CBCS SCHEME

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15ME71

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Energy Engineering

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What is pulverized coal? Explain with neat sketch overfeed and underfeed principle of coal firing. **(12 Marks)**

b. List the advantages and limitations of pulverized coal. **(04 Marks)**

OR

2 a. With neat sketch explain the working principle of Benson boiler. **(08 Marks)**

b. Define draught and explain the operation of induced draught system with neat sketch. **(08 Marks)**

Module-2

3 a. Draw the layout of Diesel engine power plant and explain its operation. **(06 Marks)**

b. Describe the different methods of starting the Diesel engine. **(06 Marks)**

c. Mention the application of Diesel engines in power field. **(04 Marks)**

OR

4 a. Explain briefly about
   i) Surge tank
   ii) Water hammer effect. **(08 Marks)**

b. The runoff data of a river at a particular site is tabulated below :

Month	Mean in discharge per month in million of m^3
Jan	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 the flow duration curve
   ii) Also draw hydrograph and find the mean flow **(08 Marks)**

Module-3

5 a. Explain with neat sketch working principle of solar pond electric power plant. **(08 Marks)**

b. What is Solar radiation? Explain the working principle of pyranometer with neat sketch. **(08 Marks)**

OR

6 a. What is photovoltaic cell? Explain the principle of photo-voltaic conversion. **(08 Marks)**

b. Calculate the Local Apparent Time (LAT) corresponding to 13.30hrs (IST) on July 16, 1998 at Delhi (28°35′ N 77°23′E). The equation at the time correction on July 16 is (–6) minutes. Indian Standard Time (IST) use the local civil time corresponding to 82°5′E longitude. Also calculate the declination. **(08 Marks)**

Module-4

7 a. Explain the method of harnessing wind energy using the horizontal axis wind machine with neat sketch. **(08 Marks)**

b. Explain the method of harnessing tidal energy using the double basin system. **(08 Marks)**

OR

8 a. A horizontal shaft, propeller type wind turbine is located in area having the following wind characteristics.

i) Total power density in wind steam W/m^2

ii) Maximum possible obtainable power density in W/m^2

iii) Actual obtainable power density in W/m^2 assume 40% efficiency

iv) Total power from the wind turbine of 120m diameter. **(08 Marks)**

b. Mention the difference between vertical and horizontal wind turbines. **(08 Marks)**

Module-5

9 a. Explain with neat sketch working principle of KVIC biogas digester. **(08 Marks)**

b. What is anaerobic digestion? What are the factors which affect biodigestion. **(08 Marks)**

OR

10 a. Briefly explain Alkaline Fuel cell and Molten carbonate fuel cells. **(08 Marks)**

b. Write short notes on Geothermal energy and state the advantages and limitations **(08 Marks)**

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