"Shri Gajanan Maharaj Prasanna"
P. R. Pote Patil Edu. & Welf. Trust's, Group of Institutions,
College of Engineering & Management, Amravati Institute Code : 1107
(Recognized by AICTE, New Delhi, Approved by Govt. of Maharastra & Affiliated to SGBAU, Amravati)
NAAC
- Kathora Road, Amravati, Maharashtra, India
- Ph. No. : +91-721-2970110, Fax No. : +91-721-2530089, Email : prpotepatilcollege@gmail.com
- Web. : www.prpcem.org, www.prpatilcollege.org

Report of Title: **Training Program on Rooftop Solar PV System Installation**

| | | |
|---|---|---|
| 1 | Title of Workshop | Training Program on Rooftop Solar PV System Installation |
| 2 | Date of Workshop | 7th to 19th Jan 2019 |
| 3 | Venue of Workshop | Electrical Department |
| 4 | Resource Person | Mr. Ravindra Sharma, Director, Autosys Indore,<br>Prof. A.A. Ghute, Astt. Prof. PRPCEM, Amravati |
| 5 | Target of Students | Electrical Engineering UG |
| 6 | Number of Students/Participants | 48 |
| 7 | Schedule of Program | **PFA** |
| 8 | Topics Covered | Day-1- Understanding solar |
| | | Day-2- solar cell parameter<br>. |
| | | Day-3- Solar PV System. |
| | | Day-4- PV System Design and Integration. |
| | | Day-5 - Selecting the solar PV |
| | | Day-6-PVsystem components ARES |

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| | | Day-7 Balance-of-System |
| | | Day-8(BOS) of solar Power Plant |
| | | Day-9 Project assignment |
| 9 | Mode Assessment | Question and answering |
| 10 | Outcome of workshop/FDP/Seminar /webinar | 1. Demonstrate knowledge of and apply key solar electric system terms and concepts.<br>2. Size and design a photovoltaic system.<br>3. Mount, ground, position, install, wire and connect a photovoltaic system.<br>4. Test voltage generated by photovoltaic system Operate & Maintain of Solar Power.<br>5. Participants will learn different types of solar PV module and batteries used in solar PV plant. |

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**Schedule of Programme**

| Date | Day | Session | Time | Instructor | Contents |
|---|---|---|---|---|---|
| 7/01/2019 | Monday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma, Director, Autosys Indore, | Understanding solar Systems |
| 8/01/2019 | Tuesday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma | Understanding solar cell parameter |
| 9/01/2019 | Wednesday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma, Prof. A.A. Ghute, | Solar PV System Design and Integration |
| 10/01/2019 | Thursday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma, Prof. A.A. Ghute, | Solar PV System Design and Integration |
| 11/01/2019 | Friday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma, Prof. A.A. Ghute | Selecting the solar PV system components |
| 12/01/2019 | Saturday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma, Prof. A.A. Ghute, | Selecting the solar PV system components |
| 14/01/2019 | Monday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma, , Prof. A.A. Ghute, | Balance-of-System (BOS) of so Power Plant |
| 15/01/2019 | Tuesday | I | 2:00pm-4.00pm | Mr. Ravindra Sharma, Prof. A.A. Ghute, | Balance-of-System (BOS) of so Power Plant and Project Discussion |

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|---|---|---|---|---|---|
| 16/01/2019 | Wednesday | I | 2:00pm-5.00pr | Mr. Ravindra Sharma,<br>Prof. A.A. Ghute, | Balance-of-System (BOS) of sc<br>Power Plant and Project Discussion |
| 17/01/2019 | Thursday | I | 2:00pm-5.00pr | Mr. Ravindra Sharma,<br>Prof. A.A. Ghute, | Project assignment & Discussion |
| 18/01/2019 | Friday | I | 11.00 am-2.00p<br>2:00pm-5.00pr | Mr. Ravindra Sharma, , | Project assignment & Discussion |
| 19/01/2019 | Saturday | I | 2:00pm-4.00pr | Mr. Ravindra Sharma,<br>Prof. A.A. Ghute, | Concluding Remarks and<br>Quiz and Feedback |

