

3. Which type of material is most useful for solar cell work CO2 [K₂]
a) Semi-conductors b) Insulators
c) Aluminum d) Either (a) or (b)
4. What is the sequence of ranking of the following states starting from highest wind power installation capacity? CO1 [K₁]
1. Gujarat 2. Rajasthan 3. Maharashtra 4. Tamil Nadu
a) 1- 2 - 4 -3 b) 2- 1 - 4 -3
c) 4 – 3 – 1 - 2 d) 4 – 3 – 2 - 1
5. **Assertion (A):** A fixed solar array is oriented east west. CO2 [K₂]
Reason (R): It is mechanically simpler.
a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false d) A is false but R is true
6. Grid interface issues in WECS are CO3 [K₂]
1. Voltage variations 2. Phase angle variations 3. Frequency fluctuations 4. Harmonics
Choose the correct answers
a) 1,2,4 b) 1,2,3
c) 1,2,3,4 d) 3,4
7. Arrange the following renewable sources of energy production in India in descending order CO1 [K₃]
1) Bio mass 2) Small Hydro 3) Wind 4) Solar
a) 2-3-4-1 b) 1-3-2-4
c) 3-4-1-2 d) 4-2-3-1
8. A place where many wind turbines are installed together to produce electricity is called CO1 [K₁]
a) Wind farm b) Wind turbine station
c) Propeller collection d) Wind station
9. **Assertion (A):** Hybrid systems are designed to maximize the renewable energy sources. CO4 [K₂]
Reason (R): The hybrid system is costly.
a) Both A and R are Individually true and R is the correct explanation of A b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false d) A is false but R is true
10. The range of mini hydro plant is CO4 [K₂]
a) 25 – 100MW b) 100 KW – 1 MW
c) 1-25MW d) 5KW – 100KW

PART B (10 x 2 = 20 Marks)
(Answer not more than 40 words)

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| 11. What are the advantages of renewable energy sources? | CO1 | [K ₂] |
| 12. List the primary and secondary energy sources. | CO1 | [K ₁] |
| 13. What are all the DC-DC converters used for solar energy conversion? | CO5 | [K ₂] |
| 14. What are the instruments used for measuring solar radiation? | CO2 | [K ₁] |
| 15. Define Tip speed ratio. | CO2 | [K ₁] |
| 16. What is meant by Yaw Control and Pitch Control in wind turbine? | CO3 | [K ₁] |
| 17. List the wind farm accessories. | CO3 | [K ₁] |
| 18. What is multi-level inverter? | CO3 | [K ₁] |
| 19. List out the advantages of hybrid system. | CO4 | [K ₂] |
| 20. Draw the block diagram of solar –diesel hybrid system. | CO4 | [K ₂] |

Answer any FIVE Questions:-
PART C (5 x 14 = 70 Marks)
(Answer not more than 300 words)

Q. No. 21 is Compulsory

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| 21. Describe with a neat sketch the working principle and operation of a wind energy conversion system (WECS) with its main components. | CO2 | [K ₂] |
| 22. Explain the applications of solar photovoltaic system for (a) street lighting (b) water pumping. | CO6 | [K ₂] |
| 23. Explain wind – mini hydro system in detail. | CO4 | [K ₂] |
| 24. What is the principle of solar photovoltaic power generation? Explain a basic PV system integrated with the utility grid, with necessary block diagrams. | CO3 | [K ₂] |
| 25. Explain the IV and PV Characteristics of a solar cell with the help of its equivalent circuit. | CO2 | [K ₃] |
| 26. Explain the operation of fuel cell based electricity generation. | CO1 | [K ₂] |
| 27. (a) Explain in detail about social and environmental aspects of bio mass plants. | (6) | CO1 [K ₂] |
| (b) Illustrate the operation of line commutated inverters with necessary waveforms. | (8) | CO5 [K ₂] |
