Seventh Semester B.E. Degree Examination, December2018/January2019

Energy Engineering (Model QP)

Time: 3 hrs   Max marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module

Module-1

1   a. Explain the cyclone furnace. Why they are more suitable for Indian coals.   **(08 Marks)**
     b. Explain with neat sketch, working of Multi Retort Stokers and their advantages.   **(08 Marks)**

OR

2   a. With a neat sketch explain the working of Velox high pressure boiler.   **(08 Marks)**

     b. Determine mass of flue gases flowing through the chimney of diameter 1.75 m and produces a draught of 1.8 cm of water. Temperature of flue gases is 290^0C. The flue gases formed per kg of fuel burnt are 23 kg. Neglect the losses and assume atmospheric temperature as 20^0C. **(08Marks)**

Module-2

3   a. Draw a schematic diagram of Diesel engine power plant and describe it in brief.   **(08Marks)**
     b. Explain the different methods used for starting diesel engines.   **(04 Marks)**
     c. What are the applications of diesel engine power plant   **(04Marks)**

OR

4   a. Draw a general layout of hydro-electric power plant and explain the functions of each part.
                                                                                           (08 Marks)

     b. The runoff data of a river at a particular site tabulated below

Month	Mean discharge per month (Millions of cubic meter)	Month	Mean discharge per month (Millions of cubic meter)
January	40	July	75
February	25	August	100
March	20	September	110
April	10	October	60
May	0	November	50
June	50	December	40

     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 80 m and overall efficiency of generation is 85%.
     Take each month of 30 days.   **(08Marks)**

Module-3

5   a Name the instruments used for measuring beam radiation. With neat sketch explain the working of Pyranometer **(10 Marks)**

     b Determine the local Apparent Time (LAT) corresponding to 14:30hours (IST) at Mumbai (19°07′N, 75°51′E) on July 4. In India, standard time is based on 82.5°E. And equation of time correction is (-3.5)′ for the given location. **(06Marks)**

6 a Write a note on thermal applications of solar energy. **(08 Marks)**

b With a neat sketch explain construction and working of a flat plate collector. **(08 Marks)**

Module-4

7 a With a neat sketch, explain horizontal axis wind machine. Mention its advantages and limitations **(08Marks)**

b Wind blows with velocity of 16 m/s and 15^0C. Assume 1 standard atmospheric pressure and turbine diameter is 115m with operatying speed of 40 rpm at maximum efficiency, calculate the following: i) Total power density in the wind stream
ii) Maximum obtainable power density
iii) Total power
iv)Torque and axial thrust **(08Marks)**

OR

8 a Explain the method of harnessing tidal energy using the double basin system. What are the advantages and limitations of tidal power generation **(10Marks)**

b Explain the factors considered for the selection of wind machines. **(06 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 Explain the working of Downdraft gasifier, with a neat sketch **(08 Marks)**

OR

10 a With a neat sketch, explain MHD power generation. **(08Marks)**

b Sketch and Explain the working of
 i) Molten Carbonate Fuel Cell ii) Polymer Electrolytic Membrane Fuel Cell **(08 Marks)**