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P.R. Pote Patil College of Engineering and Management, Amravati

Department of Electrical engineering

Academic Year 2018-19

Report on

**Training Program on Rooftop Solar PV System Installation**


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**Name of course:** Training Program on Rooftop Solar PV System Installation

**Nature of course:** Certificate Program

**Course Duration:** 30 Hours

**Career opportunity**:

1. Design Engineer - Solar
2. Become entrepreneur / self employed.
3. Area Sales Manager-Solar Thermal & PV Products.

**Objectives of the Course**:

This is a skill oriented course in the study of solar photovoltaic (PV) cells, modules, and system components; electrical circuits; PV system design and sizing for use on homes, commercial building etc., understanding energy conversion from sunlight to electricity, and working with solar conversion equipment. This Course will give students the book knowledge and hands on experience needed to become entrepreneur / self employed.

**Course Outcomes**

On completion of this course, the students will be able to exhibit

CO1. Conceptual knowledge of the technology, economics and regulation related issues associated with solar power development and management

CO2. Ability to analyse the viability of solar power projects

CO3. Capability to integrate various options and assess the business and policy environment regarding solar power projects

CO4. Advocacy of strategic and policy recommendations on usage of solar power

**Outcome of workshop:**Upon completion of this course, the student will be able to:

6. Demonstrate knowledge of and apply key solar electric system terms and concepts.
7. Size and design a photovoltaic system.
8. Mount, ground, position, install, wire and connect a photovoltaic system.
9. Test voltage generated by photovoltaic system Operate & Maintain of Solar Power.
10. Participants will learn different types of solar PV module and batteries used in solar PV plant.
11. Design of solar PV Plant based on estimated loads.

**Duration of course :** 7th to 19thJan 2019

**Resource person :** Mr. Ravindra Sharma, Director, Autosys Indore,

Prof. A.A. Ghute, Astt. Prof. PRPCEM, Amravati

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**Target participants :** Electrical Engineering Students.

**Course Structure and Syllabus**

This is a skill oriented course in the study of solar photovoltaic (PV) cells, modules, and system components; electrical circuits; PV system design and sizing for use on homes, commercial building etc., understanding energy conversion from sunlight to electricity, and working with solar conversion equipment.

**Course Contents :**

- Understanding solar cell parameter [5 Hrs]
- Solar PV System Design and Integration[5 Hrs]
- Selecting the solar PV system components [5 Hrs]
- Balance-of-System (BOS) of solar Power Plant [5 Hrs]
- Project assignment & Discussion [5 Hrs]

.

**Course Mapping with POs:**

| **Workshop** | | | | | | | | | | **Academic Year: 2018-19** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Course/Subject: TRAINING on Renewable Energy: Rooftop Solar PV System** | | | | | | | | | | | | |
| **CO** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 3 | 3 | - | - | - |
| **CO2** | 2 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | - | - | - |
| **CO3** | 2 | 2 | 3 | 2 | 1 | 2 | 1 | 2 | 1 | - | - | - |
| **CO4** | 1 | 2 | 2 | 3 | 1 | 3 | 1 | 3 | 2 | - | - | - |
| **Avg** | **2** | **2** | **2** | **2** | **1** | **2** | **1** | **2** | **2** | **-** | **-** | **-** |

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Date: 03/01/2019

# Office Order

The undersigned is pleased to appoint the following staff members of Electrical Engineering Department as **Coordinator and Co-coordinator** for Add-on course on ‘‘**Training Program on Rooftop Solar PV System Installation’’**from 7th to 19th Jan 2019. You are therefore expected to take responsibility of coordinating the related activities & cooperate.

| Sr No. | Faculty | Responsibility |
|---|---|---|
| 01 | Mr. Ravindra Sharma | Resource person |
| 02 | Prof. A.A. Ghute | Co-coordinator |

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Prof. D. A. Shahakar
**HOD (EE Dept)**

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# Department of Electrical Engineering

## Academic Year 2018-19

## NOTICE

Date: 03/01/2019

All the students of Department of Electrical Engineering are hereby informed that, our department is going to organize Training Program on ‘‘**Training Program on Rooftop Solar PV System Installation’’**from7th to 19th Jan 2019. All the students are hereby informed that they have to register for the workshop.

