

Unit 2 - Week 1 : Introduction and Solar radiation fundamentals

Course outline

How does an NPTEL online course work?

Week 1 : Introduction and Solar radiation fundamentals

- Lecture 01 : Introduction to Solar Energy
- Lecture 02 : Solar Radiation
- Lecture 03 : Atmospheric Effects on Solar Radiation
- Lecture 04 : Effect of Location on Time
- Lecture 05 : Sun-Earth Angular Relations
- Quiz : Assignment 1
- Solar Photovoltaics: Principles, Technologies and Materials: Week 1 Feedback
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Week 2 : Basic physics of semiconductors

Week 3 : Carrier transport, generation and recombination in semiconductors

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Week 6 : First Generation Solar Cells

Week 7 : Second Generation Solar Cells

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Assignment 1

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-12, 23:59 IST.

1) Local time and Local solar time are different due to 1 point

- difference in latitude w.r.t GMT
- difference in longitude w.r.t. GMT
- due to presence of time zone
- earth's orbital eccentricity

No, the answer is incorrect.
Score: 0

Accepted Answers:
due to presence of time zone
earth's orbital eccentricity

2) For solar photovoltaic applications, maximum amount of solar irradiance should lie in: 1 point

- Ultraviolet region
- Visible region
- Ultraviolet and Visible region
- Visible and near infrared region

No, the answer is incorrect.
Score: 0

Accepted Answers:
Visible and near infrared region

3) The insolation received by the earth's surface at any point depends upon: 1 point

- Solar zenith angle
- Thickness of outer atmosphere
- Amount of water vapour present in the atmosphere
- Absorptivity of the earth' surface

No, the answer is incorrect.
Score: 0

Accepted Answers:
Solar zenith angle
Thickness of outer atmosphere
Amount of water vapour present in the atmosphere

4) Maximum amount of solar irradiance incident on the earth's surface lies 1 point

- above the tropic of cancer
- below tropic of capricorn
- between the tropic of cancer and tropic of capricorn
- at the equator

No, the answer is incorrect.
Score: 0

Accepted Answers:
between the tropic of cancer and tropic of capricorn

5) Choose the correct statement(s) with respect to Sun-Earth relation 1 point

- Hour angle at local solar noon is zero.
- Angle subtended by sun on the earth's center is 32 minutes.
- Percentage variation in distance between earth and sun over the year is 1.7%.
- Variation in the sun's apparent position through the year is a north-south swing over 46.9° of angle.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Hour angle at local solar noon is zero.
Angle subtended by sun on the earth's center is 32 minutes.
Variation in the sun's apparent position through the year is a north-south swing over 46.9° of angle.

6) Solar declination angle on 27th January 2020 will be: 1 point

- +18.79°
- 18.79°
- +22.48°
- 22.48°

No, the answer is incorrect.
Score: 0

Accepted Answers:
-18.79°

7) What is the value of air mass index (AM), when zenith angle is equal to 30°? 1 point

- AM 1.15
- AM 1.50
- AM 2.00
- AM 2.15

No, the answer is incorrect.
Score: 0

Accepted Answers:
AM 1.15

8) Solar azimuthal angle is defined as: 1 point

- Angle made by the line joining the centers of the sun and the earth with its projection on the equatorial plane
- Angle between the sun ray and horizontal normal
- Angle between the sun ray and horizontal surface
- Angle made in the horizontal plane between the N-S line and the projection of sun ray on the horizontal plane

No, the answer is incorrect.
Score: 0

Accepted Answers:
Angle made in the horizontal plane between the N-S line and the projection of sun ray on the horizontal plane

9) For designing solar cell, which of the following parameter(s) has/have to be maximized? 1 point

- Transmission of light
- Reflection of light
- Absorption of light
- Refraction of light

No, the answer is incorrect.
Score: 0

Accepted Answers:
Absorption of light

10) Which of the following physical factor(s) has/have to be taken care of for the correct estimation of terrestrial solar radiation data for long time at a location? 1 point

- Spectral distribution of solar irradiance
- Temporal distribution
- Greenhouse gases distribution
- Latitude of the location

No, the answer is incorrect.
Score: 0

Accepted Answers:
Spectral distribution of solar irradiance
Temporal distribution
Greenhouse gases distribution
Latitude of the location

11) For India, the local standard time meridian is 1 point

- 15° E
- 82.5° E
- 67.5° E
- 90° E

No, the answer is incorrect.
Score: 0

Accepted Answers:
82.5° E

12) At solar noon, which among the following is the correct angular relation? (γ_s : Solar azimuthal angle, α : Solar altitude angle, λ : latitude angle, δ : Declination angle) 1 point

- $\gamma_s=0^\circ$ and $\alpha=90^\circ-\lambda-\delta$
- $\gamma_s=0^\circ$ and $\alpha=90^\circ-\lambda+\delta$
- γ_s is not equal to 0° and $\alpha=90^\circ-\lambda-\delta$
- γ_s is not equal to 0° and $\alpha=90^\circ-\lambda+\delta$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\gamma_s=0^\circ$ and $\alpha=90^\circ-\lambda+\delta$

13) In Solar time equation, Equation of time (EoT) is a correction that takes care of: 1 point

- Eccentricity of the Earth's orbit
- Axial tilt of Earth
- Standard and local time meridians difference
- Day light saving

No, the answer is incorrect.
Score: 0

Accepted Answers:
Eccentricity of the Earth's orbit
Axial tilt of Earth

14) Bhopal, a city in Madhya Pradesh, India is located at longitude and latitude angles of 77.41°E and 23.26°N respectively, and have 1 point local standard time meridian of 82.5°E.

What will be the solar time on 1st February 2020 at 03:00pm?

- 02:26pm
- 02:54pm
- 03:06pm
- 03:34pm

No, the answer is incorrect.
Score: 0

Accepted Answers:
02:26pm

15) Bhopal, a city in Madhya Pradesh, India is located at longitude and latitude angles of 77.41°E and 23.26°N respectively, and have 1 point local standard time meridian of 82.5°E.

What will be the hour angle on 1st February 2020 at 03:00pm?

- 36.45°
- 43.50°
- 46.50°
- 53.40°

No, the answer is incorrect.
Score: 0

Accepted Answers:
36.45°