Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Energy Engineering

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1 a. With the help of a neat diagram, explain the working of spreader stroker. Mention its disadvantages. **(10 Marks)**
   b. Draw a line diagram of pneumatic ash handing system and explain its working. **(10 Marks)**

2 a. Sketch and explain Benson boiler. **(08 Marks)**
   b. Explain the principle of operation of hyperbolic cooling tower, with a neat sketch. **(08 Marks)**
   c. Briefly explain the function of Air Preheater and Super heaters in thermal power plant. **(04 Marks)**

3 a. Sketch and explain briefly a plant layout for diesel power station all the required equipment. **(10 Marks)**
   b. Why cooling of diesel engine is necessary? Give for important functions of lubrication system. **(05 Marks)**
   c. Write a short note on application of diesel engine in power field. **(05 Marks)**

4 a. Explain clearly storage, pondage and pumped storage hydro-electric power plants. **(06 Marks)**
   b. Classify hydro-electric power plant. **(04 Marks)**
   c. The run off date of a river at a particulars site is tabulated in the following tables:

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean discharge millions of Cu.m.	30	25	20	0	10	50	80	100	110	65	45	30

   i) Draw the hydrograph and find mean flow.
   ii) Draw flow duration curve.
   iii) Find the power developed if the head available is 90 m and the overall efficiency of generation is 86 percent. Assume each months of 30 days. **(10 Marks)**

PART – B

5 a. Describe with neat sketch, working principle of pressurize water reactor highlighting its advantages and disadvantages. **(10 Marks)**
   b. Explain the sodium-graphite nuclear reactor, with a neat sketch. **(10 Marks)**

6 a. Explain the methods of harnessing solar energy. **(06 Marks)**
   b. Explain briefly the main application of solar ponds. **(06 Marks)**
   c. A horizontal shaft, propeller types wind turbine is located in area having the following wind characteristics:
   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 120 m diameter.
   Determine the above parameters. **(08 Marks)**

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7 a. Explain with neat sketch Rankine cycle OTEC plant. **(08 Marks)**
   b. With a neat sketch, explain the working of hot dry rock geothermal plant. **(07 Marks)**
   c. How the power can be obtained from tides? How the tidal plants are classified? **(05 Marks)**

8 a. Write notes on the following:
      i)   Solar radiation at the earth surface.
      ii) Biogas plant. **(10 Marks)**
   b. How are the gasifiers classified? With a schematic diagram, explain the working of downdraft gasifier. **(10 Marks)**

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