CRASH COURSE

USN | | | | | | | | | | | 　　　　10ME754

Seventh Semester B.E. Degree Examination, May 2017
Non-Conventional Energy Sources

Time: 3 hrs. 　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting*
atleast TWO questions from each part.
2. *Missing data can be assumed suitably.*
3. *Use of hand book is permitted.*

PART – A

1　a. What are renewable energy sources? Explain in brief the main renewable energy sources that can be harnessed with reference to Indian context? **(10 Marks)**

　b. Explain the following: (i) Solar constant　(ii) Diffusion radiation　(iii) Global radiation (iv) Air mass　　(v) Spectral distribution of radiation. **(10 Marks)**

2　a. Calculate the angle made by beam radiation with the normal to a flat plate collector on December 1, at 9.00 AM. Solar time for a location at $28°35'N$. The collector is tilted at an angle of latitude plus $10°$, with the horizontal and is pointing due south. **(06 Marks)**

　b. Define the following terms:
　　(i) Solar altitude angle　　　(ii) Solar time　　　　(iii) Solar Azimuth angle
　　(iv) Hour angle. **(08 Marks)**

　c. What is pyranometer? Explain its working principle with the aid of neat sketch. **(06 Marks)**

3　a. What are concentrating collector? Explain any two types of concentrating collectors with neat sketches. **(10 Marks)**

　b. With a neat sketch, explain the following : (i) Solar air heaters　　(ii) Solar pond operational problems. **(10 Marks)**

4　a. Explain the applications of solar energy for, (i) green house effect　(ii) solar distillation. **(08 Marks)**

　b. What are the main components of a flat plate solar collectors? Explain the functions of each. **(12 Marks)**

PART – B

5　a. Write a short note on principle of photo-voltaic conversion. **(05 Marks)**

　b. Explain the availability of wind energy in India. **(05 Marks)**

　c. The velocity of wind at a place is 18 m/s, where the condition of pressure and temperature are 1 standard atmospheric and $15°C$ respectively. Determine the following:
　　(i)　The total power density of the wind stream.
　　(ii)　The maximum power density that can be absorbed.
　　(iii)　The possible power absorption.
　　(iv)　The total power.
　　(v)　The torque.
　　(vi)　The axial thrust.
　　　　Take : Turbine diameter = 125 m, Conversion $\eta = 35\%$, Turbine speed N = 42 rpm,
　　　　$1 \text{ Atm} = 1.01325 \times 10^5 \text{ Pa}$ **(10 Marks)**

6 a. Explain the construction and working of a tidal power plant.   (10 Marks)
   b. What are the problems associated with OTEC?   (10 Marks)

7 a. Give a list of the materials used for biogas generation.   (06 Marks)
   b. What are the factors, which affect the size of biogas plant?   (06 Marks)
   c. Explain briefly the methods of maintainance of biogas production.   (08 Marks)

8 a. What are the different methods of production of hydrogen? Explain any one method of production of hydrogen.   (10 Marks)
   b. Explain the different methods of hydrogen storage.   (10 Marks)

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