

SNJB (Jain Gurukul's)
K.K.H. Abad Arts, S.M.G. Lodha Commerce & S.P.H. Jain Science College
Neminagar, Chandwad-423101, Dist.-Nashik, Maharashtra.



Establishment
27/11/1928

(Affiliated to Savitribai Phule Pune University) Id. No.PU/NS/AC/015/1970

(02556) Off. 252125 Res.252126 Tel. Fax:02556-252125

• P. O. Box No.: 6 • E-mail : alccchandwad@yahoo.co.in

• Website : www.acschandwadcollege.com

Best College Award by Savitribai Phule Pune University (2015-16)

1.1.2:

Name of Course: Solar Photovoltaics and Solar Thermal Energy
(2017-18 & 2018-19)

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ESTD - 1928

S.N.J.B's

KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad. Dist.- Nashik

Department of Physics

Certificate course on

"SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY"

SPSTE 01

date 16/06/2017

date :- 16/6/17

To,
Head Department of Physics
SNJB's KKHA Arts, SMGL Comm and SPHJ Sci College
Chandwad Nashik

Subject: Permission regarding the conduction of Certificate Course on "*Solar photovoltaic's and solar thermal energy*"

Dear Sir,

As per the discussion in the Departmental meeting held on 15 June 2017 we have decided to conduct the certificate course on the "Solar photovoltaic's and solar thermal energy" during 04 - 09 December 2017 for UG and PG students interested in the study of Solar Photovoltaic's and solar thermal energy.

You are requested to permit to conduct the certificate course during this period since regular academics will be no more during this period.

Thanking you

With Warm Regards


16/06/2017

Course Coordinator

Mr. Anil B. Gite



IQAC Remark: - permitted -

Principal Remark:

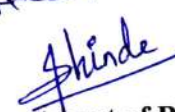
Permitted



PRINCIPAL

KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

permitted & forwarded to IQAC



Head, Department of Physics

HEAD
Department of Physics
KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

Shri Neminath Jain Brahmacharyashram (Jain) (ul's)



स्थापना
१७/११/१९२८

**KARMVEER KESHAVLALJI HARAKCHANDJI ABAD ARTS,
SHRIMAN MOTILALJI GIRIDHARILALJI LODHA COMMERCE
& SHRIMAN P. H. JAIN SCIENCE COLLEGE**

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Dr. G. H. Jain
Principal

M.Sc., A.D.C.S.A & A, Ph.D.
Member - B.O.S. (Physics) University of Pune

Outward No. :

Date : 23/11/2017

NOTICE

All the students of **B.Sc Physics & M.Sc-I&II Physics** are informed that we are conducting the short term certificate course on "**SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY**" SPTE-01 of one week duration (30Hrs) from **04/12/2017 to 09/12/2017**. The number of seats are limited to 10 & course consists of both Hands on Training and Theoretical session. Preference will be given to the highly motivational students wants to pursue their carrier in the same field. Other details are mentioned on the Notice Board.

Coordinator

HOD

Principal


PRINCIPAL







Karmvir Keshavlalji Harakchandji Abad
Arts, Shriman Motilalji Giridharilalji Lodha
Commerce and Shriman P.H.Jain Science
College Chandwad Dist.Nashik

Forwarded to IQAA
23/11/2017

24.11.17

Course Information Booklet

Sr. No.	Particulars	Information to be filled
1.	Course Picture/Logo	 <p align="center">Certificate course on "Solar photovoltaic's and solar thermal energy"</p>
2.	Course Coordinator and other team members' names	<p>Mr. Anil Gite (Course Coordinator) Dr. G. H. Jain Dr. G. E. Patil Dr. S. D. Shinde Dr. T. S. Salve Dr. S. B. Deshmukh</p>
3.	Brief profile of the Course Coordinator and other Team Members	<ul style="list-style-type: none"> • Mr. A. B. Gite is presently working as Assistant Professor in Physics at KKHA Arts, SMGL Comm and SPHJ Sci College Chandwad Nashik having 15 years of teaching experience for UG and PG students in Physics. He has expertise in material Science. • Dr. G. H. Jain is working as a Principal and Head at at KKHA Arts, SMGL Comm and SPHJ Sci College Chandwad Nashik. He has guided 11 students for Ph. D and 03 students are presently pursuing Ph. D. under his guidance. He has expertise in thin film synthesis, characterization and gas sensing. • Dr. G. E. Patil is working as Assistant Professor in Physics at KKHA Arts, SMGL Comm and SPHJ Sci College Chandwad Nashik having 08 years of teaching experience for UG and PG students. • Dr. S. D. Shinde is presently working as Assistant Professor in Physics at KKHA Arts, SMGL Comm and SPHJ Sci College Chandwad Nashik having 18 years of teaching experience for UG and PG students in Physics. He has expertise in material Science. • Dr. T. S. Salve is working as Assistant Professor in Electronics at KKHA Arts, SMGL Comm and SPHJ Sci College Chandwad Nashik having 05 years of teaching experience for UG. • Dr. S. B. Deshmukh is working as Associate Professor

		in Mahatma Gandhi Vidyamandir, Malegaon College. He is teaching Physics and having the experience of 30 years. He has expertise in material synthesis and characterizations.
4.	Course Coordinator and other Team Members Designation & Affiliation	Mr. A. B. Gite, Dr. G. H. Jain, Dr. G. E. Patil, Dr. S. D. Shinde, Dr. S. D. Shinde, Dr. T. S. Salve are KKHA Arts, SMGL Comm and SPHJ Sci College Chandwad Nashik and Dr. S. B. Deshmukh is working in Mahatma Gandhi Vidyamandir, Malegaon College.
5.	Course Coordinator and other team members' picture'	   Mr. Anil Gite Dr. G. H. Jain Dr. G. E. Patil    Dr. S. D. Shinde Dr. T. S. Salve Dr. S. B. Deshmukh
6.	Objective of the course	<ol style="list-style-type: none"> 1. To provide exposure to the learner on the solar photovoltaic and different solar generations of solar cells. 2. To let the learner acquire the skill to utilization of solar thermal energy for the household proposes.
7.	Type of Course :UG/PG/Diploma/Certificate /School	Certificate
8.	Intended Audience	UG and PG students of Physics and Electronics having interest in study of solar energy.
9.	No of Credits	NA
10.	Course Duration	30 Hrs

11.	Start date & End date of the Course	04/12/2017 to 09/12/2017
12.	<p>Course Plan</p> <p>Module: I</p> <p>Solar Radiation and Its Measurements</p> <ul style="list-style-type: none"> • Importance of Solar Energy : Nature of solar radiation • Sun as a fusion reactor • special distribution of extraterrestrial radiation • Estimation of extraterrestrial solar radiation • Radiation on horizontal and titled surfaces • Solar Photovoltaics (SPV) Conversion : Basic principles, Types of solar cell materials, Fabrication of solar photovoltaic cells, solar cell parameters and characteristics, • Modules. Block diagram of general SPV conversion system and their characteristics, • Different configurations, Application (such as street light, water pumps, Radio/TV, Small capacity power generation) • Solar Photovoltaic (SPV) Systems Designing : Load estimation, selection of inverters, battery sizing, array sizing. <p>List of Experiments: (Any Three)</p> <ol style="list-style-type: none"> 1. Determination of Calorific value of Wood/Cow dung. 2. Study of Optical Properties of selective coatings. 3. Study of Photovoltaic a Characteristics of Solar Cell (Variation of Intensity, Distance between Source and Solar Cell, and load) 4. Study of power versus load characteristics of Solar Power Photovoltaic Systems and Study of Series and Parallel Combination of Solar Photovoltaic panels. <p>Module: II</p> <p>Photo thermal applications of Solar Energy</p> <ul style="list-style-type: none"> • Selective coatings : Ideal characteristics of selective coating for various applications, • Types of selective coatings, materials and techniques for selective coatings, • Effect of selective coating on the efficiency of solar collectors. • Solar Thermal Devices and Systems • Different types of collectors , Flat plate collector(Basic principle, construction • Energy balance equation of steady state, Testing, Methods to reduce losses) • Solar cooker • Domestic hot water system • Solar dryers • solar pond • Solar still • Solar furnace • Solar refrigeration • Solar concentrators • systems based on use of solar concentrators <p>List of Experiments: (Any Three)</p>	

	<ol style="list-style-type: none"> 1. Study of Hot Water system 2. Determination of heat Loss Coefficient in Flat Plate Collector 3. Study of Solar Dryer (Hot Air Collector) 4. Study of Solar Still 5. Performance Evaluation of Box Type and Concentrating Type Solar Cooker 	
13.	Important Instructions:	<p>Registration is limited to 10 students.</p> <ul style="list-style-type: none"> • This course is offered in partnership (as a fund raiser) with several not-for-profits. • No fee for this one-week and course includes instruction, hands-on labs, study table and lab material, installation tool kit for experiments. • Accommodations facility will be provided for the outstation participants.
14.	Examination Date	NA
15.	<p>Learning outcome</p> <p>After successful completion of this course, the learner will be able to</p> <ol style="list-style-type: none"> 1. Solar radiation spectrum and solar thermal studies. 2. Learner will be able to design solar water heating system for house hold purpose. 	



