## Unit-2

| S.No | Questions | BT | CO | PO |
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| | Part -A (Short Answer Questions) | | | |
| 1. | Define a centralized inverter used in solar PV systems. | L1 | CO2 | 1 |
| 2. | What is a string inverter? Mention its advantages. | L1 | CO2 | 1 |
| 3. | Define a multi-string inverter. | L1 | CO2 | 1 |
| 4. | What are microinverters in solar PV systems? | L1 | CO2 | 1 |
| 5. | List any two advantages of module integrated inverters. | L2 | CO2 | 1 |
| 6. | What is inverter topology? | L2 | CO2 | 1 |
| 7. | Define PWM technique used in inverters. | L2 | CO2 | 1 |
| 8. | What is the purpose of battery sizing in a solar PV system? | L2 | CO2 | 1 |
| 9. | Define grid-connected solar PV system. | L2 | CO2 | 1 |
| 10. | What is a stand-alone solar PV system? | L1 | CO2 | 1 |

| S.No | Questions | BT | CO | PO |
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| | Part -B (Long Answer Questions) | | | |
| 1. | Explain the working principle, advantages, and disadvantages of centralized inverters used in solar PV systems. | L2 | CO2 | 2 |
| 2. | Describe the construction and operation of string inverters and multi-string inverters with neat block diagrams. | L3 | CO2 | 2 |
| 3. | Explain module integrated inverter (microinverter) technology and discuss its advantages over conventional inverters. | L2 | CO2 | 2 |
| 4. | Discuss different inverter topologies used in | L3 | CO2 | 2 |

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| | solar photovoltaic systems. | | | |
| 5. | Explain the mathematical model of a solar inverter with suitable equations and waveforms. | L3 | CO2 | 2 |
| 6. | Describe the procedure for sizing batteries for a stand-alone solar PV system. | L4 | CO2 | 3 |
| 7. | Explain the design considerations for selecting an inverter for a solar PV installation. | L2 | CO2 | 3 |
| 8. | A solar PV system supplies a load of 4 kW. The inverter efficiency is 90%.<br>Calculate:<br>1. Input power required from PV array<br>2. Suitable inverter rating<br>b) A microinverter receives 320 W from a PV module and delivers 295 W AC power.<br>Calculate:<br>1. Power loss<br>2. Efficiency of the microinverter | L2 | CO2 | 3 |
| 9. | a)A stand-alone PV system must supply:<br>• Load = 1.5 kW<br>• Operating time = 8 hours<br>• Battery voltage = 24 V<br>Calculate the required battery capacity in Ah.<br>b) A PV array produces:<br>• Voltage = 300 V<br>• Current = 12 A<br>Calculate:<br>1. Output power of PV array<br>2. Minimum inverter rating required | L2 | CO2 | 3 |
| 10. | a) A single-phase inverter supplies | L2 | CO2 | 3 |

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| | 230 V AC load of 3.45 kW.<br>Calculate:<br>1. Output current supplied by inverter<br>2. Input current drawn from 48 V battery assuming 90% efficiency<br><br>b) A home requires:<br>Daily energy consumption = 6 kWh<br>Battery voltage = 48 V<br>Maximum depth of discharge = 80%<br>Calculate the required battery capacity in Ah. | | | |