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10ME53

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Energy Engineering

Time: 3 hrs.

Max. Marks:100

- Note:** 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
2. Missing data may be assumed suitably.

PART – A

- 1 a. What is pulverized-coal? (02 Marks)
b. Explain with sketch overfeed and underfeed principle of firing coal. (09 Marks)
c. Sketch and explain a cyclone Burner with advantages and disadvantages. (09 Marks)
- 2 a. Explain the Velox steam generator, with a neat sketch. (06 Marks)
b. Classify different types of Draughts and explain with a neat sketch the balanced draught. (06 Marks)
c. Calculate the mass of flue gases flowing through the chimney when the draught produced is equal to 2 cm of water, temperature of flue gases is 300°C and ambient temperature is 20°C. The flue gases formed per kg of fuel burnt are 25 kg. Neglect the losses and take the diameter of the chimney as 1.9 metre. (08 Marks)
- 3 a. Draw a line diagram to show the layout of diesel power plant. (05 Marks)
b. Explain different methods of starting the diesel engine. (07 Marks)
c. For a diesel power station. Discuss briefly about the following:
(i) Cooling system (ii) Lubricating system. (08 Marks)
- 4 a. How are the hydro-electric power plant classified? With a neat sketch, explain the pumped storage plant. (08 Marks)
b. The run off data of a river at a particular site is tabulated below:

Month	Mean discharge per month (millions of cu.m)
January	40
February	25
March	20
April	10
May	0
June	50
July	75
August	100
September	110
October	60
November	50
December	40

- i) Draw a hydrograph and find the mean flow.
ii) Draw the flow duration curve.
iii) Find the power in MW available at mean flow, if the head available is 90 m and overall efficiency of generation is 86%.
Take each month of 30 days. (12 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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PART – B

- 5 a. What is Nuclear fusion? How does it differ from nuclear fission? (04 Marks)
b. Explain the Boiling water reactor, with a neat sketch. (08 Marks)
c. Explain:
(i) Thermal utilization factor.
(ii) Multiplication factor.
(iii) Disposal of radioactive wastes. (08 Marks)
- 6 a. Sketch and explain the working of Pyranometer. (06 Marks)
b. Sketch and explain the principle of working of solar pond. (08 Marks)
c. Calculate the angle made by beam radiation with the normal to a flat-plate collector on May 1 at 0900h (local apparent time). The collector is located in New Delhi ($28^{\circ}35'N$, $77^{\circ}12'E$). It is tilted at an angle of 36° with the horizontal and is pointing down South. (06 Marks)
- 7 a. What are the advantages and limitations of Tidal power generation? (08 Marks)
b. With a neat sketch, explain the closed cycle OTEC plant. (08 Marks)
c. Briefly write a note on geothermal energy. (04 Marks)
- 8 a. What are the factors affecting biogas generation? Explain any two factors. (05 Marks)
b. Explain with neat sketch of Indian Bio-gas plant. (10 Marks)
c. In brief write a note on energy plantation. (05 Marks)
