

16/11/13

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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

MECHANICAL ENGINEERING

VII Semester

Subject code & Subject Title : ME9401 POWER PLANT ENGINEERING

(Regulation 2008)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Explain how Thermal Power Plant leads to acid rain.
2. Why is ideal regenerative cycle not practicable?
3. What is Nuclear stability?
4. Explain the function of Moderator?
5. What is surge tank? Why it is important in a hydro plant?
6. Give the applications of Fuel cells
7. What is the environmental impact of a combined cycle plant?
8. What are two basic parameters to decide while planning a power plant?
9. How can the cost of power generation be reduced?
10. What is the total power of wind stream?

Part – B (5 x 16 = 80 marks)

11. The maximum demand of a power station is 96000 kw and daily load curve is described as follows.

Time (hrs)	0-6	6-8	8-12	12-14	14-18
Load (MW)	48	60	72	60	84

- i) Draw the load curve and load duration curve
- ii) Determine load factor of power station

What is the load factor of standby equipment rated at 30 MW that takes up all load in excess of 72 MW? Also calculate its use factor.(16)

12. a) i) Explain the operation of MHD power plant with a neat sketch(8)
- ii) Give the specific advantages and disadvantages of a gas turbine plant for a utility system.(8)

OR

- b) i) What is OTEC? Explain the operation of OTEC plant(8)
- ii) Write brief notes on PAFC, MCFC, SOFC and PEM systems (8)

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13. a) i) Explain the working principle of Fluidized bed combustion system(8)
ii) What are the merits and demerits of coal gasification(8)
OR
- b) i) Explain with neat sketch construction and working of CANDU type reactor(10)
ii) Explain the function of pressurizer in a PWR(6)
14. a) i) With a neat sketch explain the working principle hybrid power plant. What are its advantages? (8)
ii) With a neat sketch explain the working principle Pumped storage plant (8)
OR
- b) State the functions of a dam. How are dams classified? Briefly describe a few important types of dams. How would you select the site and the type of the dam?
(16)
15. a) i) Explain the working principle of optical pyrometer with a neat sketch (8)
ii) Explain the working principle of Orsat gas analyzer with a neat sketch. (8)
OR
- b) Methane (CH_4) is burned with atmospheric air. The analysis of the products on a dry basis is as follows: $\text{CO}_2 = 10\%$, $\text{O}_2 = 2.37\%$, $\text{CO} = 0.53\%$, $\text{N}_2 = 87.10\%$
i) Determine the combustion equation
ii) Calculate the A/F ratio
iii) Percentage of theoretical air(16)