END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH] NOVEMBER-DECEMBER 2019

Paper Code: ETEE-419	Subject: Renewable Energy Resources

(2013 Onwards)

Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q. No. 1 which is compulsory. Attempt one question from each unit. Assume missing data if any.

Q1 (a) What do you understand by the term "Renewable Energy Resources"? Explain. (3)

(b) What are the benefits of solar power generation in the rural areas? (3)

(c) Describe what is YAW control in WECS? (3)

(d) Explain the classification of wind mills. (3)

(e) Explain the differences between biomass and biogas. (4)

(f) What is the basic principle of OTEC. What are its advantages? (3)

(g) What is low voltage ride through? (3)

(h) What precautions are to be taken before coupling the SPV Array output to the national electrical grid? (3)

UNIT-I

Q2 (a) What are the different types of solar collectors? Explain the constructional details of a flat plate type solar collector. What are its main advantages? (6)

(b) Describe the basic principle of solar photovoltaic power generation. Name and discuss the main elements of a PV system. (6.5)

Q3 (a) A solar cell has an output capacity of 0.5 A at 0.4 V. Assume that an array of such cells with 100 parallel strings and each string with 300 cells in series is to be built up. What will be the array output voltage (V_a), array output current (I_a) and the array output power (P_a)? (6)

(b) Calculate the fill factor (F.F.) of a solar cell having open circuit voltage V_{oc}=0.611 V, short circuit current I_{sc}=2.75 m A, and at maximum power output of the cell the maximum voltage is V_m=0.5 V and the maximum current is I_m=2.59mA. (6.5)

UNIT-II

Q4 (a) What is the basic principle of wind energy conversion? Prove that the power available in the wind is proportional to the cube of the wind velocity. (6)

(b) Why a tall tower is essential for mounting a Horizontal Axis Wind Turbine? Explain the salient points in detail. (6.5)

Q5 (a) Explain the parameters which should be considered while selecting the wind mill location. (6)

(b) A three bladed wind rotor with blade length of 52 m is operating in a wind stream having wind velocity of 12 m/s. Air density is 1.23 kg/m³ and power coefficient may taken as 0.4. Calculate the extractable power from the wind. (6.5)

P.T.O.

UNIT-III

Q6 (a) What do you understand by geothermal energy? Enunciate the merits and demerits of geothermal energy and its applications. (6)

(b) What do you understand by Incineration, Pyrolysis and Gasification? Discuss the difference among all the three processes. (6.5)

Q7 (a) What do you understand by the term tidal energy? What are the difficulties in tidal power developments? (6)

(b) Explain the basic principle of a Fuel Cell? What are the different types of fuel cells? List their advantages. (6.5)

UNIT-IV

Q8 (a) Explain (i) ramp rate limitations and in scheduling (6)

(b) Explain the impact of grid connection on the steady state and the dynamic performance of a power system. (6.5)

Q9 (a) Write short notes on (i) Reserve requirements and (ii) Frequency and voltage control. (6)

(b) Why do we require to connect the electrical power obtained from the renewable energy resources to be connected to the power grids? (6.5)

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