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10ME53

**Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020**

**Energy Engineering**

Time: 3 hrs.

Max. Marks:100

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

**PART - A**

- 1 a. With the help of a neat diagram, explain the working of spreader stoker. Mention its disadvantages. (10 Marks)
- b. Draw a line diagram of pneumatic ash handing system and explain its working. (10 Marks)
- 2 a. Sketch and explain Benson boiler. (08 Marks)
- b. Explain the principle of operation of hyperbolic cooling tower, with a neat sketch. (08 Marks)
- c. Briefly explain the function of Air Preheater and Super heaters in thermal power plant. (04 Marks)
- 3 a. Sketch and explain briefly a plant layout for diesel power station all the required equipment. (10 Marks)
- b. Why cooling of diesel engine is necessary? Give for important functions of lubrication system. (05 Marks)
- c. Write a short note on application of diesel engine in power field. (05 Marks)
- 4 a. Explain clearly storage, pondage and pumped storage hydro-electric power plants. (06 Marks)
- b. Classify hydro-electric power plant. (04 Marks)
- c. The run off date of a river at a particulars site is tabulated in the following tables:

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean discharge millions of Cu.m.	30	25	20	0	10	50	80	100	110	65	45	30

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

**PART - B**

- 5 a. Describe with neat sketch, working principle of pressurize water reactor highlighting its advantages and disadvantages. (10 Marks)
- b. Explain the sodium-graphite nuclear reactor, with a neat sketch. (10 Marks)
- 6 a. Explain the methods of harnessing solar energy. (06 Marks)
- b. Explain briefly the main application of solar ponds. (06 Marks)
- c. A horizontal shaft, propeller types wind turbine is located in area having the following wind characteristics:
  - i) Total power density in wind stream,  $W/m^2$ .
  - ii) Maximum possible obtainable power density in  $W/m^2$ .
  - iii) Actual obtainable power density in  $W/m^2$  assuming 40% efficiency.
  - iv) Total power from the wind turbine of 120 m diameter.
 Determine the above parameters. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.



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- 7 a. Explain with neat sketch Rankine cycle OTEC plant. (08 Marks)  
b. With a neat sketch, explain the working of hot dry rock geothermal plant. (07 Marks)  
c. How the power can be obtained from tides? How the tidal plants are classified? (05 Marks)
- 8 a. Write notes on the following:  
i) Solar radiation at the earth surface. (10 Marks)  
ii) Biogas plant. (10 Marks)  
b. How are the gasifiers classified? With a schematic diagram, explain the working of downdraft gasifier. (10 Marks)

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