**TU/ CDOE**

**TEZPUR UNIVERSITY**

**SEMESTER END EXAMINATION (AUTUMN) 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) | What is the origin of energy generating 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 range of slop (β) angle?   1. 0 - 45 Degrees 2. 0 - 90 Degrees 3. 0 - 135 Degrees 4. 0 - 180 Degrees |
| d) | Which of the following angle is complementary to zenith angle?   1. Angle of Incidence 2. Azimuth Angle 3. Inclination Angle 4. Altitude Angle |
| e) | Which is NOT a type of solar thermal collector?   1. Flat plate Collector 2. Evacuated Tube Collector 3. Open-top Collector 4. Concentrating Solar Collector |
| f) | **P.T.O.**  Pyranometer is used to measure:   1. Spectrum 2. Global Solar Radiation 3. Direct Normal Solar Radiation 4. Pressure |
| g) | Which is NOT a type of solar cell?   1. Monocrystalline Silicon 2. Amorphous Silicon 3. Amorphous Boron 4. Cadmium Telluride |
| h) | In a PV system, the device which ensures the delivery of maximum power from PV system is:   1. Inverter 2. Charge controller 3. MPPT 4. Connector |
| i) | 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 |
| j) | Which is NOT a type of battery?   1. Lead Acid 2. Nickel Cadmium 3. Aluminium Bromide 4. Zinc Air |

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

1. Difference between Solar Time and Local Time
2. Pyrheliometer
3. Passive Solar Heating
4. Solar Detoxification

3. Answer the following :

1. Draw a schematic of solar flat plate collector and indicate the different components 3
2. Discuss the working principle of evacuated tube collector and highlight the challenges 5

4. Answer the following:

1. What is a solar cell? 2
2. Describe working principle of a solar cell. 5
3. Discuss the primary components of a solar photovoltaic system highlighting their significance. 5
4. How does the grid connected PV system differ from off-grid PV system? 3
5. Discuss the characteristics of different photovoltaic system components. 8

5. Discuss the discharging and charging operation of a battery. 6

6. Answer the following :

1. Mention four refrigerant-absorbent pairs use in solar refrigeration or cooling. 2
2. Briefly discuss solar driven absorption cycle. 6
3. Briefly discuss three factors affecting a solar photocatalysis process.

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