USN ☐☐☐☐☐☐☐☐☐☐ 　　　　　　　　　　　　　　　**10ME53**

Fifth Semester B.E. Degree Examination, December 2012
Energy Engineering

Time: 3 hrs. 　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

**Note: *Answer FIVE full questions, selecting
at least TWO questions from each part.***

PART – A

1 a. Differentiate Stokes firing and pulverized fuel burning of coal. 　　　**(06 Marks)**
  b. Sketch and explain bowl pulverizing mill. 　　　　　　　　　　　　**(07 Marks)**
  c. Explain pneumatic ash handling system with a neat sketch. 　　　　　**(07 Marks)**

2 a. Define draught and explain the operation of induced draught system with a neat sketch.
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　(08 Marks)
  b. Define cooling tower and explain the principle of operation of hyperbolic cooling tower,
     with a neat sketch. 　　　　　　　　　　　　　　　　　　　　　　**(08 Marks)**
  c. Explain any two boiler accessories used in steam generators. 　　　　**(04 Marks)**

3 a. Draw the general layout of diesel power plant. 　　　　　　　　　　**(04 Marks)**
  b. Describe the different methods of starting the diesel engine. 　　　　**(06 Marks)**
  c. Explain the necessity of cooling and lubrication of diesel engine. Sketch and explain splash
     lubrication system. 　　　　　　　　　　　　　　　　　　　　　**(10 Marks)**

4 a. Classify hydro-electric power plant. 　　　　　　　　　　　　　　**(04 Marks)**
  b. Differentiate between:
     i)   Pondage and storage type of hydel power plant.
     ii) Forebay and surge tank. 　　　　　　　　　　　　　　　　　　**(06 Marks)**
  c. The mean weekly discharge at a hydel power plant site is given below: flow is given in
     millions of cubic metre per week.

Week	1	2	3	4	5	6	7	8	9	10	11	12
Flow	160	200	300	1100	700	900	700	600	1000	600	400	300

     i)   Draw the hydrograph and find the average flow available for the whole period.
     ii) Develop the flow duration curve and plot it.
     iii) Determine the power that can be produced for the mean flow of water if the available
          head is 100m and overall efficiency of generation is 82%. 　　　　**(10 Marks)**

PART – B

5 a. Explain nuclear reactor with a neat sketch. 　　　　　　　　　　　**(07 Marks)**
  b. Explain pressurized water reactor with a neat sketch. 　　　　　　　**(07 Marks)**
  c. Write note on :
     i)   Radiation hazards.
     ii) Radio active waste disposal. 　　　　　　　　　　　　　　　　**(06 Marks)**

6 a. Explain the methods of harnessing solar energy. **(06 Marks)**
   b. Explain how wind energy can be harnessed using horizontal axis wind mill. **(06 Marks)**
   c. Wind speed at a location V_i = 30 miles/hr (13.42 m/s) the speed at turbine rotor is 60% of this value and the speed at exit is 30% of V_i. The rotor diameter is 9m, density ρ = 1.293 kg/m^3. Calculate:
      i)   The power available in the wind at the turbine rotor
      ii) The power in wind at outlet
      iii) The power developed by the turbine
      iv) The coefficient of performance. **(08 Marks)**

7 a. Explain the method of harnessing tidal energy. **(06 Marks)**
   b. Explain OTEC plant with a neat sketch. **(07 Marks)**
   c. With a neat sketch, explain the working of hot dry rock geothermal plant. **(07 Marks)**

8 a. Write short notes on:
      i) Photosynthesis
      ii) Energy plantation. **(06 Marks)**
   b. Classify gasifiers and explain the factors affecting bio-gas generation. **(06 Marks)**
   c. Explain bio-gas plant with a neat sketch. **(08 Marks)**

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