**TU/ CODL**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (SPRING) 2019**

**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 (any ten): 1×10=10

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| --- | --- |
| a) | What is the origin of energy generaTION in the sun?   1. Photosynthesis 2. Nuclear Fusion 3. Chemical Reaction 4. Gravitational Force |
| b) | What is the value of solar constant?   1. 900 Wm-2 2. 1053 Wm-2 3. 1149 Wm-2 4. 1366 Wm-2 |
| c) | What is the value of Hour angle?   1. 5 Degree 2. 10 Degree 3. 15 Degree 4. 20 Degree |
| d) | The most common material in use to fabricate the solar cell is   1. Aluminium 2. Silver 3. Iron 4. Silicon |
| e) | The band gap of silicon is   1. 1.9 eV 2. 1.1 eV 3. 2.1 eV 4. 0.7 eV   **P.T.O.** |
| f) | Which is NOT a type of solar thermal collector?   1. Flat plate Collector 2. Evacuated Tube Collector 3. High Pressure Collector 4. Concentrating Solar Collector |
| g) | Pyrheliometer can measure   1. Solar Spectrum 2. Global Solar Radiation 3. Direct Solar Radiation 4. Sunshine Duration |
| h) | 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 |
| I) | Which is not a type of energy storage?   1. Electrochemical storage 2. Latent heat storage 3. Pyroelectric storage 4. Flywheel energy storage |
| j) | Which is a common photocatalyst?   1. Titanium Dioxide 2. Silicon Oxide 3. Sulfuric Acid 4. Argon |
| k) | In a PV system, the device converts the DC to AC is called   1. Inverter 2. Charge controller 3. PV module 4. Connector |

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

a) Pyranometer

b) Solar Incidence angle

c) Solar Pond

d) Solar detoxification

3. Answer the following questions:

a) Briefly explain the working principle of a solar cell. 3

b) Daw the schematic diagram of a PV system and identify the different

components. 5

4. Discuss the discharging and charging operation of a battery. 5

5. Answer the following questions:

a) Mention four refrigerant-absorbent pairs use in solar refrigeration or

cooling. 2

b) Draw a schematic diagram for a solar driven absorption cycle 5

6. Discuss the working principle of solar thermal collector with the help of energy balance equation. 8

7. Mention the different classification and types for solar thermal energy storage 5

8. Describe the evacuated solar thermal collector and its advantages over solar plat plate collector. 8

9. Mention the four condition to be satisfied for grid integration of

photovoltaic system. 4

10. Mention the names of six BOS (Balance of System) components of a photovoltaic system. 3

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