

Indus University

Mechanical Engineering Department

Non Conventional Energy Sources

Question bank for reference

Unit 1: Solar Energy

1. Explain solar energy. What are the applications of solar energy?
2. Explain solar constant.
3. Explain solar radiation on earth's surface.
4. Explain different term related to solar radiation geometry such as: latitude, hour angle, slope, zenith angle, declination, solar Azimuth angle, altitude angle.
5. Explain different solar radiation measurement instruments and instrument for day length measurement.
6. Explain construction and Working of solar pyranometer for measuring Globe solar radiation.
7. Explain construction and working of solar instrument pyrliometer for measuring direct solar radiation.
8. Numerical.

Solar Collectors

1. Classify solar collectors. Explain construction of liquid flat plate collector. Also explain which factor affecton the performance of the liquid flat plate collectors.
2. Explain given solar collectors: Parabolic dish concentrator, parabolic through concentrator, Fresnel lenstype collector.
3. Explain Mirror strip collector, Compound parabolic collector, central receiver type collector.
4. Explain about transmission losses in solar collectors and cover.
5. Explain about performance evaluation of solar flat plate and concentric collectors: heat output of flat plate collector.
6. Explain construction & working of evacuated tube type collectors.
7. Explain liquid air heating collectors. Also write advantages and disadvantages.
8. Explain forced circulating & Natural circulating solar water heating system. Also explain solar water heating system with antifreeze.
9. Explain direct gain passive solar space solar heating.
10. Explain trombe wall gain passive solar space solar heating.
11. Explain box type solar cooker, Oven & advanced solar cooker as solar collector.
12. Explain parabolic dish concentrator type solar cooker & scheffler cooker.
13. Explain in detail about solar still.
14. Explain different types of solar dryer.

Unit 2:
Wind Energy

1. What is wind energy? Explain different low speed wind turbine rotors.
2. Explain vertical axis windmill and its different parts.
3. Explain different vertical axis wind turbine rotors.
4. Explain working of Savonius rotor , Darrieus type rotor Vertical axis wind turbine.
5. Explain difference between vertical axis wind turbine & Horizontal axis wind turbine.
6. Explain different environmental aspects of wind mills.
7. Explain Horizontal axis wind turbine and its different parts.
8. Explain different high speed wind turbine rotors.
9. Explain basic components of WECS.
10. Derive equation of betz limit for maximum power generation.
11. Explain Factors affecting the distribution of wind energy on the surface of the earth.
12. Numerical.