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KKHA Arts, SMGL Commerce &
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Dist- Nashik 423 101 Maharashtra



Shri Neminath Jain Brahmacharyashram (Jain Gurukul's)

KARMVEER KESHAVLALJI HARAKCHANDJI ABAD ARTS,
SHRIMAN MOTILALJI GIRIDHARILALJI LODHA COMMERCE
& SHRIMAN P. H. JAIN SCIENCE COLLEGE

NEMINAGAR, CHANDWAD - 423 101 (DIST. NASHIK)

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Senior College Code No. 088

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Best College Award - 2015-16 of Savitribai Phule Pune University, Pune

Dr. G. H. Jain
Principal

M.Sc., A.D.C.S.A & A, Ph.D.
Member - B.O.S. (Physics) University of Pune

Outward No. : 272A/ALSC/2017-18

Date 01/09/2017

Dr. S. B. Deshmukh

Associate Professor

MSG College Malegaon,

Malegaon Nashik



Subject: Nomination of BoS member of certificate course and invitation for the meeting

Dear Sir,

As per our telephonic discussion we need your expertise for the syllabus design and conduction of certificate course in "Solar photovoltaic's and solar thermal energy" which will be conducted by Department of Physics. You are **nominated as BoS member** for the above certificate course in from the academic year 2017-18. You **are invited for the meeting** on **06/09/2017** for the same.

Meeting is arranged in Department of Physics **at 4:00pm** on aforesaid date, you are requested to be present on time for the meeting.

With warm regards.

Principal

PRINCIPAL

KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

Shri Neminath Jain Brahmacharyashram (Jain Gurukul's)



स्थापना
१७/११/१९२८

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Outward No. : 272A/ALSC/2017-18

Date : 01/09/2017



To,

Dr. G. H. Jain

Associate Professor

SNJB ACS Chandwad Nashik,

Nashik

Subject: Nomination of BOS Chairman of certificate course and invitation for the meeting

Dear Sir,

As per our discussion we need your expertise for the syllabus design and conduction of certificate course in "Solar photovoltaic's and solar thermal energy" which will be conducted by Department of Physics. You are **nominated as BOS Chairman** for the above certificate course in from the academic year 2017-18. You are **invited for the meeting** on **06/09/2017** for the same.

Meeting is arranged in Department of Physics **at 4:00pm** on aforesaid date, you are requested to be present on time for the meeting.

With warm regards.

Received

PRINCIPAL

K.K.H.A. Arts SMGL Comm.
& S.P.H.J. Science College,
Chandwad, Dist. Nashik - 423 101

Shri Neminath Jain Brahmacharyashram (Jain Gurukul's)

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Member - B.O.S. (Physics) University of Pune

Outward No. : 272A/ALJC/2017-18

Date : 01/09/2017

Dr. S. D. Shinde

Assistant Professor

SNJB ACS Chandwad Nashik,

Nashik



Subject: Nomination of BoS member of certificate course and invitation for the meeting

Dear Sir,

As per our discussion we need your expertise for the syllabus design and conduction of certificate course in "Solar photovoltaic's and solar thermal energy" which will be conducted by Department of Physics. You are **nominated as BoS member** for the above certificate course from the academic year 2017-18. You are **invited for the meeting** on 06/09/2017 for the same. Meeting is arranged in Department of Physics at 4:00pm on aforesaid date, you are requested to be present on time for the meeting.

With warm regards.

Principal

PRINCIPAL

KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

Received.
Shinde

Shri Neminath Jain Brahmacharyashram (Jain Gurukul's)



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Member - B.O.S. (Physics) University of Pune

Outward No. : 272A/ALS/2017-18

Date 01/09/2017

Dr. T. S. Salve

Assistant Professor

SNJB ACS Chandwad Nashik,

Nashik



Subject: Nomination of BoS member of certificate course and invitation for the meeting

Dear Sir,

As per our telephonic discussion we need your expertise for the syllabus design and conduction of certificate course in "Solar photovoltaic's and solar thermal energy" which will be conducted by Department of Physics. You are **nominated as BoS member** for the above certificate course in from the academic year 2017-18. You are **invited for the meeting** on **06/09/2017** for the same.

Meeting is arranged in Department of Physics **at 4:00pm** on aforesaid date, you are requested to be present on time for the meeting.

With warm regards.

Principal
PRINCIPAL

KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

Received,

Shri Neminath Jain Brahmacharyashram (Jain Gurukul's)



स्थापना
१७/११/१९२८

**KARMVEER KESHAVLALJI HARAKCHANDJI ABAD ARTS,
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Principal

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Member - B.O.S. (Physics) University of Pune

Outward No. : 272A/ALJC/2017-18

Date : 01 / 09 / 2017

Dr. G. E. Patil

Assistant Professor

SNJB ACS Chandwad Nashik,

Nashik



Subject: Nomination of BoS member of certificate course and invitation for the meeting

Dear Sir,

As per our discussion we need your expertise for the syllabus design and conduction of certificate course in "Solar photovoltaic's and solar thermal energy" which will be conducted by Department of Physics. You are **nominated as BoS member** for the above certificate course from the academic year 2017-18. You are **invited for the meeting** on 06/09/2017 for the same.

Meeting is arranged in Department of Physics **at 4:00pm** on aforesaid date, you are requested to be present on time for the meeting.

With warm regards.

Principal
PRINCIPAL

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SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

Received
Patil

Shri Neminath Jain Brahmacharyashram (Jain Gurukul's)



स्थापना
१७/११/१९२८

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Member - B.O.S. (Physics) University of Pune

Outward No. : 2721A/ALJC/2017+18

Date : 01/09/2017

To,

Mr. Anil B. Gite

Assistant Professor

SNJB ACS Chandwad Nashik,

Nashik



Subject: Nomination of BoS member of certificate course and invitation for the meeting

Dear Sir,

As per our discussion we need your expertise for the syllabus design and conduction of certificate course in "Solar photovoltaic's and solar thermal energy" which will be conducted by Department of Physics. You are **nominated as BoS member** for the above certificate course in from the academic year 2017-18. You **are invited for the meeting** on 06/09/2017 for the same. Meeting is arranged in Department of Physics **at 4:00pm** on aforesaid date, you are requested to be present on time for the meeting.

With warm regards.

Received
AMM

Principal

PRINCIPAL

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SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra




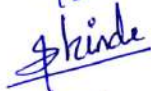


Minutes of Meeting held on 06/09/2017

Meeting for the certificate course syllabus design and implementations was held in Department of Physics on 06/09/2017 at 4:00pm with BoS chairman and members were present during the meeting.

Following points are discussed during the meeting:

- Members were suggested the different topics to be included in the certificate course.
- Experiment part emphasis was suggested and also revive of syllabus will be taken time to time.
- Meeting resolves the syllabus of the course and also decided to take the feedback from various stake holders from time to time.

Following members were present during the meeting.

Dr. G. H. Jain	Chairman	
Dr. S. B. Deshmukh	Member	
Dr. G. E Patil	Member	
Dr. S. D. Shinde	Member	
Dr. T. S. Salve	Member	
Mr. A. B. Gite	Member	

Copy forwarded to:

1. IQAC
2. Head, Department of Physics



स्थापना
१७/११/१९२८

Shri Neminath Jain Brahmacharyashram (Jain Gurukul's)

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M.Sc., A.D.C.S.A & A, Ph.D
Member - B.O.S. (Physics) University of Pune

Outward No. :

Date : / / 201

BoS for Certificate Course on "Solar photovoltaic's and solar thermal energy"

As per the permissions received from the IQAC and discussion in the Departmental Staff meeting we have decided to conduct the certificate course on "Solar photovoltaic's and solar thermal energy" during 04-09 December 2017. We have decided to ~~construct~~ ^{form} the BoS for the said certificate course and following members are appointed as BoS during the period of next five years that is till 2021-22.

Dr. G. H. Jain	Chairman
Dr. S. B. Deshmukh	Member
Dr. G. E Patil	Member
Dr. S. D. Shinde	Member
Dr. T. S. Salve	Member
Mr. A. B. Gite	Member

All above member will work as BoS for the certificate Course for the next five years.


