



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

InSem Examination-II Summer 2025	
Exam Seat No.:	
Academic Year: 2024-2025	Semester: VI
Class: TY	Program: B.Tech
Branch Code: MEC	Pattern: 20
Name of Course: Renewable Energy Engineering	Course Code: MEC223014B
Max. Marks: 30	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 pages.
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 column indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- 1 a) 10 kW of solar PV rooftop system is planned to install on building. Assuming suitable data estimate (7) CO1
number of solar PV panels required.

Write the materials used for manufacturing of solar cell.

Question No. 2

- 2 a) Explain the following angles of solar geometry: (8) CO1
- i) Latitude (ϕ)
 - ii) Declination (δ)
 - iii) Hour angle (ω)
 - iv) Altitude (α)

OR

- 2 b) What are the different types of solar collectors? Explain the cylindrical parabolic trough collector (8) CO1
with sketch.

Question No. 3

- 3 a) What are the different types wind Machines. Explain propeller type wind turbine machine with (7) CO2
sketch.

Question No. 4

- 4 a) Derive the Betz limit (Power coefficient = 0.59) for the wind machines (8) CO2

Also explain i) Cut in speed ii) Cut out speed

OR

4 b) Wind speed is 10 m/s at the standard atmospheric pressure. Calculate :

(8) CO2

(i) the total power density in wind stream,

(ii) the total power produced by a turbine of 100 m diameter with an efficiency of 40 %.

Take Air density = 1.226 kg/m^3

..... End of question paper.....