Register Number: ……

B.E. DEGREE EXAMINATIONS: NOV/DEC 2010

Seventh Semester

MECHANICAL ENGINEERING

U07ME702: Power plant Engineering

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. Load Factor of a power station is generally

   (a) more than unity (b) less than unity (c) equal to unity (d) None of the above

2. Narora atomic power station is located in ----------

   (a) Madhya pradhesh (b) Utter Pradesh (c) Gujarat (d) Karnataka

3. Providing Excess air is to

   (a) minimize air flow rate (b) improve combustion efficiency

   (c) minimize fuel input (d) increase heat rate

4. Natural draught in a steam power plant is produced by

   (a) chimneys (b) Fans (c) Steam jets (d) blowers

5. The modern steam turbines are ----------

   (a) reaction turbines (b) impulse turbine (c) impulse-reaction turbines (d) all of the above

6. The boiling water reactor uses ---------- as fuel

   (a) enriched uranium (b) pultonium (c) thorium (d) none of the above

7. In a diesel engine heat lost to the cooling water is about

   (a) 3 0% (b) 70% (c) 10% (d) 60%

8. The temperature of the combustion gas at the gas turbine inlet is about

   (a) 900^0C (b) 715^0C (c) 1200^0C (d) 1400^0C

9. Running cost of a hydro-electric power plant is

   (a) more than running cost of a steam power plant

   (b) less than running cost of a steam power plant

   (c) equal to running cost of a steam power plant

   (d) equal to running cost of a nuclear power plant

10. The steam consumption in large turbine is about

    (a) 5 kg per kWh (b)10 kg per kWh (c)15 kg per kWh (d) 20 kg per kWh

PART B (10 x 2 = 20 Marks)

11. List the merits of using fluidized bed in boilers.
12. Name any two examples for high pressure and super critical boilers.
13. Write down the merits of mechanical stokers?
14. What is the purpose of electrostatic precipitator?
15. List out the desirable properties of a good moderator.
16. What is the use of spillways?
17. Mention the purpose of intercooler and regenerator in gas turbine power plant.
18. Write down the methods used for supercharging of diesel engines.
19. Differentiate between load curve and load duration curve.
20. What is meant by OTEC?

PART C (5 x 14 = 70 Marks)

21. a) Briefly explain the construction and working principle of nuclear power plant.

(OR)

b) With neat sketch explain the construction and working principle of La mont and Velox boilers. Also write the merits of high pressure boilers.

22. a) (i) What is meant by “over feed” and “under feed” principles of firing coal? (6)

(ii) Name the different type of stokers. Briefly explain the Multi-Retort Stokers with neat sketch. (8)

(OR)

b) (i) Describe the working principle of down flow type surface condenser. Also write the requirements of modern surface condenser. (7)

(ii) Name the various draught systems. Describe the operation of balanced draught system. (7)

23. a) (i) Explain the working principle of boiling water reactor. What are its advantages over pressurised water reactor? (8)

(ii) How waste is disposed off in a nuclear power station? List the main difficulties in handling radioactive waste. (6)

(OR)

23. b) (i) What are the different factors to be considered while selecting the site for hydro electric power plant? (8)

(ii) Explain the term “Hydrology”. Describe Hydrologic cycle. (6)

24. a) (i) Describe the auxiliary equipment of diesel engine power plant. (10)

(ii) Compare air cooling and water cooling of IC Engine. (4)

(OR)

b) (i) With neat sketch explain the closed cycle gas turbine plant. What are the merits of closed cycle. (10)

(ii) List out the factors affecting air - rate. (4)

25. a) A central power station has annual factors as follows

Load factor =60%

Capacity factor = 45%

Use factor = 45%

Power station has a maximum demand of 15,000 kW. Determine Annual energy production, Reserve capacity over and above peak load, Hours per year not in service.

(OR)

b) (i) Briefly explain the different types of tariffs (7)

(ii) Write down the classification of tidal power plant. Also mention the merits and demerits of tidal power. (7)

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