CBCS SCHEME

USN | | | | | | | | | | 415ME71

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.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. Enumerate and explain the steps involved in handling of the coal. **(08 Marks)**
b. Explain the traveling grate stoker, with a neat sketch. **(08 Marks)**

OR

2 a. What are the different types of cooling ponds and cooling towers? **(06 Marks)**
b. Define Draught and explain forced draught, with a neat sketch. **(06 Marks)**
c. Explain the function of air — preheater and superheater in thermal power plant. **(04 Marks)**

Module-2

3 a. Draw the layout of a diesel power plant. **(06 Marks)**
b. Show the different methods of engine cooling. **(04 Marks)**
c. Explain different methods of starting the diesel engine. **(06 Marks)**

OR

4 a. Classify hydro — electric plants. **(02 Marks)**
b. Explain the necessity of using the components like surge tank, gates and valves in hydel power station. **(06 Marks)**
c. At a particular site the mean discharge (in millions of m^3) of a river in 12 months from January to December are 30, 25, 20, 0, 10, 50, 80, 100, 110, 65, 45 and 30 respectively. Draw the flow duration curve on graph sheet. Also estimate the power developed in MW if the available head is 90m and the overall efficiency of generation is 87.4%. Assume each month of 30 days. **(08 Marks)**

Module-3

5 a. What is Pyrheliometer? With a neat sketch, explain its working principle. **(07 Marks)**
b. Explain the following : i) Solar constant ii) Extra terrestrial radiation iii) Global radiation. **(03 Marks)**
c. With a neat sketch, explain the working of space heating and cooling by using solar collectors. **(06 Marks)**

OR

6 a. Explain with neat figure working of a solar photovoltaic cell. **(08 Marks)**
b. Explain the applications of solar photovoltaic cells. **(08 Marks)**

Module-4

7 a. What are the major problems associated with wind power? Explain horizontal axis wind mill with sketch. **(08 Marks)**

b. A horizontal shaft, propeller type wind turbine is located in area having the following wind characteristics :
Speed of wind 10m/s at 1 atm and 15 °C. Calculate the following :
i) Total power density in wind stream, W/m^2.
ii) Maximum possible obtainable power density in W/m^2.
iii) Actual obtainable power density in W/m^2 assuming 40% efficiency.
iv) Total power from the wind turbine of 120m diameter. **(08 Marks)**

OR

8 a. Describe the principle of power generation methods using tidal energy source. **(08 Marks)**
b. What are the advantages and limitations of Tidal power generation? **(08 Marks)**

Module 5

9 a. Explain Photosynthesis with example. (08 Marks)
b. Explain briefly method of biomass gasification. (08 Marks)

OR

10 a. Mention the different types of fuel cells. **(02 Marks)**
b. Explain a simple MHD generator and its working with figure. **(08 Marks)**
c. With a sketch, explain the working of "Hot dry rock" geothermal plant. **(06 Marks)**