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Registration no:

Total Number of Pages: 02

**B.TECH**  
**PEEL5302**

**5<sup>TH</sup> Semester Regular / Back Examination 2015-16**  
**RENEWABLE ENERGY SYSTEMS**

**BRANCH: EE,EEE**

**Time: 3 Hours**

**Max marks: 70**

**Q.CODE: T607**

**Answer Question No.1 which is compulsory and any five from the rest.**  
**The figures in the right hand margin indicate marks.**

- Q1** Answer the following questions: **(2 x 10)**
- a) What do you mean by Energy yield ratio?
  - b) What do you mean by Toppling cycle and Bottoming cycle ?
  - c) Define the term graded function.
  - d) What are the basic levels of solar spectrum?
  - e) Mention the advantages of vertical axis wind turbine over horizontal axis wind turbine.
  - f) Find out the solidity of a 3 meter radius rotor which has 24 blades of 0.25m wide.
  - g) What are the advantages and disadvantages of floating drum plant?
  - h) Explain pyrolysis process.
  - i) Comment on use of Hydrogen as energy carrier.
  - j) State four advantages of fossil fuel based systems.
- Q2** a) Explain briefly Savonius type and Darrieus type wind mill. **(5)**  
b) Explain briefly the effect of Tip Speed Ratio on torque and solidity. **(5)**
- Q3** a) Derive the expression to obtain maximum torque on Turbine rotor. **(5)**  
b) A wind energy generates 2000W at arated speed of 10 m/s at 1 atm pressure and 30<sup>0</sup>c. Calculate power generated and change in output if the wind generator operates at an altitude of 1750m ,temp of 180c, speed of 15 m/s and pressure of 0.6atm. **(5)**
- Q4** What are the various Biomass conversion technologies presently used? **(10)**
- Q5** a) What are the environmental impacts of geothermal energy? **(5)**  
b) Explain the factors affecting collector system's efficiency? **(5)**

- Q6** a) Find the angle subtended by beam radiation with the normal to a flat plate collector at 9 a.m. for the day on Dec 8 2015. The collector is in Bhubaneswar (  $28^{\circ}35'N$  ;  $77^{\circ}12'E$  ) inclined at an angle of  $52^{\circ}$  with the horizontal facing south. **(5)**
- b) Explain the current voltage characteristics of a solar cell. Also define Fill factor. **(5)**
- Q7** a) Explain the details about Double output system and single output system with suitable sketch. **(5)**
- b) Explain advantages, disadvantages and applications of Hybrid Power Systems. **(5)**
- Q8** Write short notes on any two: **(5 x 2)**
- a) History of fossil fuels.
- b) Difference between fixed dome type plant and moveable drum type plant.
- c) Reactive power compensation.
- d) Distributed generation and Dispersal generation.