IQAC



Principal

PRINCIPAL

KKHA Arts, SMGL Commerce &
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Dist- Nashik 423 101 Maharashtra

Schedule of Course

Sr. No	Day and date	Time	Topics	Expert
1.	Monday 04/12/2017	11.00 to 12.00pm	<ul style="list-style-type: none"> • Importance of Solar Energy : Nature of solar radiation • Sun as a fusion reactor • special distribution of extraterrestrial radiation (Two Experiments' for Hands on Practice)	Dr. G. E. Patil
		12.00pm to 1.00pm		
		Break		
		2.00pm to 3.00pm		
		3.00pm to 4.00pm		
		4.00pm to 5.00pm		
2	Tuesday 05/12/2017	11.00 to 12.00pm	<ul style="list-style-type: none"> • Estimation of extraterrestrial solar radiation • Radiation on horizontal and titled surfaces • Solar Photovoltaics (SPV) Conversion : Basic principles, Types of solar cell materials, Fabrication of solar photovoltaic cells, solar cell parameters and characteristics, (Two Experiments' for Hands on Practice)	Dr. S. D. Shinde
		12.00pm to 1.00pm		
		Break		
		2.00pm to 3.00pm		
		3.00pm to 4.00pm		
		4.00pm to 5.00pm		
3	Wed 06/12/2017	11.00 to 12.00pm	<ul style="list-style-type: none"> • Modules. Block diagram of general SPV conversion system and their characteristics, • Different configurations, Application (such as street light, water pumps, Radio/TV, Small capacity power generation) • Solar Photovoltaic (SPV) Systems Designing: Load estimation, selection of inverters, battery sizing, and array sizing. (Two Experiments' for Hands on Practice)	Mr. G. H. Jain
		12.00pm to 1.00pm		
		Break		
		2.00pm to 3.00pm		
		3.00pm to 4.00pm		
		4.00pm to 5.00pm		
4	Thursday 07/12/2017	11.00 to 12.00pm	<ul style="list-style-type: none"> • Selective coatings : Ideal characteristics of selective coating for various applications, • Types of selective coatings, materials and techniques for selective coatings, • Effect of selective coating on the efficiency of solar collectors. (Two Experiments' for Hands on Practice)	Dr. S. B. Deshmukh
		12.00pm to 1.00pm		
		Break		
		2.00pm to 3.00pm		
		3.00pm to 4.00pm		
		4.00pm to 5.00pm		


5	Friday 08/12/2017	11.00 to 12.00pm	<ul style="list-style-type: none"> • Solar Thermal Devices and Systems • Different types of collectors , Flat plate collector(Basic principle, construction • Energy balance equation of steady state, Testing, Methods to reduce losses) • Solar cooker • Domestic hot water system (Two Experiments' for Hands on Practice)	Mr. Anil B. Gite
		12.00pm to 1.00pm		
		Break		
		2.00pm to 3.00pm		
		3.00pm to 4.00pm		
		4.00pm to 5.00pm		
6	Saturday 09/12/2017	11.00 to 12.00pm	<ul style="list-style-type: none"> • solar pond • Solar still • Solar furnace • Solar refrigeration • Solar concentrators • systems based on use of solar concentrators (Two Experiments' for Hands on Practice)	Dr. T. S. Salve
		12.00pm to 1.00pm		
		Break		
		2.00pm to 3.00pm		
		3.00pm to 4.00pm		
		4.00pm to 5.00pm		

S.N.J.B's
KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad.
Dist.- Nashik

Department of Physics
Certificate course on
“Solar photovoltaics and solar thermal energy”

Students List

Sr.No.	Name of the Students	Class	Mob.No.
1	Jadhav Pavan Sharad	M.Sc-II	9552785011
2	Bhoye Tejas Ramesh	M.Sc-II	9730956949
3	Taskar Kanchan Keshav	M.Sc-II	9763676235
4	Gangurde Gorakh waluba	M.Sc-II	8805656925
5	Kale Navanath Ramesh	M.Sc-II	7083513168
6	Sonar Yogesh Sanjay	M.Sc-II	9970537937
7	Kale Priyanka Anil	M.Sc-II	7588306586
8	Thakare Vaishali Hanuman	M.Sc-II	9423527993
9	Pawar Rupali Kishor	M.Sc-II	9075558863
10	Thakare Bhagyashri Anil	M.Sc-II	9665185812


Coordinator *Anil B. G.*


HOD

HEAD
Department of Physics
KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

S.N.J.B's
KKHA Arts SMGL Comm. and SPHJ Science College,
Chandwad .Dist.- Nashik
Department of Physics
Certificate course on "Solar photovoltaics and solar thermal energy"
Attendance sheet

Sr. No.	Name of the students	04/12/2017	05/12/2017	06/12/2017	07/12/2017	08/12/2017	09/12/2017
1	Jadhav Pavan Sharad	P	P	P	P	P	P
2	Bhoye Tejas Ramesh	P	P	P	P	P	P
3	Taskar Kanchan Keshav	P	P	P	P	P	P
4	Gangurde Gorakh waluba	P	P	P	P	P	P
5	Kale Navanath Ramesh	P	P	P	P	P	P
6	Sonar Yogesh Sanjay	P	P	P	P	P	P
7	Kale Priyanka Anil	P	P	P	P	P	P
8	Thakare Vaishali Hanuman	P	P	P	P	P	P
9	Pawar Rupali Kishor	P	P	P	P	P	P
10	Thakare Bhagyashri Anil	P	P	P	P	P	P


Mr. A. B. Gite
 Coordinator

Report on Certificate Course

Certificate course on “Solar photovoltaics and solar thermal energy” was held in the Department of Physics during 04-09 December 2017. Ten students were participated in the certificate course from the department of physics. The course was scheduled with different faculty members during the period. Student has taken the keen interest in the theory and practical sessions during the course. Few snaps of students during the experiment sessions are given below.



Photo: Students performing the various experiments during the certificate course.

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Shri Neminnath Jain Brahmacharyashram (Jain Gurukul's)

K. K. H. Abad Arts, S. M. G. Lodha Commerce and S. P. H. Jain Science College,

Neminagar, Chandwad, Dist-Nashik 423 101

Re-accredited by NAAC, with 'B' Grade

"Best College Award 2015-16 of Savitribai Phule Pune University, Pune"



Certificate Course on - "Solar Photovoltaic's and Solar Thermal Energy"

04th to 09th December, 2017

Sponsored by

Department of Physics

CERTIFICATE

This is to certify that

Class: **M.Sc. II** has participated in **Certificate**

Course on - "Solar Photovoltaic's and Solar Thermal Energy" held on 04th to 07th December 2017, organized by SNJB's KKHA Arts, SMGL Commerce and SPHJ Science College, Chandwad.

Mr. A. B. Gite

Coordinator

Smt. Dr. S. D. Shinde

Head of Department

Dr. G. H. Jain

Principal



S.N.J.B. ASHRAM'S
K.K.H.A. ARTS, S.M.G.L. COMMERCE & S.P.H.J. SCIENCE
SENIOR COLLEGE CHANDWAD, Dist.: Nashik, 423 101
Department of Physics



Certificate Course on "Solar Photovoltaic and Solar Thermal Energy"
04/12/2017 to 09/12/2017

Course Outcomes

Name of Programme: Certificate Course on *Solar Photovoltaic and Solar Thermal Energy*

Type of Programme: Certificate Course

Programme Code: PHYCC-001

Course Code: SPSTE-001

Academic Year: 2017-18

1. Students learned various features of Solar Photovoltaic and Solar Thermal Energy.
2. Students learned the solar radiation coming on the earth surface and designing of solar photovoltaic system.
3. Students learned various coating used for the harvesting the solar thermal energy.
4. Students are able to use solar thermal energy equipment's and use of them.
5. Major outcome is students are able to design the solar system for the house hold purpose.



Mr. Anil B. Gite
Co-Ordinator



(Dr. G. H. Jain)

PRINCIPAL
K.K.H.A. Arts SMGL Comm.
& S.P.H.J. Science College,
Chandwad, Dist. Nashik - 423 101



S.N.J.B. ASHRAM'S
K.K.H.A. ARTS, S.M.G.L. COMMERCE & S.P.H.J. SCIENCE
SENIOR COLLEGE CHANDWAD, Dist.: Nashik, 423 101
Department of Physics

Certificate Course on "Solar Photovoltaic and Solar Thermal Energy"
04/12/2017 to 09/12/2017



Multiple Choice Question paper

Time: 30 minutes

Name of Student: -----

Class: -----

- All Questions Compulsory
- Each Question carry two marks
- No negative marking

1. **Which of the following is a disadvantage of renewable energy?**
 - a) High pollution
 - b) Available only in few places
 - c) High running cost
 - d) Unreliable supply
2. **A Solar cell is an electrical device that converts the energy of light directly into electricity by**
 - a) Photovoltaic effect
 - b) Chemical effect
 - c) Atmospheric effect
 - d) Physical effect
3. **Wood is a renewable resource.**
 - a) True
 - b) False
4. **In hydroelectric power, what is necessary for the production of power throughout the year?**
 - a) Dams filled with water
 - b) High amount of air
 - c) High intense sunlight
 - d) Nuclear power
5. **The main composition of biogas is _____**
 - a) Methane
 - b) Carbon dioxide
 - c) Nitrogen
 - d) Hydroge
6. **Which Ministry is mainly responsible for research and development in renewable energy sources such as wind power, small hydro, biogas and solar power?**
 - a) Human Resource Development
 - b) Agriculture and Farmers Welfare
 - c) Ministry of New and Renewable Energy
 - d) Health and Family Welfare
7. **Which among the following have a large amount of installed grid interactive renewable power capacity in India?**
 - a) Wind power
 - b) Solar power
 - c) Biomass power
 - d) Small Hydro power
8. **The world's first 100% solar powered airport located at _____**
 - a) Cochin, Kerala

