**TU/ CODL**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (SPRING) 2020**

**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) | Which of the characteristics make Solar Energy an important resource for power generation in recent times?   1. Low Cost 2. Low land requirement 3. Environmentally Clean 4. High Reliability |
| b) | Which of the following makes the Solar Energy as the energy for future?   1. Solar Energy incident on earth is much higher than the global energy demand. 2. The efficiency of Solar Energy technology is much higher than existing technologies for power generation 3. Solar Energy technology do not require storage 4. Installation of Solar Energy Systems do not require skilled technician |
| c) | What is the origin of the solar radiation from sun?   1. Photosynthesis Reaction 2. Oxidation Reaction 3. Nuclear Fusion Reaction 4. Photo-degradation Reaction |
| d) | 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.** |
| e) | The two basic requirements of solar flat plate collector are-   1. Maximum absorption of solar radiation and minimum heat loss 2. Maximum reflection of solar radiation and maximum heat loss 3. Minimum absorption of solar radiation and minimum heat loss 4. Minimum exposure to solar radiation and maximum heat loss |
| f) | Which is NOT a design of solar concentrator?   1. Parabolic Concentrator 2. Aerofoil Concentrator 3. Compound Parabolic Concentrator 4. Fresnel Lens Concentrator |
| g) | Which refrigerant-absorbent pair is used in solar-based absorption air conditioning system?   1. Ammonia - Salt 2. CFC - Hydrogen 3. Silicon – Alcohol 4. Hydrogen – Oxygen |
| h) | Which is one of the chemical properties of Phase Change Material used in heat storage of solar thermal System?   1. Abundancy 2. Long term Chemical stability 3. Low Vapour Pressure 4. Low cost |
| I) | Which is not a type of energy storage?   1. Electrochemical storage 2. Latent heat storage 3. Pyroelectric storage 4. Flywheel energy storage |
| j) | What is the function of an inverter in PV System?   1. Supply electricity during grid breakdown 2. Convert DC to AC power 3. Store electricity in the form of chemical energy 4. To ensure safety of the PV system |

2. Write short note on the following: 4x3=12

1. Solar Flat Plate Collector
2. Solar Concentrators
3. Photovoltaic System Configuration

3. Answer the following:

1. Mention four passive solar heating design components. 2
2. What is the photovoltaic effect? 2
3. Mention the four different components of a battery. 2
4. How does the grid connected PV system differ from off-grid PV system.? 3
5. Mention the design characteristics of evacuated tube collector. 3
6. How does the evacuated tube collector is different than the flat plate collector? 3
7. Mention three desired features of inverters for application in

standalone PV system. 3

1. With the help of a schematic discuss the role of ‘solar control’ in passive space cooling. 4
2. What are the two main challenges of organic solar cell? 4
3. Describe the process of converting the solar radiation into electricity by a solar cell with the help of a schematic. 6
4. Discuss the characteristics of different photovoltaic system components. 8
5. Discuss the basic characteristics of four different types of batteries used in solar photovoltaic system. 8

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