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Total Number of Pages : 02

B.Tech
PEL5J001

5th Semester Regular / Back Examination 2018-19
RENEWABLE ENERGY SYSTEMS

BRANCH : EEE

Time : 3 Hours

Max Marks: 100

Q.CODE : E496

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Short Answer Type Questions (Answer All-10) (2 x 10)

- Distinguish between conventional and non conventional energy sources.
- What do you mean by solar passive heating and cooling, solar active heating system? Give one of these example for each.
- Define fill factor. What is the significance fill factor?
- What do you mean by energy conservation and energy efficiency?
- What are the present trends in micro hydro power development?
- What do you understand by cavitation?
- What is the relative feature of drag and lift type machines?
- Write down some advantages of anaerobic digester.
- What do understand by tip speed ratio of a wind turbine?
- Distinguish between an abrupt and graded pn junction of semiconductor.

Part- II

Q2 Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Discuss main features of non conventional energy sources?
- What do understand by cell mismatching in solar module and what are its implications? Explain with I-V characteristics of two cell in a module.
- During anaerobic digestion, glucose is transformed into methane through a series of steps. The overall reaction is $((CH_2O)_6 \rightarrow 3CH_4 + 3CO_2$ Calculate the percentage of methane (by both volume and mass) produced.
- Draw the equivalent circuit of solar cell and explain the operation of it with I-V characteristics.
- Explain the various factor contributing to losses and hence reduction of efficiency of a solar cell.
- With schematic diagram explain the effect of partial or complete shading of solar cell in a module. How to overcome it?
- Write the advantages and disadvantages of concentrating collector over flat plate types solar collectors.
- Write down the factors affecting the performance of a biogas digester.
- The machine with higher speed have lower starting torque. Prove the statement taking tip-speed ratio of the wind turbine.
- Write down the various methods that the energy can be extracted from biomass.
- Comment on environmental impact on wind energy.
- What are the major advantages and disadvantages of biomass energy?

Part-III

Long Answer Type Questions (Answer Any Two out of Four)

Q3 Explain the importance of MPPT in an SPV system. Discuss various strategies used for operation of an MPPT. **(16)**

With the help of block diagram explain the operation of standalone and grid interactive solar PV systems.

Q4 With the help of neat diagram explain the working of a gassifier using woodchip biomass. What further processing is required to use the gas produced in a diesel engine? **(16)**

Q5 Using Betz model of a wind turbine, derive the expression for power extracted from wind. What is the maximum theoretical power that can be extracted and under what condition? Draw and explain the power coefficient versus perturbation factor curve. **(16)**

Q6 What are the present trends in micro hydro power development? With the neat diagram explain the layout of a typical micro hydro power station. What are the different types of hydro turbine. Give the application of each. **(16)**