**Prof.D.A.Shahakar**

**HOD(EE)**

Snapshots of Workshop

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Theory session


Practical session of Program

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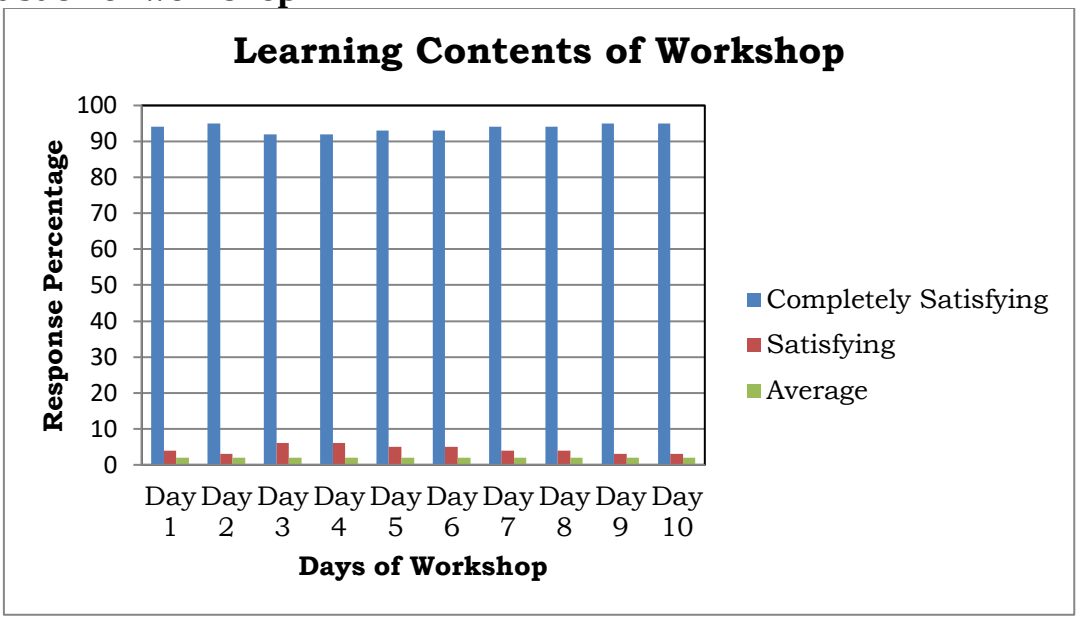
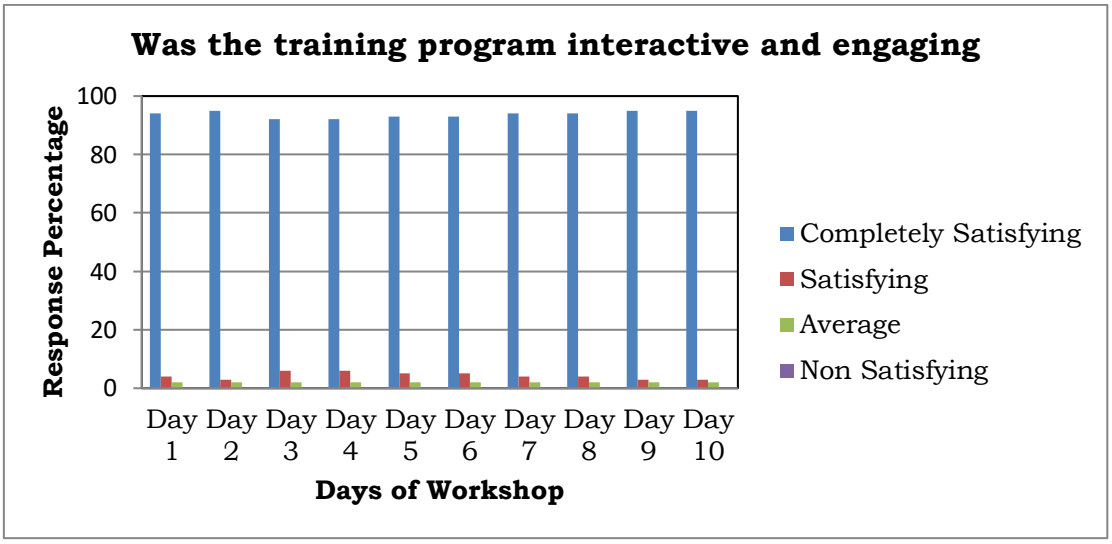
## Feedback of workshop