- b) Bengaluru, Karnataka
 - c) Chennai, Tamil Nadu
 - d) Mumbai, Maharashtra
9. **Which of the following is not under the Ministry of New and Renewable Energy?**
- a) Wind energy
 - b) Solar energy
 - c) Tidal energy
 - d) Large hydro
10. **Where is the largest Wind Farm located in India?**
- a) Jaisalmer Wind Park, Rajasthan
 - b) Muppandal Wind Farm, Tamil Nadu
 - c) Vaspeta Wind Farm, Maharashtra
 - d) Chakala Wind Farm, Maharashtra
11. **Solar radiation which reaches the surface without scattering or absorbed is called ---**
- a) Beam Radiation
 - b) Infrared radiation
 - c) Ultraviolet radiation
 - d) Diffuse radiation
12. **The scattered solar radiation is called _____**
- a) Direct Radiation
 - b) Beam Radiation
 - c) Diffuse radiation
 - d) Infrared Radiatio
13. **Solar radiation received at any point of earth is called _____**
- a) Insolation
 - b) Beam Radiation
 - c) Diffuse Radiation
 - d) Infrared rays
14. **Insolation is less _____**
- a) when the sun is low
 - b) when the sun right above head
 - c) at night
 - d) at sun rise
15. **What is unit of nuclear radiation?**
- a) Reaumur
 - b) Roentgen
 - c) Rankine
 - d) Pascal
16. **Which type of fuel is removed from the reactor core after reaching end of core life service?**
- a) Burnt Fuel
 - b) Spent fuel
 - c) Engine oil
 - d) Radioactive fuel
17. **A module in a solar panel refers to**
- a. Series arrangement of solar cells.
 - b. Parallel arrangement of solar cells.
 - c. Series and parallel arrangement of solar cells.
 - d. None of the above.
18. **The efficiency of the solar cell is about**
- a. 25 %
 - b. 15 %
 - c. 40 %
 - d. 60 %
19. **For satellites the source of energy is**
- a. Solar cell

- b. Fuel cells
 - c. Edison cells
 - d. Cryogenic storage
20. **The output of the solar cell is of the order**
- a. 0.5 W
 - b. 1.0 W
 - c. 5.0 W
 - d. 10.25 W
21. **In a fuel cell cathode is of**
- a. Oxygen
 - b. Ammonia
 - c. Hydrogen
 - d. Carbon monoxide
22. **What is the maximum possible output of a solar array?**
- a. 300 W/m²
 - b. 100 W/m²
 - c. 250 W/m²
 - d. 500 W/m²
23. **How long does it take for sunlight to travel from the sun to the Earth?**
- A. 8 seconds
 - B. 8 minutes
 - C. 8 hours
 - D. 8 days
24. **What percentage of the world's energy is predicted to come from renewable sources by 2040?**
- A. 20% B. 30% C. 40% D. 50%
25. **The commercial sources of energy are**
- (a) solar, wind and biomass
 - (b) fossil fuels, hydropower and nuclear energy
 - (c) wood, animal wastes and agriculture wastes
 - (d) none of the above

Answers Key :

1d	2a	3b	4a	5a	6c	7 a	8 a	9d	10 b
11a	12c	13a	14a	15b	16b	17c	18b	19a	20b
21c	22c	23b	24d	25b					



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KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad.Dist.- Nashik

Department of Physics

***Certificate course on
(SPSTE02)***

"SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY"

Date: 19/03/2019

To,

The Principal / IQAC
SNJB's KKHA Arts, SMGL Comm. & SPHJ Science
College, Chandwad Dist.-423101

Subject: Regarding the permission for the certificate course for M. Sc- I & II students

Respected Sir/Madam,

As mentioned in the subject above we want to conduct an 30Hrs certificate course on” **SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY**” for M. Sc-II students during 22/03/2019 to 27/03/2019. The details of the certificate course and syllabus are attached here with.

Thanking you,


PRINCIPAL
KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra


20/3/2019
NAAC


(Smt. Dr. S. D. Shinde)

HEAD
Department of Physics
KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra

Date: 19/03/2019

To,


The Head of Department
Department of Physics
SNJB's KKHA Arts, SMGL Comm. & SPHJ Science
College, Chandwad Dist.-423101

Subject: Regarding the permission for the certificate course for M. Sc- I & II students

Respected Sir/Madam,

As mentioned in the subject above we want to conduct an 30Hrs certificate course on " **SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY**" for M. Sc- I & II students during 22/03/2019 to 27/03/2019. The details of the certificate course and syllabus are attached here with.

Thanking you,



19/03/2019

Mr. Anil B. Gite
(Certificate course Coordinator)



HEAD
Department of Physics
KKHA Arts, SMGL Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101 Maharashtra



Shri Neminath Jain Brahmacharyashram's
K. H. A. Arts, S. M. G .L. Commerce & S. P. H. J. Science College,
Neminagar, Chandwad ,Dist.-Nashik 423 101
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"Best College Award 2015-16 of Savitribai Phule Pune University, Pune"

Date: 19/03/2019

NOTICE

All the students of **M. Sc- I & II (Physics)** are informed that we are conducting the short term certificate course on **"SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY"** SPTE-02 of one week duration (30Hrs) from **22/03/2019 to 27//03/2019**. The number of seats are limited & course consists of both Hands on Training and Theoretical session. Preference will be given to the highly motivational students wants to pursue their carrier in the sure field. Other details are mentioned on the Notice Board.

Coordinator
Department of Physics
KKHA Arts, SMGL Commerce &
PHJ Science College, Chandwad

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SNJB's

KKHA Arts SMGL Comm and SPHJ Science College Chandwad Nashik
Department of Physics

Certificate course on

SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY

Course Code: SPSTE02

Course Duration: One Week (30 Hours)

Date: 22/03/2019 to 27/03/2019

Course Content Includes:

Module: I

Solar Radiation and Its Measurements

- Importance of Solar Energy : Nature of solar radiation
- Sun as a fusion reactor
- special distribution of extraterrestrial radiation
- Estimation of extraterrestrial solar radiation
- Radiation on horizontal and tilted surfaces
- Solar Photovoltaics (SPV) Conversion : Basic principles, Types of solar cell materials, Fabrication of solar photovoltaic cells, solar cell parameters and characteristics,
- Modules. Block diagram of general SPV conversion system and their characteristics,
- Different configurations, Application (such as street light, water pumps, Radio/TV, Small capacity power generation)
- Solar Photovoltaic (SPV) Systems Designing : Load estimation, selection of inverters, battery sizing, array sizing.

List of Experiments: (Any Three)

1. Determination of Calorific value of Wood/Cow dung.
2. Study of Optical Properties of selective coatings.
3. Study of Photovoltaic a Characteristics of Solar Cell (Variation of Intensity, Distance between Source and Solar Cell, and load)
4. Study of power versus load characteristics of Solar Power Photovoltaic Systems and Study of Series and Parallel Combination of Solar Photovoltaic panels.
5. Study of Solar Collector (Efficiency versus $\Delta T/I$)

Module: II

Photo thermal applications of Solar Energy

- Selective coatings : Ideal characteristics of selective coating for various applications,
- Types of selective coatings, materials and techniques for selective coatings,
- Effect of selective coating on the efficiency of solar collectors.
- Solar Thermal Devices and Systems
- Different types of collectors , Flat plate collector(Basic principle, construction
- Energy balance equation of steady state, Testing, Methods to reduce losses)
- Solar cooker
- Domestic hot water system
- Solar dryers
- solar pond
- Solar still
- Solar furnace
- Solar refrigeration
- Solar concentrators
- systems based on use of solar concentrators

List of Experiments: (Any Three)

1. Study of Hot Water system
2. Determination of heat Loss Coefficient in Flat Plate Collector
3. Study of Solar Dryer (Hot Air Collector)
4. Study of Solar Still
5. Performance Evaluation of Box Type and Concentrating Type Solar Cooker

Important Instructions:

Registration is limited to 30 students. This course is offered in partnership (as a fund raiser) with several not-for-profits. No fee for this one-week and course includes instruction, hands-on labs, study table and lab material, installation tool kit for experiments. Accommodations facility will be provided for the outstation participants.


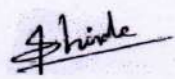


Minutes of Meeting held on 19/03/2019

Meeting for the certificate course syllabus design and implementations was held in Department of Physics on 19/03/2019 at 4:00pm with BoS chairman and members were present during the meeting.

