

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2016–2017& thereafter)

B.Voc. DEGREE EXAMINATION, NOVEMBER 2023
SUSTAINABLE ENERGY MANAGEMENT
FIFTH SEMESTER

COURSE : MAJOR CORE
PAPER : SOLAR POWER PLANT DESIGNING
SUBJECT CODE : 16VS/VM/PD56
TIME : 2 HOURS **MAX.MARKS:50**

SECTION – A

ANSWER ALL QUESTIONS: **(20x1=20)**

I. Choose the correct answer:

1. Transmission and distribution of electric power by underground system is superior to overhead system in respect of
 - a) Appearance and public safety
 - b) Maintenance cost
 - c) Frequency of faults, power failure and accidents
 - d) All of the above
2. Transmission line connects
 - a) Generating station to a switching station
 - b) Stepdown transformer station to service transformer banks
 - c) Distribution transformer to consumer premises
 - d) Service points to consumer premises
3. Which component is responsible for protecting an electrical circuit from overcurrent and short circuits?
 - a) Circuit breaker
 - b) Transformer
 - c) Substation
 - d) Overhead line
4. Why is a soil test conducted at a site before the installation of electrical infrastructure?
 - a) To determine the quality of the soil for planting vegetation
 - b) To assess the suitability of the soil for construction and grounding
 - c) To identify the presence of archaeological artefacts
 - d) To estimate the depth of underground water sources
5. What is the primary purpose of a solar charge controller in a PV system with battery storage?
 - a) Converts solar energy into mechanical energy
 - b) Regulates the charging and discharging of batteries
 - c) Provides shade for solar panels
 - d) Increases the efficiency of solar panels

II Fill in the blanks:

6. _____ is the instrument used to measure solar radiations.
7. PV cells which have two base materials are called as _____.

8. The unit of measurement for the capacity of a solar power plant is _____.
9. _____ is the crucial foundation for switchyards.
10. Lightning arrestor foundations are designed to _____.

III. State True or False:

11. Grid tied photovoltaic systems do not require battery storage.
12. Nominal voltage and current conditions will not be available from PV array at all times due to constant changes in solar irradiance.
13. The difference between beam radiation and diffuse radiation is called the globular radiation.
14. The combiner box in an off grid solar PV plant combines the electrical outputs from multiple solar panels.
15. Colour and aesthetics of the lights are typically considered when designing a foundation for street lights.

IV. Answer in a sentence or two.

16. Mention a merit and demerit of a solar PV system.
17. Name the required components of a solar cell.
18. List the different types of overhead line conductors.
19. Draw the diagram of a single phase 3-wire system.
20. Define solar constant.

SECTION – B

ANSWER ANY SIX QUESTIONS:

(6x3=18)

21. What is a photovoltaic cell? Explain the working of photovoltaic cell in harvesting energy.
22. Give brief notes on rooftop photovoltaic power station.
23. Discuss all the factors affecting electricity generated by a solar PV module.
24. Describe the role of batteries in a solar power plant. What types of batteries are commonly used?
25. Explain the purpose of an earthing pit in an electrical system.
26. Describe the safety precautions and procedures that workers should follow when using tools like drills, saws, and wiring equipment in a solar installation.
27. What are the key design considerations for a switchyard layout in a high-voltage electrical substation?
28. Explain the different methods of harnessing solar energy.
29. Discuss the merits and limitations of combiner boxes and switch gears in a Solar PV system.
30. How do you measure the efficiency of a solar cell?

SECTION – C

ANSWER ANY TWO QUESTIONS:

(2x6=12)

31. Describe the working of a solar PV electric plant with a neat schematic diagram.
32. Elucidate on the essential subsystems in a solar energy plant.
33. Enumerate the features of invertors in the process of converting electric energy from DC to AC.
34. Design a transmission tower that is suitable for a 230-kV power line. Discuss the tower's structure, height, and the materials used.
