**TU/ CODL**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (AUTUMN) 2017**

**DRE102: 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 **1×12=12**

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| --- | --- |
| A) | What is the origin of energy generates in sun   1. Photosynthesis 2. Nuclear Fusion 3. Chemical Reaction 4. Gravitational Force |
| B) | The value of solar constant is   1. 1000 Wm-2. 2. 746 Wm-2. 3. 1562 Wm-2. 4. 1366 Wm-2. |
| C) | 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 |
| D) | Which is NOT a solar radiation measuring device?   1. Pyranometer 2. Pyrheliometer 3. Rotameter 4. Solarimeter |
| E) | The temperature for low-temperature solar thermal system need to be   1. 50°C >T 2. 50°C < T 3. 500°C > T 4. 100°C > T   **P.T.O** |
| F) | Which is NOT a basic component of flat plate solar thermal collector   1. Absorber plate 2. Transparent glass cover 3. Bottom and side insulation 4. concentrator |
| G) | The ratio of useful energy gain to the useful energy gain that would occur if absorber plate is at local fluid temperature, is called   1. Heat Removal Factor 2. Collector Efficiency Factor 3. Collector Flow Factor 4. Heat Transfer Coefficient |
| H) | In general, evacuated tube collector is a type of   1. Solar water heater 2. Solar dryer 3. Solar still 4. Solar pond |
| I) | Which is not a type of thermal energy storage?   1. Sensible heat storage 2. Latent heat storage 3. Thermochemical energy storage 4. Flywheel energy storage |
| J) | Fill up the blank: Photovoltaic technology converts \_\_\_\_ energy to electrical energy.   1. Mechanical 2. Chemical 3. Light 4. Biomass |
| K) | In a PV system, the device converts the DC to AC is called   1. Inverter 2. Charge controller 3. PV module 4. Connector |
| L) | Which is NOT a type of solar cell   1. Monocrystalline silicon 2. Cadmium Telluride 3. Dye-Sensitize 4. Open loop |

2. With the help of a flow chart, categories different direct and indirect utilization of solar energy. **5**

3. (a) What is the concept of solar time? **2**

(b) At Tezpur, what is the solar time corresponding to 11:30AM local time on February 13? (Latitude and Longitude of Tezpur are: 26.63°N and 92.8°E) **5**

4. (a) With the help of a diagram indicate different component/parts of solar flat plate collector (FPC). **4**

(b) Describe the function and characteristics of each components of a solar flat plate collector. **6**

5. (a) Mention the classifications of phase change material.  **3**

(b) Discuss properties of different phase change materials used in solar thermal industry. **4**

6. Discuss the working principle of a solar cell  **5**

7. Discuss four different configurations of photovoltaics system. **8**

8. Briefly discuss the requirement for effective synchronization of photovoltaic system with grid.  **4**

9. Briefly discuss the characteristics of four different types of batteries in the market. **8**

10. Mention the four fundamental parameters in solar photocatalysis. **4**

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