Following points are discussed during the meeting:

- Members were suggested the different topics to be included in the certificate course.
- Experiment part emphasis was suggested and also revive of syllabus will be taken time to time.
- Meeting resolves the syllabus of the course and also decided to take the feedback from various stake holders from time to time.

Following members were present during the meeting.

Dr. G. H. Jain	Chairman	
Dr. S. B. Deshmukh	Member	
Dr. G. E Patil	Member	
Smt. Dr. S. D. Shinde	Member	
Dr. T. S. Salve	Member	
Mr. A. B. Gite	Member	

Copy forwarded to: IQAC

Schedule of Course

Sr.No	Day and date	Time	Topics	Expert
1	22/03/2019	09.00 to 10.00pm	<ul style="list-style-type: none"> Importance of Solar Energy : Nature of solar radiation Sun as a fusion reactor special distribution of extraterrestrial radiation (Two Experiments' for Hands on Practice)	Mr. A. B. Gite
		10.00am to 11.00am		
		11:00am to 12.00 pm		
		Break		
		4.00pm to 5.00pm		
		5.00pm to 6.00 pm		
2	23/03/2019	09.00 to 10.00pm	<ul style="list-style-type: none"> Estimation of extraterrestrial solar radiation Radiation on horizontal and tilted surfaces Solar Photovoltaics (SPV) Conversion : Basic principles, Types of solar cell materials, Fabrication of solar photovoltaic cells, solar cell parameters and characteristics, (Two Experiments' for Hands on Practice)	Mr. G. B. Dhomse Miss. A. H. Patil
		10.00am to 11.00am		
		11:00am to 12.00 pm		
		Break		
		4.00pm to 5.00pm		
		5.00pm to 6.00 pm		
3	24/03/2019	09.00 to 10.00pm	<ul style="list-style-type: none"> Modules. Block diagram of general SPV conversion system and their characteristics, Different configurations, Application (such as street light, water pumps, Radio/TV, Small capacity power generation) Solar Photovoltaic (SPV) Systems Designing: Load estimation, selection of inverters, battery sizing, and array sizing. (Two Experiments' for Hands on Practice)	Dr. G. E. Patil Mr. R.D.Pathare
		10.00am to 11.00am		
		11:00am to 12.00 pm		
		Break		
		4.00pm to 5.00pm		
		5.00pm to 6.00 pm		
4	25/03/2019	09.00 to 10.00pm	<ul style="list-style-type: none"> Selective coatings : Ideal characteristics of selective coating for various applications, Types of selective coatings, materials and techniques for selective coatings, Effect of selective coating on the efficiency of solar collectors. (Two Experiments' for Hands on Practice)	Dr. T. S. Salve Smt.Dr.S.D.Shinde
		10.00am to 11.00am		
		11:00am to 12.00 pm		
		Break		
		4.00pm to 5.00pm		
		5.00pm to 6.00 pm		
5	26/03/2019	09.00 to 10.00pm	<ul style="list-style-type: none"> Solar Thermal Devices and Systems Different types of collectors , Flat plate collector(Basic principle, construction Energy balance equation of steady state, Testing, Methods to reduce losses) Solar cooker Domestic hot water system (Two Experiments' for Hands on Practice)	Prof. L. A. Patil Mr.V. S. Pawar
		10.00am to 11.00am		
		11:00am to 12.00 pm		
		Break		
		4.00pm to 5.00pm		
		5.00pm to 6.00 pm		
6	27/03/2019	09.00 to 10.00pm	<ul style="list-style-type: none"> solar pond Solar still Solar furnace Solar refrigeration Solar concentrators systems based on use of solar concentrators (Two Experiments' for Hands on Practice)	Prof. L. A. Patil Mr. Y. B.Kavade
		10.00am to 11.00am		
		11:00am to 12.00 pm		
		Break		
		4.00pm to 5.00pm		
		5.00pm to 6.00 pm		

Note: Regular schedule will be conducted as per time table.

Mr. HOD
physics department

विषय : वस न शांबल्यामूळ काल
उशीर झाला म्हणून certificate
course ला गैरहजर राहण्याबाबत

महोदय,

दिनांक ~~22~~ 22-03-19 रोजी
सकाळी आमची वस न शांबल्यामूळ certifi-
-cate course ला उशीर झाला. आज
पासून आम्हाला certificate course ला
join करावे. ही गम विनंती

आपली विश्वासू
MSC-I

- 1) Pawar Payal Kailas
- 2) Sagar Rutuja Karbhari
- 3) Vyavhare Jagruti
- 4) Gangurde Vaishali
- 5) Ahire Kavari

Attendance from today
MSK
23/03/2019

~~MSK~~

From 23/03/2019 the
regular course has been
attended by
MSK.

मा. HOD,

.. Physics Department,

विषय - certificate course ला गॅरहजर सहकार्यालय
राहण्याबाबत

नाव - MSc-I student

महोदय,

दिसांक 22/03/2019 पासून certificate
course चालु झाला. खहिल्या विवशी MSc-I
च्या 6 मुली गॅरहजर आहेत. उदया पासून ते
Regular attend certificate course attend करार
आहित. तरी त्यांना उदया पासून certificate course
ला Join करावे.

नम्रविनंती

आपला विश्वासु,
MSc-I student.

- 1) Arhad Rajeshri
- 2) Jadhav Harshali
- 3) Shinde Priyanka
- 4) Thakre Sampada
- 5) Dandekar Kavari
- 6) Vyawase Jagruti
- 7) Nikam Sagar
- 8) Desai Harshada

Approved from [Signature]

[Signature]
22/03/2019

[Signature]

[Signature]

HEAD
Department of Physics
KKHA Arts, SMGI, Commerce &
SPHJ Science College, Chandwad
Dist- Nashik 423 101, Maharashtra

S.N.J.B's
KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad. Dist.-Nashik
Department of Physics
Certificate course on "Solar photovoltaics and solar thermal energy"
Students Attendance List

Date: 22/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
1	Huda Imran Ahemad	Msc II	9028745463	Huda
2	Shikalkar Zeba S.S.J	Msc II	8999845869	Zeba
3	Wasolkar Shital Anil	Msc-I	8275833534	Shital
4	Balunke Prem Sunesh	-II-	9689196928	Prem
5	Dongare Rohini Numdeo	Msc I	9146735984	Rohini
6	Sonawane monali sanjay	Msc-II	7057133517	Monali
7	Sable Mayur Madan	Msc-II	9764952536	Mayur
8	Patil Yogesh Jagannath	Msc-II	7028492937	Patil
9	Gaikwad Harshal Ranjan	Msc-I	9975500582	Harshal
10	Jondhale Rupali M.	Msc-II	7767931309	Rupali
11	Deore Pranali D	Msc-II	9049967448	Pranali
12	Gangurde Preeti Gokul	Msc II	7066311633	Preeti
13	Mahire Jayashri Uttamrao	Msc-II	7066139388	Jayashri
14	Kshiresugde Pratiksha Keshav	Msc-II	9764716847	Pratiksha
15	Deore Mayuri Sunil	M.Sc II	9284368412	Mayuri
16	Jadhav Swati Radhakrishan	Msc-I	7028312674	Swati
17	Sonawane Suyesh Ashok	Msc-II	9834803860	Suyesh
18	Pagire Gitanjali Bulamatl	Msc-I	8308268578	Gitanjali
19	Mariyaz Nagema Shakil	Msc-I	9552045905	Nagema
20	Dhamane Rowini Manohar	Msc-II	9139026919	Rowini
21	Sadeqna Masood Azaad	Msc II	8237994846	Sadeqna
22				
23				
24				
25				

HOD
Department of Physics
 KKHA Arts, SMGL Commerce &
 SPHJ Science College, Chandwad
 Dist- Nashik 423 101 Maharashtra

Coordinator
 Gite AB
 22/3

Expert
 Gite AB
 22/03

S.N.J.B's
KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad. Dist.-Nashik
Department of Physics
Certificate course on "Solar photovoltaics and solar thermal energy"
Students Attendance List

