

1377

Register No.:

October 2024

Time - Three hours
(Maximum Marks: 100)

- [N.B.]**
1. Answer all questions under Part-A. Each question carries 3 marks.
 2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.]

PART - A

1. List out the properties of water at its critical point.
2. Define: dryness fraction.
3. Name the impurities present in water.
4. What are the factors influencing boiler efficiency?
5. Write the working principle of a wet scrubber.
6. Define condenser efficiency.
7. What are the differences between fissile and fertile fuel?
8. What is the function of moderators and reflectors?
9. State the uses of compressed air.
10. State the merits of open cycle gas turbine.

PART - B

11. (a) The following observations were recorded to find the dryness fraction of steam by combined separating and throttling calorimeter.

Total quantity of steam passed	=	36 kg
Water drained from separator	=	1.8 kg
Steam pressure before throttling	=	12 bar
Steam pressure after throttling	=	1 bar
Temperature of steam after throttling	=	110°C
Specific heat of super heated steam	=	2.09 kJ/kg K

Determine the (i) dryness fraction of steam entering into throttling calorimeter (ii) dryness fraction of steam in steam main.

(Or)

- (b) Steam at a pressure of 10 bar and 0.9 dry expands to the atmospheric pressure hyperbolically. Specific heat of steam is 2.1 kJ/kg K. Calculate (i) work done (ii) change in internal energy (iii) change in enthalpy (iv) heat absorbed.

[Turn over.....

12. (a) Explain the working of a BHEL high pressure boiler with a neat sketch.

(Or)

- (b) The following data were obtained in a boiler trial:
Feed water supplied per hour = 690 kg at 28°C,
Steam produced = 0.97 dry at 8 bar,
Coal fired per hour = 91 kg of calorific value 27,200 kJ/kg,
Ash and unburnt coal collected in fire bars = 7.5 kg/hr of calorific value 2,700 kJ/kg,
Mass of flue gas per kg of coal burnt = 17.4 kg,
Temperature of flue gas = 325°C,
Room temperature = 17°C,
Specific heat of flue gas = 1.005 kJ/kg K.
Estimate boiler efficiency and draw up a heat balance sheet.

13. (a) Explain the working of thermal power plant with a layout.

(Or)

- (b) (i) A surface condenser having an absolute pressure of 0.010 bar is supplied with cooling water at the rate of 40 kg/kg of steam condensed. The rise in temperature of cooling water is 14°C. Find the dryness fraction of steam entering the condenser. The condensate leaves at 44°C. Also calculate the amount of heat to be removed from 1kg of steam. (7)
- (ii) The temperature of condensate in a condenser is 31°C and the vacuum is 705 mm of mercury. The barometer reading is 760 mm of mercury. Calculate the vacuum efficiency of condenser. (7)

14. (a) Explain the working of hydel power plant with a layout diagram. Also write its merits and demerits.

(Or)

- (b) Explain the working of CANDU type reactor with a neat sketch.

15. (a) Explain the working of turbo jet engine with a neat sketch. Also state its advantages.

(Or)

- (b) Explain the working of centrifugal compressor with a neat sketch.