

Non conventional energy resources

1. Explain in short flywheels and super capacitors as energy storage technologies.
2. Compare supercapacitor and flywheel as energy storage devices
3. What is fuel cell? Explain with simple sketch. Explain in short basic fuel cell operations.
4. Explain in short: Phosphoric acid fuel cell (PAFC), Polymer electrolyte membrane fuel cell (PEMFC), Alkaline fuel cell (AFC), Molten carbonate fuel cell (MCFC), and Solid oxide fuel cell (SOFC)
5. Discuss in short various components of the fuel cell.
6. Discuss in short various parts of the battery and their functions
7. Distinguish between primary and secondary batteries
8. With a schematic diagram explain the typical battery test process.
9. What is C rate of the battery? Discuss the effect of C rate on charge-discharge curve.
10. What is a polarization curve? What is its significance? Discuss a typical polarization curve of a battery.
11. What is the principle of fuel cell? Discuss problems associated with operation of fuel cell.
12. What is polarization? List different types of polarizations that occur in fuel cells.
13. What is geothermal energy? Give detailed classification of geothermal sources of energy
14. What are the advantages and disadvantages of geothermal energy over other forms of energy?
15. What is biogas? Explain how it is renewable source of energy? What are the main problems associated with biomass energy?
16. Explain in short different approaches in which biomass is being used for energy?
17. Derive the expression for power developed due to wind.
18. Define and explain the following terms with reference to wind machines: (a) cut-in speed, (b) cut-out speed (c) rated speed
19. Explain the following terms with reference to wind machines: (a) tip speed ratio (b) Betz limit
20. Explain the advantages and disadvantages of horizontal axis wind machines over vertical axis wind machines.
21. What is the principle of photovoltaic power generation? What are the main elements of a PV system?
22. What are the advantages and disadvantages of photovoltaic solar energy conversion?
23. What are the steps involved in the Czochralski process to prepare single crystalline silicon?
24. What is the advantage of using Czochralski method for crystal growth?
25. Differentiate Czochralski process vs Float Zone growth techniques for mono-crystalline silicon.
26. What is zone refining? Explain with suitable example.
27. What is p-n junction? Explain construction and working of p-n junction.
28. Describe in short the different ways in which band diagrams can be plotted.
29. Explain with simple sketch the working principle of evacuated tube collectors.
30. What factors affect the performance of a solar flat plate collector?
31. Explain the following terms with reference to solar radiation geometry: (a) Zenith Angle (b) Solar Azimuth angle (c) hour angle (d) declination