Date: 23/08/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
1	Huda Imran Ahemad	Msc II	9028745463	Huda
2	Shikalkar zeba S.S.J	MSc II	8999845869	Zeba
3	Patil Yogesh Jagannath	Msc-II	7028492937	Patil
4	Sable Mayur Madan	MSc-II	9764952536	Sable
5	Thakare Sampada Babasaheb	Msc-I	8668611995	Thakare
6	Jadhav Hareshali Himaman	Msc-I	8908064520	Jadhav
7	Shinde priyanka kashav	Msc-I	7218232146	Shinde
8	Vyavhaze Jagruti Rajendra	Msc-I	8983078135	Vyavhaze
9	Avhad Rajashri Madhukar	Msc-I	8669764202	Avhad
10	Gangurde Vaishali bitarram	Msc-I	9021295502	Gangurde
11	Ahire kaveer Bapu	Msc-I	9067739026	Ahire
12	Dongare Rohini Namdeo	MSc I	9146735984	Dongare
13	Wasulkar Shital Anil.	Msc-I.	8275833534	Wasulkar
14	Salunke Prem Suresh	-II-	9689196928	Salunke
15	Deore Harshada Kailas	Msc-I	9067627980	Deore
16	Deore Pranali Dilip	Msc-II	9049967448	Deore
17	Gaikwad Harshal Ranjan	Msc-I	9975500582	Gaikwad
18	kshiresagar Peatitsha keshav	Msc-II	9764716847	Kshiresagar
19	Deore Mayuri sunil	MSc II	9284368412	Deore
20	Jadhav swati Radhakrishnan	Msc-II	7028312674	Jadhav
21	sonawane monalisarya	Msc-II	7057133517	Sonawane
22	sagar Rutuja karbhari	Msc-I	93857169619	Sagar
23	Dhamane Rowai Manohar	Msc-II	9139026919	Dhamane
24	Pawar Payal Kai las	Msc-I	9763581104	Pawar
25	Mahire Jayashri Uttamrao	Msc-II	7066139388	Mahire

Shinde
HOD

[Signature]
Coordinator
[Signature]

Expert
[Signature]
G.B. Dhomse

Department of Physics
 KKHA Arts, SMGL Commerce &
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 Dist- Nashik 423 101 Maharashtra

S.N.J.B's
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Department of Physics
Certificate course on "Solar photovoltaics and solar thermal energy"
Students Attendance List

Date: 24/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
1	Gairwad Harshal Ranjan	MSc-I	9975500582	<i>[Signature]</i>
2	Nikam Sagar Ramesh	MSc-I	9860882980	<i>[Signature]</i>
3	Salunke Pzrem Suresh	-II-	9689196928	<i>[Signature]</i>
4	Dhamane Rowini Manohar	MSc-II	9139026919	<i>[Signature]</i>
5	Mahire Jayashri Uttamrao	MSc-II	9066139388	<i>[Signature]</i>
6	Reundal Poonam Bhausaheb	MSc-II	9730679808	<i>[Signature]</i>
7	Sathe Sonali Arun	MSc-II	9011847992	<i>[Signature]</i>
8	Thakare Sampada Babasaheb	MSc-I	8668611995	<i>[Signature]</i>
9	Jadhav Hareshali Himaman	MSc-I	8308064520	<i>[Signature]</i>
10	Deore Harshada Kailas	MSc-I	9067627980	<i>[Signature]</i>
11	Shinde priyanka keshav	MSc-I	7218232146	<i>[Signature]</i>
12	Antad Rajashri madhukar	MSc-I	8669764202	<i>[Signature]</i>
13	Waghaze Jagruti Rajendra	MSc-I	8983078183	<i>[Signature]</i>
14	Wasulkar Shital Anil	MSc-I	8275833534	<i>[Signature]</i>
15	Huda Imran Ahemad	MSc-II	9028745463	<i>[Signature]</i>
16	Shikalkar Zeba S.S.J	MSc-II	8999845869	<i>[Signature]</i>
17	Dongare Rohini Namdeo	MSc-I	9146735984	<i>[Signature]</i>
18	Gangurde Vaishali Sitaram	MSc-I	9021295502	<i>[Signature]</i>
19	Ahire kavaji Bapu	MSc-I	9069739026	<i>[Signature]</i>
20	Kshirsagar Preetiksha Keshav	MSc-II	9764716847	<i>[Signature]</i>
21	Jadhav Swati Radhakrishnan	MSc-II	7028312674	<i>[Signature]</i>
22	Deore mayuri sunil	MSc-II	9284368412	<i>[Signature]</i>
23	Dasetai kavaji Sudhakar	MSc-I	7499135638	<i>[Signature]</i>
24	Pawar Payal kailas	MSc-I	9763581104	<i>[Signature]</i>
25	Sagar Rutuja Karbhari	MSc-I	9385769617	<i>[Signature]</i>

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S.N.J.B's
 KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad. Dist.-Nashik
 Department of Physics
 Certificate course on "Solar photovoltaics and solar thermal energy"
 Students Attendance List

Date: 24/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
26	Sonawane monali sanjay	Msc-I	7057133517	
27	Jondhate Rupali m	MSC II	7767931309	
28	Deore Pranali Dilip	MSC-II	9049967448	
29	Patil Yogesh Jagannath	MSc-II	7022492937	
30	Sable Mayur Madan	MSc-II	9764952536	
31	Jonawase Jyesh Ashok	MSc-II	9834803860	
32				
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Students Attendance List

Date: 25/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
1	Wasulkar shital Anil	Msc-I	8275833834	WVK
2	Pagire Gitanjali Balanath	Msc-I	8308268878	Pagire
3	Maniyar Nagama Shakil	Msc-I	952045905	Maniyar
4	Patil Yogesh Jagannath	Msc-II	7028492937	Patil
5	Sable Mayur Madan	Msc-II	9764952536	Sable
6	Huda Imran Ahemad	Msc-II	9028745463	Huda
7	Shikalkar Zeba S.S.J	Msc-II	8999845869	Shikalkar
8	Salunke Prem Suresh	Msc-I	9689196928	Salunke
9	Thakare Sampada Babasaheb	Msc-I	8668611995	Thakare
10	Gaikwad Harshal Ranjan	Msc-I	9975500585	Gaikwad
11	Avhad Rajashri Madhukar	Msc-I	8669764202	Avhad
12	Shinde pritanika keshav	Msc-I	7218232146	Shinde
13	Jadhav Hemshali Himanshu	Msc-I	8308064520	Jadhav
14	Vavhaze Jagruti Rajendra	Msc-I	8983078183	Vavhaze
15	Darekare kavasi sudhakar	Msc-I	7499195638	Darekare
16	Shewale Rutuja Satish	Msc-I	8329567176	Shewale
17	Pawar Payal kailas	Msc-I	9763581104	Payal
18	Sagar Rutujakarbhari	Msc-I	7385769617	Rutuja
19	Mahire Jayashri Uttamrao	Msc-II	7066139388	Mahire
20	Dhamane Rohini Manohar	Msc-II	9139026919	Dhamane
21	Deore Hemshada Kailas	Msc-I	9067627980	Deore
22	Anise Kavari Bapu	Msc-I	9067739020	Anise
23	Gangurde Vaishali Gitanand	Msc-I	9021295502	Gangurde
24	Jadhav Swati Radhakrishnan	Msc-II	7028312679	Jadhav
25	Kshirsagar Pratibha Keshav	Msc-II	9764716847	Kshirsagar

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R.D. Pathare

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 KKHA Arts, SMGL Commerce &
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 Dist- Nashik 423 101 Maharashtra

S.N.J.B's
KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad. Dist.-Nashik
Department of Physics

Certificate course on "Solar photovoltaics and solar thermal energy"
Students Attendance List

Date: 25/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
26	Sonawane monalisanjay	Msc-II	7057133511	
27	Baebhav shital Arun	Msc-II	7058809474	
28	Sathe Sonali Aewu	Msc-II	9011847992	
29	Deore Mayuri Sunil	Msc-II	9284368412	
30	Deore Pranali Dilip	Msc-II	9049967448	
31	Gangurde Preeti Gokul	Msc-II	7066311633	
32	Jondhale Rupali M	Msc-II	7767931309	
33	Dongare Rohini Namdeo	Msc-I	9146735984	
34	Nikam Sagar Famesh	Msc-I	9860882980	
35				
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 KKHA Arts, SMGL Commerce &
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S.N.J.B's
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Department of Physics
Certificate course on "Solar photovoltaics and solar thermal energy"
Students Attendance List

Date: 26/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
1	Pagire Gitanjali Balanath	MScI	8308268578	Pagire
2	Walsurke Shital Anil	MSc-I	8275893534	Shital
3	Maniyar Nagama Shakil	MScI	9552045905	Maniyar
4	Kolhar Mayuri Anil	MScI	9834383563	Kolhar
5	Gangurde Vaishali Sitaram	MSc-I	9021295502	Gangurde
6	Ahije Kaveri Bapu	MSc-I	9067739026	Ahije
7	Jadhav Swati Radhekrishna	MSc-II	7028312879	Jadhav
8	Sonawane monalisanjay	MSc-II	7057133517	Sonawane
9	Huda Imran Ahemad	MSc-II	9028745463	Huda
10	Shikalkar Zeba S.S.J	MScII	8999845869	Shikalkar
11	Salunke Prem Suresh	M.Sc-I	9689196928	Salunke
12	Deore Harshada Kailas	MSc-I	9067627980	Deore
13	Jadhav Hareshali Hiraman	MSc-I	8808064520	Jadhav
14	Shinde priyanka keshav	MSc-I	7218232146	Shinde
15	Avhad Rajshree M.	MSc-I	8669764202	Avhad
16	Deore Pranali Dilip	MSc-II	9049967448	Deore
17	Thakare Sampada Babasaheb	MSc-I	8668611995	Thakare
18	Jondhale Rupali M.	MSc-II	7767931309	Jondhale
19	Dhamane Rohini M.	MSc-I	9139020919	Dhamane
20	Dangare Rohini Namdeo	MScI	9146735984	Dangare
21	Patil Yogesh Jagannath	MSc-II	7028492937	Patil
22	Sable Mayur Madan	MSc-II	9764952536	Sable
23	Gaikwad Harshal Ranjan	MSc-I	9975500582	Gaikwad
24	Kshirsagar Peatiksha Keshav	MSc-II	9764716847	Kshirsagar
25	Deore Mayuri Sunil	MScII	9284368412	Deore