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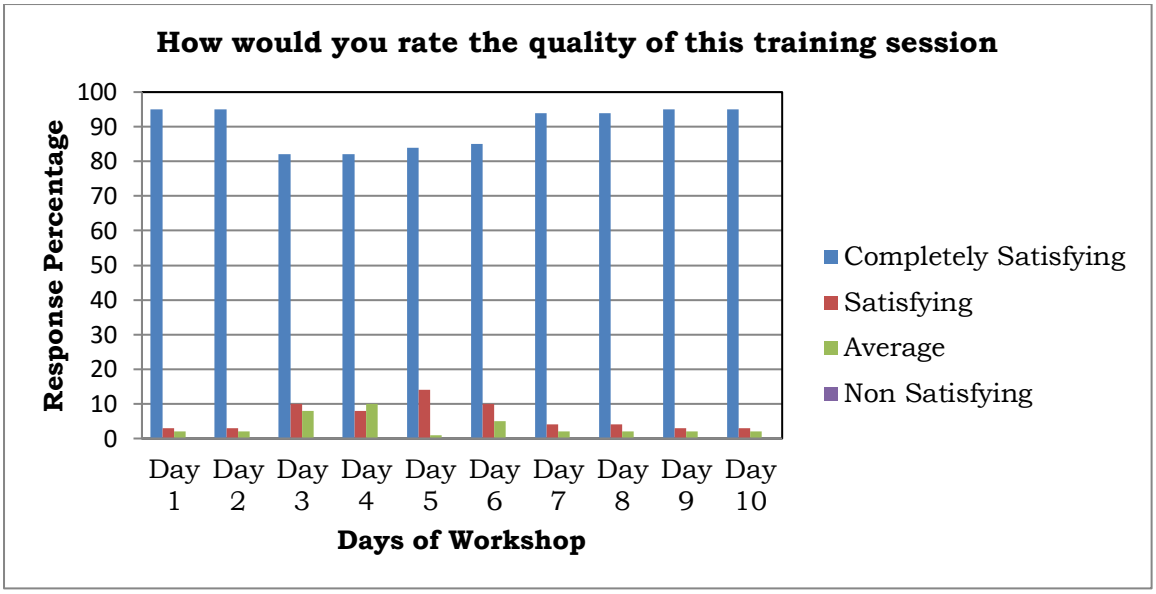


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**Quiz**

1. The current density of a photo voltaic cell ranges from

a. 10 – 20 mA/cm2

**b. 40 – 50 mA/cm2**

c. 20 – 40 mA/cm2

d. 60 – 100 mA/cm2

2. . The function of a solar collector is to convert.....

A. Solar Energy into Electricity

B. Solar Energy radiation

**C. Solar Energy thermal energy**

D. Solar Energy mechanical energy

3. What is the rate of solar energy reaching the earth surface?

a) 1016W b) 865W c) 2854W d) 1912W

**Answer: a**

**Explanation:** The solar energy reaching the surface of the earth is about 1016W whereas the worldwide power demand is 1013W. That means solar energy gives us 1000 times more energy than our requirement.

