



9. What is the principle of operation of OTEC plant ?
10. The peak load on a power plant is 60 MW. The loads having maximum demands of 30 MW, 20 MW, 10 MW and 14 MW are connected to the power plant. Estimate diversity factor.

**PART - B (5 × 16 = 80 Marks)**

11. (a) A steam power plant, operating with one regenerative feed water heating runs at the initial steam conditions of 35.0 bar and 440 °C with exhaust pressure of 0.040 bar. Steam is bled from the turbine for feed water heating at a pressure of 1.226 bar. Determine :
- (i) Specific heat consumption
  - (ii) Thermal efficiency of the cycle
  - (iii) Economy percentage compared with the cycle of a simple condensing power plant.

**OR**

- (b) What is Fluidised Bed Combustion ? Sketch and describe a Fluidised Bed Combustion (FBC) system. State the advantages of FBC system.

12. (a) Explain with the help of neat sketch, the construction and working of steam power plant.

**OR**

- (b) With the help of neat diagrams, explain the working of surface condenser highlighting merits and limitations.

13. (a) Explain with the help of a neat sketch the working principle of pressurized water reactor.

**OR**

- (b) List and describe the factors mainly considered in selecting a prime-mover for (i) run-off river plant (ii) storage plant (iii) pump-storage plant.



14. (a) With a neat sketch, describe the working principle of Diesel plant. List its classifications ?

OR

- (b) At the design speed, the following data apply to a gas turbine set employing a heat exchanger :

Isentropic efficiency of the compressor – 75 %, Isentropic efficiency of the turbine – 85 %, Combustion efficiency – 98 %, Mass flow – 22.7 kg/sec, Pressure ratio – 6:1, Heat exchanger effectiveness – 75 %, Maximum cycle temperature – 1000 K.

The ambient air temperature and pressure are 15 °C and 1.013 bar respectively. By assuming no pressure-loss in heat exchanger and combustion chamber, calculate the net power output and thermal efficiency of the cycle. Take the lower calorific value of the fuel as 43125 kJ/kg. Take  $C_p = 1.005$  kJ/kg K and  $\gamma = 1.4$  during compression.  $C_p = 1.147$  kJ/kg K and  $\gamma = 1.33$  during heating and expansion.

15. (a) (i) Describe the wind power generation with neat sketch. (8)  
(ii) Explain the construction and working of Geothermal plant. (8)

OR

- (b) The annual peak load on a 30 MW power station is 25 MW. The power station supplies load having maximum demands of 10 MW, 8.5 MW, 5 kW and 4.5 MW. The annual load factor is 0.45. Find :
- (i) Average load
  - (ii) Energy supplied per year
  - (iii) Diversity factor
  - (iv) Demand factor.