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KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad. Dist.-Nashik
Department of Physics
Certificate course on "Solar photovoltaics and solar thermal energy"
Students Attendance List

Date: 27/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Signature
1	Pawar Payal Kailas	MSc-I	9763581104	Payal
2	Sagar Rutuja K.	M.Sc-I	7885769617	Rutuja
3	Jain Shruti Prakash.	M.Sc I	7776925663	Shruti
4	Pagise Gitanjali Balanath	MSc I	8308268578	Pagise
5	Wasulkar Shital Anil	MSc-I	8275833534	Shital
6	Maniyar Nagama Shakil	MSc I	9552045905	Maniyar
7	Gangurde Vaishali Sitarasam	MSc-I	9021295502	Gangurde
8	Ahije Kaveri Babu	MSc-I	9067739026	Ahije K
9	Dongare Rohini M	MSc-I	9146735984	Dongare
10	Kolhar Mayuri Anil	MSc-I	9834383563	Kolhar
11	Deore Mayuri Sunil	MSc II	9284368412	Deore
12	Kshirsagar Pratiksha Keshav	MSc-II	9764716847	Kshirsagar
13	Shikalkar zeba S.S.J	MSc II	8999845869	Shikalkar
14	Huda Imran Ahemed	MSc-II	9028745463	Huda
15	Gangurde Preeti Gokul	MSc-II	7066311633	Gangurde
16	Jondhale Rupali M.	MSc II	7767931309	Jondhale
17	Deore Pranali Dilip	MSc-II	9049967448	Deore
18	Patil Yogesh Jagannath	MSc-II	7028492937	Patil
19	Sable Mayur Madan	MSc-II	9764952536	Sable
20	Banchood Akshay Rajesh	MSc-I	9503999621	Banchood
21	Deore Harshada Kailas	MSc-I	9067627980	Deore
22	Shinde priyanka keshav	MSc-I	7218232146	Shinde
23	Thakare Sampada Babasaheb	MSc-I	8668611995	Thakare
24	Nikam Sagar Ramesh	MSc-I	9860882950	Nikam
25	Saunle Pram Suresh	M.Sc-I.	9689196928	Saunle

Shinde

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Department of Physics
 KKHA Arts, SMGL Commerce &
 SPHJ Science Coll.

[Signature]
Coordinator

Prof. L.A. Padi
Expert



Shri Nemimath Jain Brahmacharyashram's
K. K. H. A. Arts, S. M. G. L. Commerce & S. P. H. J. Science College,
Neminagar, Chandwad, Dist.-Nashik 423 101
Re-accredited by NAAC with 'B' grade
"Best College Award 2015-16 of Savitribai Phule Pune University, Pune"



ESTD - 1928

Certificate course on
"Solar photovoltaics and solar thermal energy"

Department of Physics

CERTIFICATE

This is to certify that ~~Mr.~~Miss **Zeba Sayyad Shikalkar**.....Class **M.Sc. II**
has Participated in Certificate course on "Solar photovoltaics and solar thermal energy" held on 22nd to 27th March 2019
Organized by Department of Physics, SNJB's KKHA Arts, SMGL Commerce & SPHJ Science College, Chandwad.


Mr. A. B. Gite
Coordinator


Smt. Dr. S. D. Shinde
HOD


Dr. G. H. Jain
Principal



S.N.J.B's
KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad.Dist.-Nashik
Department of Physics
Certificate course on "Solar photovoltaics and solar thermal energy"
Students Attendance List
Date: 22/03/2019 to 27/03/2019

Sr.No.	Name of the Students	Class	Mob.No.	Gender
1	Gaikwad Harshal Ranjan	M.Sc-I	9975500582	M
2	Nikam Sagar Ramesh	M.Sc-I	9860882980	M
3	Salunke Prem Suresh	M.Sc	9689196928	M
4	Dhamane Rohini Manohar	M.Sc-II	9139026919	F
5	Mahire Jayashri Uttamrao	M.Sc-II	7066139388	F
6	Raundal Poonam Bhausahab	M.Sc-II	9730679808	F
7	Sathe Sonali Arun	M.Sc-II	9011847992	F
8	Jadhav Harshali Hiranman	M.Sc-I	8308064520	F
9	Thakare Sampada Babasaheb	M.Sc-I	8668611995	F
10	Deore Harshada Kailas	M.Sc-I	9067627980	F
11	Shinde Priyanka Keshav	M.Sc-I	7218232146	F
12	Avhad Rajashri Madhukar	M.Sc-I	8669764202	F
13	Vyavhare Jagruti Rajendra	M.Sc-I	8983078133	F
14	Wasulkar Shital Anil	M.Sc-I	8275833534	F
15	Huda Imran Ahemad	M.Sc-II	9028745463	F
16	Shikalkar Zeba Sayyad	M.Sc-II	8999845869	F
17	Dongare Rohini Namdev	M.Sc-I	9146735984	F
18	Gangurde Vaishali Sitaram	M.Sc-I	9021295502	F
19	Ahire Kaveri Babu	M.Sc-I	9067739026	F
20	Kshirsagar Pratibha Keshav	M.Sc-II	9764716847	F
21	Jadhav Swati Radhakisan	M.Sc-II	7028312674	F
22	Deore Mayuri Sunil	M.Sc-II	9284368412	F
23	Darekar Kaveri Sudhakar	M.Sc-I	7499135638	F
24	Pawar Payal Kailas	M.Sc-I	9763581104	F
25	Sagar Rutuja Karbhari	M.Sc-I	7385769617	F



S.N.J.B's
KKHA Arts SMGL Comm. and SPHJ Science College, Chandwad.Dist.-Nashik
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Sr.No.	Name of the Students	Class	Mob.No.	Gender
26	Sonawane Monali Sanjay	M.Sc-I	7057133517	F
27	Jondhale Rupali M.	M.Sc-II	7767931309	F
28	Deore Pranali Dilip	M.Sc-II	9049967448	F
29	Patil Yogesh Jagannath	M.Sc-II	7028492937	M
30	Sable Mayur Madan	M.Sc-II	9764952536	M
31	Sonawane Suresh Ashok	M.Sc-II	9834803860	M

Report on Certificate Course

Certificate course on “Solar photovoltaics and solar thermal energy” was held in the Department of Physics during 22nd -27th March 2019. Thirty one students were participated in the certificate course from the Department of Physics. The course was scheduled with different faculty members during the period. Student has taken the keen interest in the theory and practical sessions during the course. Few snaps of students during the experiment sessions & other few snap of during certificate course are given below.



Photo: Students performing the various experiments during the certificate course







S.N.J.B. ASHRAM'S
K.K.H.A.ARTS,S.M.G.L.COMMERCE&S.P.H.J.SCIENCE
SENIORCOLLEGECHANDWAD,Dist.:Nashik,423101
Department of Physics



Certificate Course on "Solar Photovoltaic and Solar Thermal Energy"

Course Outcomes

Name of Programme: Certificate Course on "Solar Photovoltaic and Solar Thermal Energy"

Type of Programme: Certificate Course

Programme Code: PHYCC-001

Course Code: SPSTE-

002Academic Year: 2018-19

1. Students learned features of Solar Photovoltaic and Solar Thermal Energy.
2. Students learned the various features of the solar radiation coming on the earth surface and designing of solar photovoltaic system.
3. Students learned various coating used for the harvesting the solar thermal energy.
4. Students are able to use solar thermal energy equipment's and use of them.
5. Major outcome is students are able to design the solar system for the house hold purpose.

Mr. Anil B. Gite
Co-Ordinator

(Dr. G. H. Jain)

PRINCIPAL
K.K.H.A. Arts SMGL Comm.
& S.P.H.J. Science College,
Chandwad, Dist. Nashik - 423 101



S.N.J.B. ASHRAM'S
K.K.H.A.ARTS,S.M.G.L.COMMERCE&S.P.H.J.SCIENCE
SENIOR COLLEGE CHANDWAD, Dist.: Nashik, 423101
Department of Physics



Certificate Course on "Solar Photovoltaic and Solar Thermal Energy"

Multiple Choice Question paper

Time: 30 min

Name of Student: -----

Class: -----

- Each MCQ carry two marks each
- No negative marking.
- All MCQ are compulsory.

