



Sanjay Ghodawat University, Kolhapur

2018-19

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/01

Year and Program: 2018-19 School of Technology
FY M.Tech

Department of Electrical Engineering

Course Code: ELE 502

Course Title: Solar & Wind
Energy Utilization.

Semester – II

Day and Date Monday
20th May, 2019

End Semester Examination (ESE)

Time:

Max Marks: 100

2-30 to 5:30 PM

Instructions:

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary.
- 3) Figures to the right indicate full marks.

Q.1	Solve any Two	Marks	Bloom's Level	CO
a)	Discuss the construction and working of Liquid flat plate collector with a neat sketch. Explain the various parameters that affect the performance of collector.	07	L ₃	CO1
b)	Derive the expression for total radiation on an inclined surface. Show that a horizontal surface receives no ground-reflected radiation.	08	L ₃	CO2
OR				
b)	Discuss the merits and demerits of concentrating collectors over flat-plate types of solar collectors for utilizing in solar plant generation.	08	L ₄	CO2
Q.2	Solve any Two			
a)	Give details about term fill factor and its importance as a performance parameter for a solar cell.	07	L ₃	CO3
b)	How the performance of liquid flat plate collector can be analyzed. Discuss the analysis in detail.	08	L ₄	CO4
OR				
b)	How the solar radiation data is collected and what way it is helpful in solar energy conversion in design of solar system?	08	L ₄	CO4

Q.3 Solve any Two

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|----|--|----|----------------|-----|
| a) | Explain the performance characteristics of a Solar cell and enumerate the factors they depend up on. | 08 | L ₄ | CO1 |
| b) | Give details about the terms Declination angle and Hour angle w.r.t Solar radiation Geometry. | 08 | L ₄ | CO2 |
| c) | List out various methods to track Maximum Power Point of solar PV systems and explain about P&O technique. | 08 | L ₄ | CO3 |
| d) | Clarify the following factors w.r.t performance of Solar collector (i) Collector efficiency factor (ii) Collector heat removal factor (iii) Collector efficiency | 08 | L ₅ | CO4 |

Q.4 Solve any Two

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|----|--|----|----------------|-----|
| a) | Elucidate the principle of aerodynamic lift and also explain the various forces acting on aerofoil shape blade of wind turbine. | 09 | L ₄ | CO5 |
| b) | Illustrate the electrical layout of a typical wind farm by means of single line diagram. State the essential equipments required for it. | 09 | L ₄ | CO5 |
| c) | Converse in detail the operation and control of a wind turbine. How the variations of wind velocity and its directions are taken care? | 09 | L ₅ | CO5 |

Q.5 Solve any Two

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|----|---|----|----------------|-----|
| a) | What are the considerations to design Wind turbines for generation of power? Discuss the detail design? | 09 | L ₅ | CO6 |
| b) | Discuss the different testing methods for testing of Wind turbines in details? | 09 | L ₄ | CO6 |
| c) | How to correlate the matlab simulation of wind system design with practical system of wind energy system? | 09 | L ₅ | CO6 |

Q.6 Solve any Three

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|----|--|----|----------------|-----|
| a) | Explain in detail the performance analysis of different wind energy applications and hence explain the design of wind pumps? | 06 | L ₅ | CO5 |
| b) | Describe standalone and grid connected system and also discuss hybrid applications of WECS. | 06 | L ₄ | CO5 |

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- c) What are Environmental Impacts of Wind Farms on nature? Discuss. 06 L₃ CO6
- d) Discuss the Economics of wind energy utilization in wind energy system in India? 06 L₃ CO6

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