Total No. of Questions—12] [Total No. of Printed Pages—4+2

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S.E. (Electrical) (I Sem.) EXAMINATION, 2010

POWER PLANT ENGINEERING

(2008 COURSE)

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

N.B. :— (*i*) Answers *three* questions from each Section.

(*ii*) Use separate answer-book for each Section.

SECTION I

UNIT 1

1. (*a*) Explain fluidised bed combustion. [4]

(*b*) With a neat sketch, explain Orsat apparatus. [8]

(*c*) Explain Bomb calorimeter with a neat sketch. [6]

Or

2. (*a*) Compare Carnot cycle with Rankine cycle (with T-S diagram). [4]

(*b*) State the advantages of Reheat cycle. [4]

(*c*) A simple Rankine cycle works between 28 bar and 0.06 bar. The initial condition of steam being dry and saturated. Calculate :

(*i*) Cycle efficiency

(*ii*) Work ratio

(*iii*) S.S.C.

Consider feed pump work. [10]

P.T.O.

UNIT 2

3. (*a*) Write a short note on Boiler draught. [6]

(*b*) Explain :

(*i*) Impulse steam turbine

(*ii*) Reaction steam turbine. [8]

(*c*) Name at least 4 high pressure boilers. [2]

Or

4. (*a*) Compare Impulse turbine with reaction turbine. [4]

(*b*) Write a short note on electrostatic precipitator. [6]

(*c*) State the advantages and disadvantages of pulverised coal firing system. [6]

UNIT 3

5. (*a*) Classify hydroelectric power plants. [6]

(*b*) Write a short note on Draft tube. [4]

(*c*) Explain governing of Pelton wheel with a neat sketch. [6]

Or

6. (*a*) State the essential elements of hydroelectric power plant and state function of each element. [8]

(*b*) What do you mean by ?

(*i*) hydrographs

(*ii*) water hammer

(*iii*) surge tank

(*iv*) catchment area. [8]

SECTION II

UNIT 4

7. (*a*) Explain the following related to nuclear reactor :

(*i*) Moderator

(*ii*) Reflector

(*iii*) Coolant

(*iv*) Control Rod. [6]

(*b*) Classify nuclear reactors. [4]

(*c*) Explain PWR with a neat sketch. [6]

Or

8. (*a*) List the various auxiliaries systems of diesel electric power plant and explain any *one* in detail. [6]

(*b*) State the advantages and disadvantages of breeder reactor. [6]

(*c*) State the various starting systems of diesel electric power plant. [4]

UNIT 5

9. (*a*) Explain open cycle gas turbine plant. [4]

(*b*) List the parameters that affect the thermal efficiency of gas turbine plant. Discuss these effects in detail with performance curves. [8]

(*c*) Write a short note on Gas turbine materials. [4]

Or

10. (*a*) Write short notes on :

(*i*) Fuel cells and its applications

(*ii*) MHD generator. [10]

(*b*) Compare gas turbine plant over steam turbine plant. [6]

UNIT 6

11. (*a*) A 60 MW power station has annual peak load of 50 MW. The power station supplies loads having max. demands of 20 MW, 17 MW, 10 MW and 9 MW. The annual load factor is 0.45. Find :

(*i*) Average load

(*ii*) Energy supplied/year

(*iii*) Diversity factor

(*iv*) Demand factor. [8]

(*b*) Define the following :

(*i*) Demand factor

(*ii*) Load factor

(*iii*) Plant capacity factor

(*iv*) Plant use factor

(*v*) Diversity factor. [10]

Or

12. (*a*) Write short notes on :

(*i*) Base loads and peak loads

(*ii*) Incremental fuel rate curve [8]

(*b*) How will you reduce power generation cost ? [4]

(*c*) A power generation station has the following loads :

(1) Residential lighting load :

Maximum demand = 1200 kW

Load factor = 0.21

Diversity between consumers = 1.32

(2) Commercial load :

Maximum demand = 2400 kW

Load factor = 0.32

Diversity between consumers = 1.2

(3) Industrial load :

Maximum demand = 6000 kW

Load factor = 0.82

Diversity between consumers = 1.22

Overall diversity factor may be taken as 1.42.

Determine :

(*i*) Maximum demand on system

(*ii*) Daily total energy consumption

(*iii*) Overall load factor

(*iv*) Connected load (total) assuming that demand factor for each load is unity. [6]