4. What is total amount of solar energy received by earth and atmosphere?

a) 3.8 X 1024 J/year

b) 9.2 X 1024 J/year

c) 5.4 X 1024 J/year

d) 2.1 X 1024 J/year

**Answer: a**

**Explanation:** Even if we use 5% of this energy, it is more than 50 times our requirement. The total solar radiation absorbed by the earth and its atmosphere is 3.8 X 1024 Joules/year. Except that it is distributed over the area of earth.

5. The process of converting light (photons) to electricity (voltage) is called:

**a)PV effect**. b)solar cell. c)radiation.

6. …….converts sunlight directly into solar power (electricity).

a) battery**. b)solar cell**. c)inverter.



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7. The most expensive type of the solar cells is:

a)AMORPHOUS. b)POLYCRYSTALLINE. **c)MONOCRYSTALLINE.**

8. Which type of solar cells has highest efficiency:

a)AMORPHOUS. b)POLYCRYSTALLINE. **c)MONOCRYSTALLINE.**

9. Which type of solar cells is more efficient in low lights:

**a)AMORPHOUS**. b)POLYCRYSTALLINE. c)MONOCRYSTALLINE.

10. All the electricity produced by the solar panels is produced as:

a)AC. **b)DC**. c) both DC and AC.



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QUIZ RESULT

| Sr. No. | Name | Marks[10] | Sr. No. | Name | Marks[10] |
|---|---|---|---|---|---|
| 1 | Manjiri Kalambe | 7 | 46 | Shubham T Ranotkar | 6 |
| 2 | Pragati Babade | 7 | 47 | Tejas Bambadkar | 7 |
| 3 | Ayushree Wankhade | 6 | 48 | Snehal Wadhai | 8 |
| 4 | Ragni Atram | 8 | 49 | Ujwal Bhagat | 7 |
| 5 | Avantika Kale | 9 | 50 | Chetan Verulka | 7 |
| 6 | Ashwini sarap | 7 | 51 | Manisha Sarap | 9 |
| 7 | Aman Pant | 6 | 52 | Rutik Pnditrao Bijwe | 8 |
| 8 | Amit Mohakar | 5 | 53 | Deep Sanjay Kale | 6 |
| 9 | Tushar Tembhare | 9 | 54 | Chand Rajendra Gedam | 7 |
| 10 | Mrunalini Wadnerker | 6 | 55 | Rushikesh kishor pardhi | 8 |
| 11 | Shrirang Futane | 7 | 56 | Vaibhav Subhash Damle | 9 |
| 12 | Rishikesh Dambale | 8 | 57 | Mrunali Darvinrao Charde | 7 |
| 13 | Nikhil Bhave | 9 | 58 | Diksha Uttamrao Waykud | 6 |
| 14 | Vaibhav Chaware | 6 | 59 | Shamali Vinodrao Mavande | 8 |
| 15 | Athar Shaikh | 8 | 60 | Sweety Kiran Kasdekar. | 9 |
| 16 | Maithili Ninghot | 6 | 61 | Samiksha T Deshmukh | 8 |
| 17 | Amruta Rithe | 9 | 62 | Pranay Prabhakar Hinge. | 6 |
| 18 | Yogini Bhojane | 6 | 63 | Kalpak Wardhe | 8 |
| 19 | Vaibhavi Bhute | 4 | 64 | Shraddha Tekade | 7 |
| 20 | Abhijeet Gawande | 8 | 65 | Snehal Kadu | 7 |
| 21 | Mohit Mehare | 8 | 66 | Ajinkya Gawande | 8 |
| 22 | Prasad Raut | 7 | 67 | Nikhil Kadu | 9 |
| 23 | Kartiket Kadu | 9 | 68 | Ashwini R Damodar | 4 |
| 24 | Vishal Bagade | 8 | 69 | Monali K Kohale | 7 |
| 25 | Manali Waghde | 6 | 70 | Abhishek E Gadekar | 8 |
| 26 | Sakshi Hirulkar | 7 | 71 | Avinash P Adhawal | 7 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 27 | Kanchan Gailwad | 4 | | 72 | Sumit P Gote | 4 |
| 28 | Pooja Indhane | 8 | | 73 | Akash Rathod | 8 |
| 29 | Kalyani Ingle | 5 | | 74 | Rakhi D Goswami | 8 |
| 30 | Akash Sundarkar | 9 | | 75 | Avanti Deepak Deshpande | 7 |
| 31 | Devanshu gayki | 8 | | 76 | Mayur Jadhao | 6 |
| 32 | Moresh sambhare | 7 | | 77 | Pranay Aharwar | 8 |
| 33 | Pallavi manne | 6 | | 78 | Darshan Gupta | 5 |
| 34 | Shrushti isokar | 8 | | 79 | Monali Tayade | 8 |
| 35 | Nikita Mungane | 9 | | 80 | Sujay Anil Bobade | 8 |
| 36 | Swapnil Tumbwad | 9 | | 81 | Komal Suresh Chavhan | 9 |
| 37 | Sanchay Solankhe | 8 | | 82 | Chaitali Panditrao Raut | 9 |
| 38 | Vaibhav Hiwase | 7 | | 83 | Vishakha Sanjay Atkare | 7 |
| 39 | Nikhil Pidurkar | 7 | | 84 | Mrunal Sanjay Sadawarte | 9 |
| 40 | Pooja kopare | 4 | | 85 | Sujay Anil Bobade | 8 |
| 41 | Bhavana Devidas Budhe | 6 | | 86 | Sagar Devidas Jadhao | 7 |
| 42 | Neha Ravindra Lonare | 8 | | 87 | Monali Mundane | 6 |
| 43 | Vaishnavi Prakashrao Lothe | 8 | | 88 | Nayan Garade | 8 |
| 44 | Nikhil Dipakrao Sarode | 7 | | 89 | Vaishnavi Pawar | 6 |
| 45 | Shubham Vijayrao Thakare | 9 | | 90 | Vaishnavi Shete | 6 |

