**TU/CDOE**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (SPRING) 2021**

**DRE 102: SOLAR ENERGY**

Time: **3 Hours** Total Marks: **70**

*The figures in the right-hand margin indicate marks for the individual question.*

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1. Choose the correct answer: 1×10=10

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| a) | What is the primary reason for solar energy to get high attention?   1. Renewable and Abundant 2. Cheap and reliable 3. Infrastructure availability 4. High Energy Density |
| b) | The value of Solar constant is an irradiance measured-   1. On the ground 2. On solar collector 3. On an Extra-terrestrial position 4. Inside Laboratory |
| c) | Pyranometer can measure-   1. Spectrum 2. Global Solar Radiation 3. Direct Normal Solar Radiation 4. Concentrated light intensity |
| d) | What is the value of Hour angle?   1. 5 Degree 2. 10 Degree 3. 15 Degree 4. 20 Degree |
| e) | In a PV system, the device that converts the DC to AC is called-   1. Inverter 2. Charge controller 3. PV module 4. Connector |
| f) | Which of the following angle is complementary to zenith angle?   1. Angle of Incidence 2. Azimuth Angle 3. Inclination Angle 4. Altitude Angle   **P.T.O.** |
| g) | Which of the following is not a type of solar cell?   1. Monocrystalline Silicon 2. Amorphous Silicon 3. Amorphous Boron 4. Cadmium Telluride |
| h) | Which is not a type of energy storage?   1. Electrochemical storage 2. Latent heat storage 3. Pyroelectric storage 4. Flywheel energy storage |
| I) | In solar energy study, the term ‘Air Mass’ represents-   1. Mass of vapour in atmosphere 2. Wavelength Spectrum of solar radiation 3. Combination of direct and diffuse radiation 4. Dust particles in air |
| j) | Which of the following is a common photocatalyst?   1. Titanium Dioxide 2. Silicon Oxide 3. Sulfuric Acid 4. Argon |

2. Write short note on the following: 3×4=12

1. Pyranometer
2. Air Mass
3. Solar concentrators
4. Solar detoxification

3. Answer the following:

1. Explain the photoelectric effect and its relevance to the photovoltaic technology. 4
2. Discuss the features and characteristics of four PV modules technologies available in the market. 8
3. Discuss the discharging and charging operation of a battery. 5
4. Mention four different types of batteries with their features and characteristics. 8
5. Discuss the working principle of a solar refrigeration system. 6
6. Mention the different classification and types for thermal storage of solar energy. 5
7. Describe the evacuated solar thermal collector and its advantages over solar plat plate collector. 8
8. Mention the four conditions to be satisfied for grid integration of photovoltaic system. 4

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