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Question Paper Code : 51436

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Fourth Semester

Electrical and Electronics Engineering

EE 2252/EE 43/EE 1252/080280027/10133 EE 403 — POWER PLANT ENGINEERING

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

Use of steam tables and Mollier Chart is permitted.

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. In a thermal power plant employing ideal Rankine cycle, superheated steam at 20 bar and 400°C is produced in the boiler and the condenser is operated at 0.2 bar. Calculate the quality of steam at the turbine outlet and the thermal efficiency of the cycle.

2. Describe the steps involved in the inplant handling of coal?

3. Differentiate storage with pondage.

4. What do you mean by water hammer?

5. Compare Nuclear fission with fusion processes.

6. What are the desirable properties of a good moderator?

7. Compare gas turbine with diesel engine power plant.

8. Air enters the compressor of a Brayton cycle at 100 kPa, 300 K, with a volumetric flow rate of 5 m^3/s. The compressor pressure ratio is 10. The turbine inlet temperature is 1400° K. Determine the thermal efficiency for the cycle.

9. What is the principle of OTEC plant?

10. Specify the significance of power production using Magneto Hydro Dynamic plant.

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Draw the layout of a modern steam power plant and explain its working principle. (12)

(ii) What do you understand by the term "Boiler draught"? (4)

Or

(b) (i) What is Fluidised Bed Combustion system? Sketch and describe a Fluidised Bed Combustion (FBC) system. (10)

(ii) Enumerate various modern ash-handling systems. (6)

12. (a) Explain the arrangement of the components of a hydro electric power plant with a neat sketch.

Or

(b) (i) Describe pumped storage power plant with neat diagram. (12)

(ii) The available discharge and head of a proposed hydroelectric power plant are 350 m^3/s and 30 m respectively. The turbine efficiency is 87%. The generator is directly coupled to the turbine. Calculate the power developed by the turbine.

13. (a) With the help of neat sketch, explain the working of boiling water reactor and discuss its relative advantages and disadvantages over pressurized water reactor.

Or

(b) Draw a neat sketch for CANDU reactor and explain its working principle and give its advantages and disadvantages.

14. (a) An ideal gas-turbine cycle with two stages of compression and two stages of expansion has an overall pressure ratio of 8. Air enters each stage of the compressor at 300° K and each stage of the turbine at 1300° K. Determine the back work ratio and the thermal efficiency of this gas-turbine cycle, assuming

(i) no regenerators and

(ii) an ideal regenerator with 100 percent effectiveness. Compare the results.

Or

(b) With the help of neat sketch, explain the working of diesel power plant in detail.

15. (a) Discuss the working principle of various solar power plant with neat sketch.

Or

(b) (i) Describe the wind power generation with neat sketch. (8)

(ii) Explain the construction and working of Geothermal plant. (8)

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