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Total Number of Pages : 1

M.TECH

M.TECH 2<sup>ND</sup> SEMESTER (AR 17) SUPPLEMENTARY EXAMINATIONS, APRIL/MAY 2019  
**GREEN ENERGY RESOURCES AND TECHNOLOGY**

Branch: PE, Subject Code:MPEPE2033

Time: 3 Hours

Max Marks : 70

**PART-A****(10 X 2=20 MARKS)****1. Answer the following questions.**

- A solar car with total roof area for solar cells of  $6.4 \text{ m}^2$  is to be designed. Calculate the electrical power available. Assuming total cell efficiency is 22% and total intensity is  $990 \text{ w/m}^2$ .
- What are the compounds present in the coal
- Define simple payback period.
- Define solar attitude angle?
- How many turbines does it take to make one megawatt (MW)?
- Define the terms Beam radiation, Diffused radiation and Total radiation
- Find out the solidity of a 3 meter radius rotor which has 24 blades of 0.25m wide.
- What is called teething?
- What do you meant by power capacity?
- Draw the equivalent circuit of a battery

**PART-B****(5 X 10=50 MARKS)****Answer any five questions from the following.**

- What are the advantages of fly wheel over batteries? [5]
  - What is a fuel cell? Describe the principle of working of a fuel cell with reference to  $\text{H}_2 - \text{O}_2$  cell. [5]
- Write about energy from biomass. [5]
  - A solar cell  $0.9 \text{ cm}^2$  receives solar radiations with photons of  $1.8 \text{ eV}$  energy having an intensity of  $0.9 \text{ mW/cm}^2$ . Measurement shows open circuit voltage of  $0.6 \text{ v/cm}^2$ , Short circuit current of  $10 \text{ mA/cm}^2$  and the maximum current is 60% of the Short circuit current. The efficiency of solar cell is 25%. Calculate the maximum voltage that the cell can give and also find the fill factor. [5]
- Explain the terms i. Yaw control ii. Pitch control [5]
  - Distinguish clearly between (i) Constant speed constant frequency WTG unit.& (ii) Variable speed constant frequency WTG system. [5]
- Explain the principle and working of ocean thermal energy conversion system [5]
  - Differentiate between Wave energy conversion system and Tidal energy conversion system. [5]
- A propeller type wind turbine has the following data:  
Speed of wind at a height of 10 meter is  $12 \text{ m/s}$ . Air density is  $1.226 \text{ kg/m}^3$ , exponent  $\alpha$  is 0.14, diameter of the rotor is 80 meter, Hub height is 100 meter, wind velocity at the turbine is 80% of wind velocity at the height 100 meter ,generator efficiency is equal to 85%, find the  
i.) Power available in wind [5]  
ii.) Power extracted by the turbine [5]
  - Explain the case study of wind/PV hybrid system
- Explain the various types of charge regulators for batteries. [5]
  - Define the terms  $I_{sc}$ ,  $V_{oc}$ , FF and efficiency of solar cells [5]
- Write short notes on
  - Solar arrays. [5]
  - Energy from biogas [5]