

12. (a) (i) Discuss the effect of pressure ratio on Brayton cycle output and efficiency. (7)
(ii) Explain the integrated gasifier based combined cycle system. (6)

Or

- (b) (i) Write a note on fuel system of diesel power plant (7)
(ii) Explain how reheating improves the efficiency of a simple open cycle gas turbine plant. (6)
13. (a) Explain the working principle of nuclear power plant with neat sketch.

Or

- (b) Explain the working principle of pressurized water reactor with neat sketch.
14. (a) Explain the working principle of hydro electric power plant with neat sketch.

Or

- (b) Explain the working principle of fuel cell power system with neat sketch.
15. (a) What is a tariff? Discuss and compare various tariff used in practice.

Or

- (b) Explain the pollution control technologies including waste disposal option for nuclear power plant.

PART C — (1 × 15 = 15 marks)

16. (a) A steam generator comprises a boiler, a super heater, an economiser and an air preheater. The feed water enters the economiser at 140°C and leaves as saturated liquid. Air is preheated from a temperature of 25°C to 250°C. Steam leaves the boiler drum at 60 bar, 0.98 dry and leaves the super heater at 450°C. When using coal with a C.V. of 25.2 MJ/kg, the rate of evaporation is 8.5 kg steam per kg coal and the air fuel ratio is 15:1 by mass. Neglecting heat losses and pressure drops, estimate the heat transfer per kg fuel in each component and the efficiency of the steam generator. What are the percentages of the total heat absorption taking place in the economiser, boiler and the super heater, respectively? Assume C_p of air and water as 1.005 and 4.2 kJ/kg K respectively.

Or

- (b) A peak load on the thermal power plant is 75 MW. The loads having maximum demands of 35 MW, 20 MW, 15 MW and 18 MW are connected to the power plant. The capacity of the plant is 90 MW and annual load factor is 0.53. Calculate the average load on power plant, energy supplied per year, demand factor and diversity factor.