CBCS SCHEME

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15ME71

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Energy Engineering

Time: 3 hrs. Max. Marks: 80

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

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.

Module-1

1 a. Differentiate Stokes firing and Pulverised fuel burning of coal. **(06 Marks)**

b. With neat sketch, explain the working of spreader stoker. State the advantages and disadvantages. **(10 Marks)**

OR

2 a. Define Draught and explain the operation of induced draught, with a neat sketch. **(08 Marks)**

b. Define Cooling tower and explain the principle of operation of hyperbolic cooling tower with neat sketch. **(08 Marks)**

Module-2

3 a. Explain the different methods of starting diesel engines. **(06 Marks)**

b. At a particular site, the mean monthly discharges (in million cubic meter) of a river in 12 months from January to December are 40, 25, 20, 10, 0, 50, 75, 100, 110, 60, 50 and 40 respectively. i) Draw the Hydrograph and Flow duration curve ii) Find the power in MW available at mean flow if the head available is 80m and overall efficiency of generation is 85%. Assume each month of 30 days. **(10 Marks)**

OR

4 a. Explain the necessity of cooling and lubrication of diesel engine. Sketch and explain Flash lubrication system. **(08 Marks)**

b. Classify Hydro – Electric Power Plants. Explain with neat sketch, the pumped storage plant. **(08 Marks)**

Module-3

5 a. Define the terms : i) Inclination angle ii) Zenith angle iii) Solar Azimuth angle. **(06 Marks)**

b. For New Delhi (28° 35' N , 77° 12' E) , calculate the Zenith angle of the sun at 2.30 pm on 20 February 2015. The standard IST latitude for India is 81° 44' E. **(10 Marks)**

OR

6 a. Classify different types of solar thermal collectors and show the constructional details of a flat plate collector. What are its main advantages? **(10 Marks)**

b. With neat sketch, explain the solar vapour compression refrigeration system. **(06 Marks)**

Module-4

7 a. What are the major problems associated with wind power? Explain any one vertical axis wind mill, with a neat sketch. **(08 Marks)**

b. With neat sketch, explain the working of Double basin tidal power plant. **(08 Marks)**

OR

8 a. What are the advantages and limitations of Tidal Power generations? **(06 Marks)**

b. A 10 m/s wind is at 1 standard atmospheric pressure at 15°C temperatures. Calculate

i) The total density in the wind stream.

ii) Maximum obtainable power density.

iii) A reasonable obtainable power density in W/m^2 and

iv) Total power produced in KW if the turbine diameter is 120m. Assume $\eta = 40\%$. **(10 Marks)**

Module-5

9 a. Explain the factors affecting biogas generation. **(06 Marks)**

b. Explain i) Anaerobic fermentation ii) Photo synthesis. **(06 Marks)**

c. Differentiate Biomass and Biogas. **(04 Marks)**

OR

10 a. What is Fuel Cell? What are potential applications of fuel cell? **(08 Marks)**

b. With the help of schematic diagram, explain the operation of Open cycle MHD generating system. **(08 Marks)**

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