1. **1-Direct Solar energy is used for**
(A) Water heating (B) Distillation
(C) Drying (D) All of the above
2. **The power from the sun intercepted by the earth is approximately**
(A) 1.8×10^8 MW (B) 1.8×10^{11} MW
(C) 1.8×10^{14} MW (D) 1.8×10^{17} MW
3. **The following is indirect method of Solar energy utilization**
(A) Wind energy (B) Biomass energy
(C) Wave energy (D) All of the above
4. **A liquid flat plate collector is usually held tilted in a fixed position, facing _____ if located in the northern hemisphere.**
(A) North (B) South
(C) East (D) West
5. **The collection efficiency of Flat plate collector can be improved by**
(A) putting a selective coating on the plate (B) evacuating the space above the absorber plate
(C) Both (A) and (B) (D) None of the above
6. **The efficiency of various types of collectors' _____ with _____ temperature.**
(A) Increases, decreasing (B) decreases, increasing
(C) remains same; increasing (D) depends upon type of collector
7. **Maximum efficiency is obtained in**
(A) Flat plate collector (B) Evacuated tube collector (C) Line focussing collector (D) Paraboloid dish collector
8. **The following type of energy is stored as latent heat**
(A) Thermal energy (B) Chemical energy (C) Electrical energy (D) Mechanical energy
9. **Which of the following type of collector is used for low temperature systems?**
(A) Flat plate collector (B) Line focussing parabolic collector (C) Paraboloid dish collector
(D) All of the above
10. **In the paraboloid dish concept, the concentrator tracks the sun by rotating about**
(A) One axis (B) Two axes (C) Three axes (D) None of the above
11. **The sun subtends an angle of _____ minutes at the earth's surface.**
(A) 22, (B) 32, (C) 42, (D) 52

12. The value of Solar Constant is

(A) 1347 W/m², (B) 1357 W/m², (C) 1367 W/m², (D) 1377 W/m²

13. The extraterrestrial radiation flux varies by ____ % over a year.

(A) ± 1.1 (B) ± 2.2 (C) ± 3.3 (D) ± 4.4

14. The following is (are) laws of black body radiation.

(A) Plank's law (B) Stefan-Boltzmann law, (C) both (A) and (B), (D) None of the above

15. Absorption of Solar radiations at earth's surface occur due to presence of

(A) Ozone (B) Water vapors (C) Carbon di-oxide (D) All of the above

16. Global radiation =

(A) Direct radiation – Diffuse Radiation

(B) Direct radiation + Diffuse Radiation

(C) Direct radiation / Diffuse Radiation

(D) Diffuse Radiation / Direct radiation

17. The zenith angle is the angle made by the sun's rays with the ____ to a ____ surface.

(A) Normal, horizontal (B) tangent, horizontal (C) normal, vertical (D) tangent, vertical

18. Solar radiation flux is usually measured with the help of a

(A) Anemometer (B) Pyranometer (C) Sunshine recorder (D) All of the above

19. Beam radiations are measured with

(A) Anemometer (B) Pyrheliometer (C) Sunshine recorder (D) All of the above

20. The angle made by the plane surface with the horizontal is known as

(A) Latitude (B) Slope (C) Surface azimuth angle (D) Declination

21. The angle made in the horizontal plane between the horizontal line due south and the projection of the normal to the surface on the horizontal plane is

(A) Hour angle (B) Declination (C) Surface azimuth angle (D) Solar altitude angle

22. Surface azimuth angle varies from

(A) 0 to 90° (B) -90 to 90° (C) 0 to 180° (D) -180° to 180°

22. The hour angle is equivalent to

(A) 10° per hour (B) 15° per hour (C) 20° per hour (D) 25° per hour

23. The complement of zenith angle is

(A) Solar altitude angle (B) Surface azimuth angle (C) Solar azimuth angle (D) Slope

24. The correction has a magnitude of ____ minutes for every degree difference in longitude.

(A) 2 (B) 4 (C) 6 (D) 8

25. The ratio of the beam radiation flux falling on a tilted surface to that falling on a horizontal surface is called the

(A) Radiation shape factor (B) Tilt factor (C) Slope (D) none

Answers Key :

1-(D)	2-(B)	3-(D)	4-(B)	5-(C)	6-(B)	7-(D)	8-(A)	9-(A)	10-(B)
11-(B)	12-(C)	13-(C)	14-(C)	15-(D)	16-(B)	17-(A)	18-(B)	19-(B)	20-(B)
21-(C)	22-(B)	23-(B)	24-(C)	25-(B)					



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Certificate Course on "Solar Photovoltaic and Solar Thermal"

Multiple Choice Question paper

Time: 30 min

Name of Student: HUDA IMRAN AHMED

Class: M.Sc. IInd

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- Each MCQ carry two marks each
 - No negative marking.
 - All MCQ are compulsory.



1. Direct Solar energy is used for
(A) Water heating (B) Distillation
(C) Drying (D) All of the above
2. The power from the sun intercepted by the earth is approximately
(A) 1.8×10^8 MW (B) 1.8×10^{11} MW
(C) 1.8×10^{14} MW (D) 1.8×10^{17} MW
3. The following is indirect method of Solar energy utilization
(A) Wind energy (B) Biomass energy
(C) Wave energy (D) All of the above
4. A liquid flat plate collector is usually held tilted in a fixed position, facing _____ if located in the northern hemisphere.
(A) North (B) South
(C) East (D) West
5. The collection efficiency of Flat plate collector can be improved by
(A) putting a selective coating on the plate (B) evacuating the space above the absorber plate
(C) Both (A) and (B) (D) None of the above
6. The efficiency of various types of collectors' _____ with _____ temperature.
(A) Increases, decreasing (B) decreases, increasing
(C) remains same; increasing (D) depends upon type of collector
7. Maximum efficiency is obtained in _____ dish collector
(A) Flat plate collector (B) Evacuated tube collector (C) Line focussing collector (D) Paraboloid collector
8. The following type of energy is stored as latent heat
(A) Thermal energy (B) Chemical energy (C) Electrical energy (D) Mechanical energy
9. Which of the following type of collector is used for low temperature systems?
(A) Flat plate collector (B) Line focussing parabolic collector (C) Paraboloid dish collector
(D) All of the above
10. In the paraboloid dish concept, the concentrator tracks the sun by rotating about
(A) One axis (B) Two axes (C) Three axes (D) None of the above
11. The sun subtends an angle of _____ minutes at the earth's surface.
(A) 22, (B) 32, (C) 42, (D) 52

12. The value of Solar Constant is
 (A) 1347 W/m^2 , (B) 1357 W/m^2 , (C) 1367 W/m^2 , (D) 1377 W/m^2
13. The extraterrestrial radiation flux varies by ___ % over a year.
 (A) ± 1.1 (B) ± 2.2 (C) ± 3.3 (D) ± 4.4
14. The following is (are) laws of black body radiation.
 (A) Plank's law (B) Stefan-Boltzmann law, (C) both (A) and (B), (D) None of the above
15. Absorption of Solar radiations at earth's surface occur due to presence of
 (A) Ozone (B) Water vapors (C) Carbon di-oxide (D) All of the above
16. Global radiation =
 (A) Direct radiation - Diffuse Radiation
 (C) Direct radiation / Diffuse Radiation
 (B) Direct radiation + Diffuse Radiation
 (D) Diffuse Radiation / Direct radiation
17. The zenith angle is the angle made by the sun's rays with the ___ to a ___ surface.
 (A) Normal, horizontal (B) tangent, horizontal (C) normal, vertical (D) tangent, vertical
18. Solar radiation flux is usually measured with the help of a
 (A) Anemometer (B) Pyranometer (C) Sunshine recorder (D) All of the above
19. Beam radiations are measured with
 (A) Anemometer (B) Pyrheliometer (C) Sunshine recorder (D) All of the above
20. The angle made by the plane surface with the horizontal is known as
 (A) Latitude (B) Slope (C) Surface azimuth angle (D) Declination
21. The angle made in the horizontal plane between the horizontal line due south and the projection of the normal to the surface on the horizontal plane is
 (A) Hour angle (B) Declination (C) Surface azimuth angle (D) Solar altitude angle
22. Surface azimuth angle varies from
 (A) 0 to 90° (B) -90 to 90° (C) 0 to 180° (D) -180° to 180°
22. The hour angle is equivalent to
 (A) 10° per hour (B) 15° per hour (C) 20° per hour (D) 25° per hour
23. The complement of zenith angle is
 (A) Solar altitude angle (B) Surface azimuth angle (C) Solar azimuth angle (D) Slope
24. The correction has a magnitude of ___ minutes for every degree difference in longitude.
 (A) 2 (B) 4 (C) 6 (D) 8
25. The ratio of the beam radiation flux falling on a tilted surface to that falling on a horizontal surface is called the
 (A) Radiation shape factor (B) Tilt factor (C) Slope (D) none