

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE-MINOR- SEMESTER-IV EXAMINATION – SUMMER 2022**

**Subject Code:114AJ01****Date:13-07-2022****Subject Name:Solar Energy System-I****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

	<b>Marks</b>
<b>Q.1</b> (a) Describe about variation of solar irradiance throughout the day with neat diagram.	<b>03</b>
(b) Explain working principle of solar cell.	<b>04</b>
(c) What is maximum power point (MPP) in the solar photovoltaic system? Explain MPP in details.	<b>07</b>
<b>Q.2</b> (a) What is mismatch losses in the case of series connected solar PV Modules?	<b>03</b>
(b) Explain the basic principle of bypass and blocking diode.	<b>04</b>
(c) Draw the basic connections of solar PV module with the variable resistor. Analyze PV and IV characteristic of PV Module.	<b>07</b>
<b>OR</b>	
(c) What are the main technical specifications of PV module while referring datasheet? Discuss the impact of temperature and irradiation on the PV module parameter.	<b>07</b>
<b>Q.3</b> (a) What is net metering? Why net metering is used in the solar photovoltaic applications?	<b>03</b>
(b) What is power purchase agreement? Discuss about it.	<b>04</b>
(c) Explain financial model of PV with Power Purchase Agreement and leasing case study.	<b>07</b>
<b>OR</b>	
<b>Q.3</b> (a) Explain power voltage characteristic of solar photovoltaic system	<b>03</b>
(b) Explain current-voltage characteristic of PV Panel	<b>04</b>
(c) Describe photovoltaic growth in India.	<b>07</b>
<b>Q.4</b> (a) Explain about government support and subsidy for the solar photovoltaic system in India.	<b>03</b>
(b) Why solar photovoltaic growth is more as compared to solar thermal systems?	<b>04</b>
(c) Explain futuristic growth potential of solar photovoltaic systems in India. Discuss the rise of the installation of ground mounted rooftop solar photovoltaic system in last three years.	<b>07</b>
<b>OR</b>	
<b>Q.4</b> (a) What are the main instrument used for the measurement of temperature, irradiance?	<b>03</b>
(b) Discuss the various tool used for the installation of off-grid and on-grid systems.	<b>04</b>

- (c) State and discuss various applications of solar photovoltaic system in details. **07**
- Q.5** (a) Explain diode characteristic. Relate diode characteristic with the photovoltaic characteristic. **03**
- (b) What are the tools used for the measurement of voltage, current in solar PV system? **04**
- (c) Describe the solar cell connection in PV Modules. How many cells are used in each module? Explain its procedure of connections. **07**
- OR**
- Q.5** (a) Explain about development in the material used for the PV cell. **03**
- (b) Describe the solar spectrum. **04**
- (c) Explain about insolation and energy on horizontal flat plan. **07**

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