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

8.4 Learning Objectives:

Intellectual skills:

- Understand the constructional details of biomass gassifier power system..
- Know components of biomass gassifier power system..
- Understand, visualize and correlate biomass gassifier power system..

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

8.5 Stepwise procedure:

1.Collect the information about biomass gassifier power system..

2.List components of biomass gassifier power system..

3.Explain details of components of biomass gassifier power system.

8.6 Neat fig. biomass gassifier power system:

8.7 Components of biomass gassifier power system:

Marks	Dated signature of teacher

Experiment No. 9

9.1 Title: Assembly / Dismantle a wind solar hybrid system

9.2 Prior Concepts: Details of component of wind solar hybrid system.

9.3 New Concepts:

Proposition1: Information collection about devices.

Method of information collection includes observations, documents, internet. Information collected is used for writing report.

9.4 Learning Objectives:

Intellectual skills:

- Understand the constructional details of wind solar hybrid system.
- Know components of wind solar hybrid system.
- Understand, visualize and correlate wind solar hybrid system.

Motor skills:

- Ability to collect the information of the subject.
- Ability to draw neat figure .
- Ability to write a report in the desired format.

9.5 Stepwise procedure:

1.Collect the information about wind solar hybrid system.

2.List components of wind solar hybrid system.

3.Explain details of components of wind solar hybrid system.

9.6 Neat fig. wind solar hybrid system:

9.7 Components of wind solar hybrid system:

Marks	Dated signature of teacher