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15ME71

Seventh Semester B.E. Degree Examination, July/August 2022
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. With a neat sketch, explain the working of spreader stokes. State the advantages and disadvantages. **(08 Marks)**
   b. Explain the pneumatic ash handling system, with a neat sketch. **(08 Marks)**

OR

2 a. With a neat sketch, explain the Benson boiler. **(08 Marks)**
   b. What is draught? Mention types of draught and explain any one type with neat sketch. **(08 Marks)**

Module-2

3 a. Draw a line diagram to shown the layout of diesel power plant. Describe it in brief.**(08 Marks)**
   b. Name the various starting methods used for diesel engine and explain them. **(08 Marks)**

OR

4 a. Differentiate between :
   (i)   Pondage and storage type of hydel power plant
   (ii) Fore bay and surge tank **(08 Marks)**
   b. The run off data of a river at a particular site is tabulated below:

Month	Mean discharge per month (million of Cum)
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) Also draw the flow duration curve.
   (iii) Find the power in MW available at mean flow if the head available is 80 m and overall efficiency of generation is 85%. **(08 Marks)**

Module-3

5 a. Define the following terms:
   (i) Solar constant   (ii) Beam radiation
   (iii) Diffuse radiation   (iv) Zenith angle   **(08 Marks)**

   b. Determine the local solar time and delination at a location latitude 23°15′N, longitude 77°30′E at 12.30 IST on June 19. Equation of time correction is given from standard table – (1′01″) and standard time longitude is 82°30′.   **(08 Marks)**

OR

6 a. Draw a neat sketch, explain flat plate collector.   **(08 Marks)**
   b. With a neat sketch, explain the working of solar cell.   **(08 Marks)**

Module-4

7 a. With a neat sketch, explain a horizontal axis wind mill and vertical axis wind mill.   **(08 Marks)**

   b. Wind blows with velocity of 15 m/s and at 15°C. Assume 1 standard atmospheric pressure if the turbine diameter is 120 m and operating at 40 rpm at maximum efficiency. Calculate torque and axial thrust at maximum efficiency. Assume propeller type wind turbine. Assume gas constant for air R = 0.287 kJ/kgK.   **(08 Marks)**

OR

8 a. Draw a neat sketch and explain the working of Double basin tidal power plant.   **(08 Marks)**
   b. Discuss the advantages and limitations of tidal power generation.   **(08 Marks)**

Module-5

9 a. With a neat sketch, explain the construction and working of KVIC digester.   **(08 Marks)**
   b. With a neat sketch, explain the working of down draft gasifier.   **(08 Marks)**

OR

10 a. Describe the classification of fuel cells.   **(08 Marks)**
   b. Write short notes on:
      (i) Nuclear energy
      (ii) Geothermal energy   **(08 Marks)**

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