

CBCS Scheme

15ME71

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Seventh Semester B.E. Degree Examination, December 2018/January 2019

Energy Engineering (Model QP2)

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 pulveriser? With a neat sketch, explain the working principle of Bowl and Race mill pulveriser. (08 Marks)
b. Explain with neat sketch, working of Travelling Grate Stokers and their advantages. (08 Marks)

OR

- 2 a. With a neat sketch explain the working of LaMont boiler. (08 Marks)
b. Derive expression for chimney height. (08 Marks)

Module-2

- 3 a. Draw a schematic diagram of Diesel engine power plant and describe it in brief. (08 Marks)
b. With a neat sketch explain i) air intake system and ii) engine exhaust system used for diesel engine power plant. (08 Marks)

OR

- 4 a. With a neat diagram explain pump storage plant and mention its advantages. (08 Marks)
b. The mean monthly discharge for 12 months of a particular site is as shown below

Month	Discharge, m ³ /s	Month	Discharge, m ³ /s
January	100	July	1000
February	200	August	1200
March	325	September	850
April	600	October	600
May	750	November	400
June	825	December	200

- i) Draw hydrograph and find mean flow
ii) Draw flow duration curve
iii) Find the power in MW available at mean flow.

If the head available is 70 m and overall efficiency of generation is 80%. (08 Marks)

Module-3

- 5 a. What is the difference between Pyrheliometer and pyranometer? Describe the principle of Angstrom type pyrheliometer (10 Marks)
b. Determine the local solar time and declination at a location latitude 77° 30'E at 12.30 IST on June 19. Equation of time correction is given from standard table or chart : -(1' 01"). (06 Marks)

OR

- 6 a Explain the principle of conversion of solar energy into heat. Explain with a neat diagram how this is employed in Flat plate collector. **(08 Marks)**
b Explain the principle of solar photovoltaic power generation. What are the main elements of Solar PV system. **(08 Marks)**

Module-4

- 7 a With a neat sketch explain the methods of harnessing tidal energy **(08Marks)**
b Wind speed at a location $V_i=30$ miles/hr (13.42 m/s) the speed at turbine rotor is 60% of this value and the speed at exit is 30% of V_i . The rotor diameter is 9m, density $\rho : 1.293$ kg/m³. Calculate:
i) The power available in the wind at the turbine rotor
ii) The power in wind at outlet
iii) The power developed by the turbine
iv) The coefficient of performance. **(08Marks)**

OR

- 8 a With usual notations, derive an expression for the maximum power output of Horizontal Axis Wind turbine. **(8Marks)**
b Explain the factors considered for the selection of wind machines. **(08 Marks)**

Module-5

- 9 a With a neat sketch, explain the construction and working of KVIC digester or Indian Bio-gas plant. **(08 Marks)**
b With a neat sketch, explain MHD power generation **(08 Marks)**
- OR**
- 10 a Write a short note on i) energy plantation ii) photosynthesis. **(08Marks)**
b Sketch and Explain the working of
i) Molten Carbonate Fuel Cell ii) Polymer Electrolytic Membrane Fuel Cell **(08 Marks)**