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**BE DEGREE END SEMESTER EXAMINATIONS Nov/Dec 2013**  
**MECHANICAL ENGINEERING BRANCH**  
**BE (FT) VII SEMESTER**  
**ME9022 NEW AND RENEWABLE SOURCES OF ENERGY**

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Time : 3 hours

Max. Marks : 100

Answer All Questions

**PART A**

**10 X 2 = 20**

- 1 What are the various applications of solar PV system?
  - 2 Define the concentration ratio ? In what context, concentration ratio is used in solar thermal technologies ?
  - 3 Differentiate horizontal and vertical axis wind turbines.
  - 4 What is cut-in speed and cut-out speed of the wind turbine generations ?
  - 5 What is briquetting of biomass?
  - 6 What is esterification of biodiesel?
  - 7 What is wave energy?
  - 8 What is tidal energy?
  - 9 What are the properties of hydrogen fuel?
  - 10 What is fuel cell?
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**PART B**

**5 X 16 = 80**

- 11 i) Explain with a neat sketch the working of solar PV power plant.  
ii) A house owner decides to use a solar PV system to run 4 CFLs ( 15 watt each ) and 2 fans (60 watt) for 6 hours per day. Design a suitable solar PV system with cost analysis and payback period. Make suitable assumptions.
- 12 a) i) Explain with a neat sketch the horizontal axis wind turbine.  
ii) What the characteristics of a good wind power site?  

OR
- b) i) What is Betz limit in wind energy and derive it.  
ii) What are the environmental issues with wind energy?
- 13 a) i) Explain with a neat sketch the biomass gasifier plant.  
ii) Compare the working of updraft, downdraft and cross draft system.

OR

- b) i) Explain with a neat sketch the operation of a biogas plant.
- ii) How ethanol is produced from biomass ?

14 a) i) Explain the working of OTEC power plant with the thermodynamic cycles.

OR

- b) i) Explain with a neat sketch the working of geothermal power plant.
- ii) Explain with a neat sketch a mini hydro power plant.

15 a) Discuss the various methods of producing hydrogen.

OR

- b) Explain the working principle, construction, merits and demerits of any one type of fuel cell.