

Exam.Code:0934

Sub. Code: 33760

2056

B.E. (Electrical and Electronics Engineering)

Fourth Semester

PC-EE-4405: Non-Conventional Energy Sources

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

I. Answer the following:-

- (a) Explain how temperature affects the efficiency of solar panels?
- (b) A solar panel has area = 2 m^2 , efficiency = 18% and solar irradiance = 800 W/m^2 .
Find the output power?
- (c) List the major engineering challenges in installation of wind turbines?
- (d) Compare the Passive balancing and Active balancing of a cell?
- (e) Why are Li-ion batteries preferred in EVs? (5x2)

UNIT - I

- II. (a) What is direct energy conservation and write in detail the need and growth of alternative energy source?
- (b) What is MPP and how does it occur? Explain the MPPT technique and plot I-V and P-V curves to find the suitable operating conditions for PV cells. (2x5)
- III. Derive the maximum power coefficient C_p for a wind turbine using momentum theory and prove why it cannot exceed 59.3%. (2x5)
- IV. a) Define and explain solar radiators. Give its applications.
b) Calculate the sun declination for the date 10th March 2008? Also calculate hour angle at the surface located at latitude of 60degree South. (2x5)

UNIT - II

- V. What are batteries? Differentiate between State of Charge (SoC) and State of Health (SoH) in batteries. How are they estimated in real systems? Explain? (10)

P.T.O.

(2)

VI. Explain the working of a hydrogen fuel cell. Write anode and cathode reactions. Also sketch and explain polarization curve? (10)

VII. Write short notes on:-

(a) Geothermal system

(b) Biomass usage and its issues

(2x5)

x-x-x