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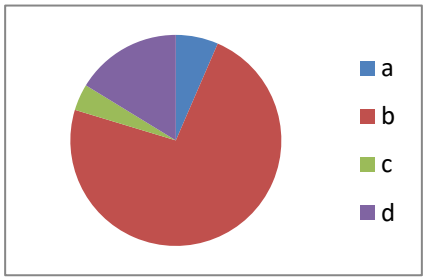
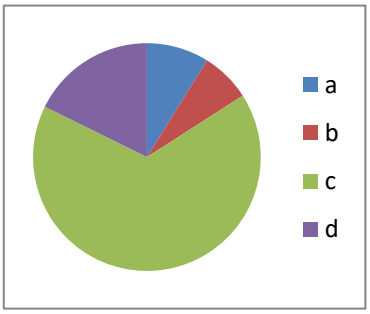
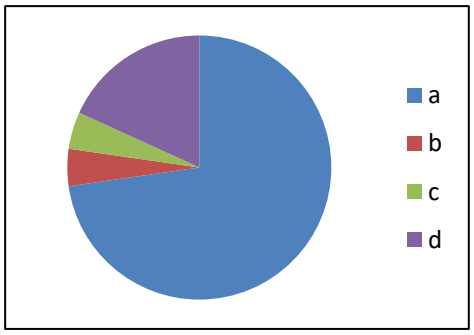
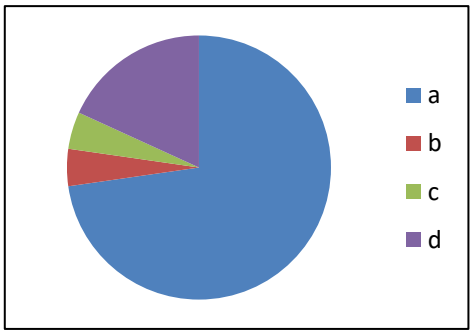
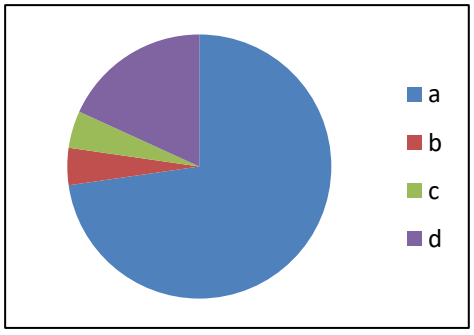
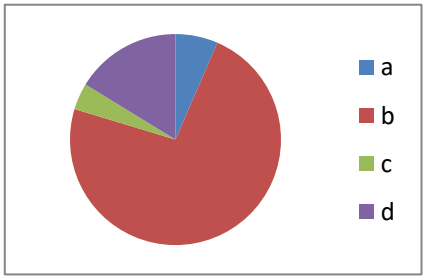
| current density of a photo voltaic cell ranges from   | 2. . The function of a solar collector is to convert.....   |
| 3. What is the rate of solar energy reaching the earth surface?   | 4. What is total amount of solar energy received by earth and atmosphere?   |
| 5. The process of converting light (photons) to electricity (voltage) is called:   | 6. …….converts sunlight directly into solar power (electricity).   |
| 7. The most expensive type of the solar cells is: | 8. Which type of solar cells has highest efficiency: |



