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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)

- 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)
