



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2024	
Exam Seat No.:	
Academic Year:2024-2025	Semester:I
Class:PG-I	Program:M.Tech
Branch Code:ELE	Pattern:2024
Name of Course:Renewable Energy System	Course Code:2406504 (A)
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains _02_ page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- 1a) Describe the working of solar water pumping system and its benefits. (6) CO1

Question No. 2

- 2a) Explain the process of wind power extraction by using suitable diagram. (6) CO1

Question No. 3

- 3a) Explain the design considerations for a wind-solar hybrid power system. Include load demand analysis and energy storage requirements. (8) CO2
- 3b) Discuss the role of energy storage systems in wind/solar integrated designs and Interpret the system reliability. (8) CO2

OR

- 3c) Explain the control strategies used in a grid-connected solar PV system for power quality improvement. (8) CO2
- 3d) Discuss the types of grid interfaces used in PV systems and their importance in ensuring grid stability. (8) CO2

Question No. 4

- 4a) Illustrate the key control strategies used in grid-connected single-phase PV inverter schemes. Illustrate with examples. (8) CO3
- 4b) Construct a power processing scheme for a multi-string PV system with three strings of 3 kW each. Explain the necessary power converters and their roles. (8) CO3

OR

- 4c) Illustrate the key challenges in designing centralized inverters for large PV installations. (8) CO3
- 4d) Demonstrate the working of a centralized three-phase inverter for large PV installations. Include a block diagram in your explanation (8) CO3

Question No. 5

- 5a) Compare centralized and distributed generation in the context of a Smart Grid. (8) CO1
- 5b) Discuss the standards and protocols used in Smart Grid communication systems. Provide examples of each. (8) CO1

OR

- 5c) With a neat diagram, describe the architecture of a Smart Grid system. Highlight the key technological elements and their integration. (8) CO1
- 5d) A Smart Grid system in a city faces challenges in integrating renewable Distributed Generation resources. Propose a solution to optimize their use and improve grid stability. (8) CO1

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