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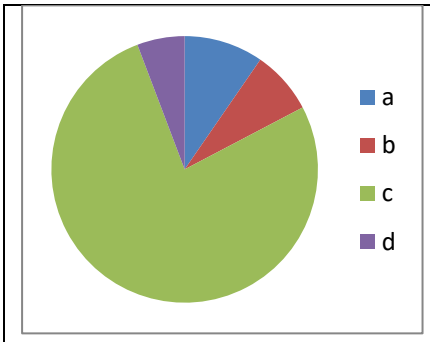
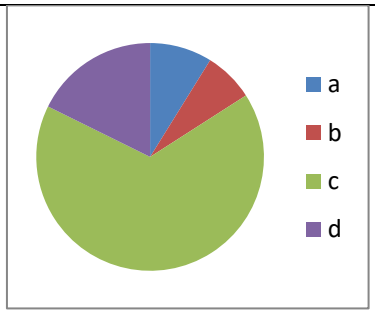
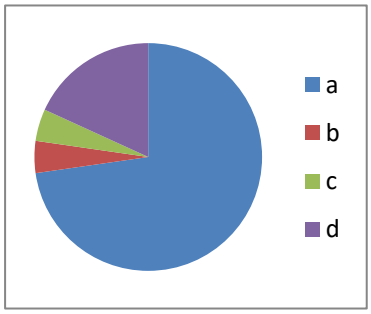
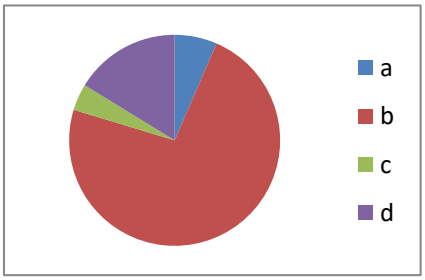
|  |  |
| 9. Which type of solar cells is more efficient in low lights:<br>  | 10. All the electricity produced by the solar panels is produced as:<br>  |



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**Sample Certificate**

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COLLEGE OF ENGINEERING & MANAGEMENT, AMRAVATI

AutoSys Indore

# CERTIFICATE

This is to certify that, Ms. Onam .Y. Waghmare, III Year Stuent of Electrical Engineering Depart,emt has completed Training Program on "Rooftop Solar PV System Installation" organized by Department of Electrical Engineering P. R. Pote (Patil) College of Engineering & Management, Amravati,, during 07/01/2019 to 19/01/2019

Dr. S.B. Warkad
IQAC Coordinator

Prof. D.A. Shahakar
HOD, EE

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