Registration No. | | | | | | | | | | |

Total Number of Pages:02 **B.Tech**

PEL5J001

5th Semester Regular/Back Examination: 2019-20

RENEWABLE ENERGY SYSTEMS

BRANCH:EEE

Max Marks: 100

Time: 3 Hours

Q.Code: HRB401

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 Only Short Answer Type Questions (Answer All-10) **(02X10)**

a) What do mean by energy chain? Differentiate between primary energy and secondary energy?

b) Define concentration ratio of a solar collector? What is the value of hour angle at solar noon?

c) What do you mean by Energy yield ratio?

d) What do you mean by partial shading of a cell in a solar module?

e) Mention the advantages of vertical axis wind turbine over horizontal axis wind turbine.

f) Define solidity. How is it related to speed of the wind turbine.

g) Briefly explain, DFIG.

h) Briefly explain about 'Bio-Diesel'.

i) What is known as Pyrolysis?

j) Why are hybrid energy based systems needed?

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) **(06x08)**

a) Explain the working of a Solar Cooker using a neat schematic diagram.

b) What is the importance of MPPT in a solar photo voltaic system?

c) What will happen if you connect two non-identical PV cells in parallel and explain the resulting I-V characteristics?

d) What is solar time and why is it different from the standard clock time of a country?

e) Why reactive power compensation is required in wind firms and how is it provided? Explain.

f) Mention the advantages of vertical axis wind turbine over horizontal axis wind turbine.

g) With the help of block diagram, explain the functions of various blocks of a WECS.

h) Explain Power versus wind speed characteristics of Wind turbine.

i) What is biomass? What are the different resources used to extract biomass energy?

j) Discuss about the difference between fixed dome and floating drum type biogas plants.

k) Explain about Microhydel-PV and Biomass-Diesel systems.

l) Discuss the various range and type of Hybrid systems.

Part-III

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

Q3 Draw and explain an equivalent circuit of a practical solar PV cell. Explain about Solar PV Module, Solar PV Panel and Solar PV Array. **(16)**

Q4 (a) With the help of a neat sketch, discuss the different types of rotors used in wind turbines. **(10)**

(b) Wind speed is 10 m/s at the standard atmospheric pressure. Calculate (i) the total power density in wind stream, (ii) the total power produced by a turbine of 100 m diameter with an efficiency of 40%. Air density = 1.226 J/kg.K/m^3. **(6)**

Q5 Explain the process of production of biogas from biomass. What are the main advantages of anaerobic digestion of biomass? What are the various Biomass conversion technologies presently used? What are the main advantages and disadvantages of Biomass Energy? **(16)**

Q6 What are Hybrid Systems? Explain about Hybrid Electric Vehicles, wind-diesel hybrid system and wind –PV hybrid system. **(16)**