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Fifth Semester B.E. Degree Examination, June 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. Draw a line diagram of pneumatic ash handling system. Explain the difficulties encountered in its design and operation. (08 Marks)
 - b. With a neat sketch, explain the working of chain grate stoker, state the disadvantages of it. (09 Marks)
 - c. How are steam power plants classified? (03 Marks)

- 2
 - a. Explain with neat sketch, the construction and working of Velox high pressure boiler. What are all its advantages? (10 Marks)
 - b. Determine the height and diameter of the chimney used to produce a draught for a boiler which has an average coal consumption of 1800 kg/h and flue gases formed per kg of coal fired are 14 kg. The pressure losses through the system are given below. Pressure loss in fuel bed = 7mm of water, pressure loss in boiler flue = 7mm of water, pressure loss in bends = 3mm of water, pressure loss in chimney = 3mm of water. Pressure head equivalent to velocity of flue gases passing through the chimney = 1.3 mm of water. The temperatures of ambient air and flue gases are 35°C and 310°C respectively. Assume actual draught is 80% of theoretical one. (10 Marks)

- 3
 - a. Explain the necessity of the cooling system in a diesel engine. With the help of neat diagram explain the working principle of thermostatic cooling. (09 Marks)
 - b. What are the applications of diesel electric power plant? (06 Marks)
 - c. Name the essential components of a diesel electric plant. (05 Marks)

- 4
 - a. What is a spillway? Why are spillways required? What are the different types of spillways? (10 Marks)
 - b. The run off data of a river at a particular site is tabulated in the following table :

Month	Mean discharge (millions of cu.m.)	Month	Mean discharge (millions of cu.m.)
January	- 30	July	- 80
February	- 25	August	- 100
March	- 20	September	- 110
April	- 0	October	- 65
May	- 10	November	- 45
June	- 50	December	- 30

- i) Draw the hydrograph and find the mean flow.
- ii) Draw flow duration curve.
- iii) Find the power developed if the head available is 90m and the overall efficiency of generation is 86 percent. Assume each month f 30 days. (10 Marks)

PART – B

- 5 a. Classify nuclear reactors used. (04 Marks)
b. With neat sketch, explain the working of Pressurized Water Reactor (PWR), and discuss its advantages. (08 Marks)
c. Draw a neat diagram of breeder reactor and list out its advantages and disadvantages. (08 Marks)
- 6 a. Explain with the help of neat sketch a solar pond electric power plant. (07 Marks)
b. What is a photovoltaic cell? (04 Marks)
c. A 10m/sec wind is at 1 standard atm pressure at 15°C temperature. Calculate : i) the total density in the wind stream ; ii) maximum obtainable power density ; iii) a reasonable obtainable power density in W/m^2 and iv) total power produced (in kW) if the turbine diameter is 120m. Assume $\eta = 40\%$. (06 Marks)
d. Name basic components of a wind electric system. (03 Marks)
- 7 a. Explain with neat sketch Rankine cycle OTEC plant. (08 Marks)
b. How the power can be obtained from tides? How the tidal plants are classified? (05 Marks)
c. With a neat sketch, explain the working of “flash steam open type system” geothermal plants. (07 Marks)
- 8 a. How are the gasifiers classified? With a schematic diagram, explain the working of down drat gasifier. (10 Marks)
b. Write short notes on :
i) Anaerobic fermentation
ii) Photosynthesis. (10 Marks)

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