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10ME53

Fifth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Energy Engineering

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Explain with neat sketch, over feed and under feed principle of firing coal. **(06 Marks)**

b. What is Pulverized coal? Discuss the advantages and disadvantages of pulverized coal. **(06 Marks)**

c. Explain the pneumatic ash handling system, with a neat sketch. **(08 Marks)**

2 a. With a neat sketch, explain the Benson boiler. **(06 Marks)**

b. Estimate the height of chimney required to produce a static draft of 16mm of water if the mean temperature of the flue gases in the chimney is 255^0C and the temperature of outside air is 25^0C. The densities of atmospheric air and the flue gases at N.T.P are 1.293 and 1.34 kg/m^3 respectively. **(04 Marks)**

c. Explain with a neat sketch, the working of natural draught cooling towers and hyperbolic cooling tower. **(10 Marks)**

3 a. Draw a line diagram to show the layout of diesel power plant and describe it in brief. **(10 Marks)**

b. What are the merits and demerits of diesel power plant? **(04 Marks)**

c. Explain different methods of starting of diesel engine. **(06 Marks)**

4 a. State the important factors to be considered while selecting the site for hydro – electric power plant. **(05 Marks)**

b. With a neat sketch and explain pumped storage plant. **(05 Marks)**

c. Mean monthly discharge for 12 months at particular site of river is tabulated below :

Month	J	F	M	A	M	J	J	A	S	O	N	D
Discharge in millions of m^3/month	45	30	20	15	0	50	75	100	110	70	60	40

Draw : i) Hydro graph and flow duration curve for the given discharge and find the average monthly flow.

ii) Power available at mean flow of water. If the available head is 80 meters. At site and overall efficiency is 80%. Take 30 days in month. **(10 Marks)**

PART – B

5 a. Explain the principle of release of nuclear energy by fusion reaction. **(06 Marks)**

b. With the help of a neat diagram, explain the working of pressurized water reactor. **(08 Marks)**

c. Explain : i) Thermal utilization factor ii) Multiplication factor. **(06 Marks)**

6 a. What are the main applications of the solar pond? Explain with the help of a neat sketch a solar pond electric power plant. **(10 Marks)**

b. Wind at 1 standard atmospheric pressure and 20^0C has velocity of 12m/s. The turbine has diameter of 120m and operating speed in 40 rpm at maximum efficiency. Calculate i) Total power density ii) Maximum power density iii) Obtainable power density assuming $\eta = 35\%$ iv) Total power v) Total torque. **(10 Marks)**

7 a. Explain the principle of working of OTEC. Explain with a sketch, Rankine cycle OTEC plant. **(08 Marks)**

b. Explain the method of harnessing tidal energy using the double basin system. **(06 Marks)**

c. With a neat sketch, explain the working of flash steam type system geothermal plants. **(06 Marks)**

8 a. Explain the phenomenon of photosynthesis. **(04 Marks)**

b. Explain the working of Downdraught gasifier, with a neat sketch. **(08 Marks)**

c. What is Energy plantation? Explain the factor affecting bio gas generation. **(08 Marks)**

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