434   Register No.: [   ]

April 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.   Distinguish between wet steam and dry steam.

2.   Define Enthalpy of water and enthalpy of evaporation.

3.   Distinguish between fire tube and water tube boiler.

4.   Define Boiler efficiency and boiler power.

5.   Name the pollutants from thermal power plant. What are the effects of these pollutants?

6.   Define Dalton's law of partial pressure.

7.   What are the differences between fissile and fertile fuel?

8.   State the advantage of floating nuclear power plant.

9.   State the effects of gas turbine with intercooler.

10.   What is jet propulsion? State the types of it.

PART – B

11.   (a)   In a test of wet steam made by a barrel calorimeter the following observations were made. Calculate the dryness fraction of the steam.

Mass of copper calorimeter   = 0.99kg
Mass of copper calorimeter + water   = 3.85kg
Mass of copper calorimeter + water and steam   = 4.04kg
Specific heat of copper   = 0.386 kJ/kg.K
Initial temperature of water   = 7^0C
Final temperature of water   = 44.5^0C
Temperature of steam   = 155^0C

(Or)

[Turn over.....

(b)   1kg of water at 95⁰C is heated under a constant pressure of 17.5 bar absolute until it is converted into steam with dryness fraction 0.98. Determine the work done, heat added, change in internal energy and the change in entropy.

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

(Or)

(b)   (i) Explain the working of a steam stop valve with a neat sketch. (7)
(ii) Explain the working of a steam injector with a neat sketch. (7)

13. (a)   Explain the pressure velocity compounding of steam turbine with a neat sketch.

(Or)

(b)   (i) A surface condenser is designed to handle 10,000kg of steam per hour. The steam enters at 0.08 bar and 0.9 dry and the condensate leaves at the corresponding saturation temperature. The pressure is constant throughout the condenser. Estimate the cooling water flow rate per hour, if the cooling water temperature rise is limited to 10⁰C. (7)

(ii) Exhaust steam of 0.975 dry enters a surface condenser at 0.12 bar and the condensate leaves at 44⁰C. If the temperature rise of cooling water is 14⁰C, determine the amount of circulating water required per kg of steam condensed. (7)

14. (a)   Explain the working of a diesel power plant with neat sketch.

(Or)

(b)   Explain the working of boiling water reactor with neat sketch.

15. (a)   Explain the working of a solid propellant rocket with a neat sketch. State the applications of rocket.

(Or)

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

- - - - -

185/31—2