CBCS SCHEME

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15ME71

Seventh Semester B.E. Degree Examination, Aug./Sept.2020
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. List the advantages and disadvantages of pulverized coat. **(05 Marks)**

b. Explain with neat sketch, the working principles of Benson Boiler. **(06 Marks)**

c. Explain Cyctone Burner with a neat sketch. **(05 Marks)**

OR

2 a. Explain Forced Draught System, Induced Draught System and Balanced Draught system for a chimney. **(09 Marks)**

b. Calculate the height of the chimney required to produce a draught equivalent to 1.7cm of water. The flue gas temperature is 270°C. The ambient temperature is 22°C and minimum amount of air/kg of fuel is 17kg. **(03 Marks)**

c. Briefly explain (i) Economiser (ii) Cooling towers. **(04 Marks)**

Module-2

3 a. Mention any four applications of Diesel engines in Power Sector field. **(04 Marks)**

b. Explain with a neat sketch, the layout diesel engine power plant. **(06 Marks)**

c. Explain with a neat sketch, the working of thermosyphon cooling system. **(06 Marks)**

OR

4 a. Explain Hydrpgraph, Flow Duration curve and mass curve. **(06 Marks)**

b. Draw the general layout of Hydel-Power-plant. **(04 Marks)**

c. Write short notes on (i) Penstock (ii) Water Hammer (iii) Surge tanks. **(06 Marks)**

Module-3

5 a. Explain the solar radiation reacting at the Earth's surface. **(04 Marks)**

b. Explain Pyranometer instrument for measuring solar radiation with a neat sketch. **(06 Marks)**

c. Explain Evacuated Tube Collector (ETC) with a neat sketch. **(06 Marks)**

OR

6 a. Explain Latent Heat thermal storage system with a neat sketch. **(04 Marks)**

b. Describe the working principle of PV-cell with a neat sketch. **(06 Marks)**

c. Write short notes on : (i) PV-module, PV-panel and PV-Array
(ii) Photovoltaic thermal (PV/T) systems. **(06 Marks)**

Module-4

7 a. What are the properties of wind? **(04 Marks)**

b. Classify wind turbine machines and explain any one with a neat sketch. **(06 Marks)**

c. Define coefficient of performance of wind turbine. Wind at 1 atm pressure and 15°C has a velocity of 15m/s. If turbine diameter is 120m and rotating at a speed of 40 rpm. Calculate (i) Total power density in wind (ii) The maximum obtainable power density (iii) Total power (iv) The maximum Torque and Axial thurst.
Take R = 0.287 kJ/kg K; 1 atm = 1.0132×10^5 kPa. **(06 Marks)**

OR

8 a. What are the characteristics of Tidal Energy? **(04 Marks)**
b. Explain the working principle of Tidal power generation with neat sketch. **(06 Marks)**
c. How the Tidal energy is harnessed using the Double Basin Arrangement? **(06 Marks)**

Module-5

9 a. Describe the different types of Biomass Conversion Technologies. **(06 Marks)**
b. Explain with a neat sketch of KVIC model (Floating Drum Type) Biodigester for Biogas production. **(07 Marks)**
c. How the urban wastes are utilized for energy conversion? **(03 Marks)**

OR

10 a. What is a Fuel cell? Explain with sketch the operating principle of Fuel cell. **(07 Marks)**
b. Explain with neat sketch of open cycle MHD (Magneto Hydro Dynamic) system. **(06 Marks)**
c. Explain the concept of zero energy building. **(03 Marks)**

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