6448

BOARD DIPLOMA EXAMINATION, (C–16)
MARCH/APRIL—2018
DME—FOURTH SEMESTER EXAMINATION
THERMAL ENGINEERING—II

Time : 3 hours]　　　　　　　　　　　　　　[*Total Marks* : 80

PART—A　　　　　　　　　　　3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define the terms 'latent heat of vaporization' and 'true latent of steam'.

2. How are steam boilers classified?

3. A closed vessel contains 1200 litres of saturated steam. Determine the mass of steam and final condition of steam if it is cooled from 8 bars pressure to 2 bars pressure.

4. A piston cylinder arrangement contains 300 litres of steam at 400 kPa and 200 ºC. When it is cooled at constant pressure, its volume falls to 60 litres. Calculate the final condition of the steam.

5. Steam enters a steam nozzle at a pressure of 1·8 MPa and at a temperature of 350 ºC and expands to a pressure of 0·12 MPa with 95% dry. Calculate the exit velocity of the steam using steam tables.

6. Write at least six advantages of steam turbines over steam engines.

7. What is compounding of steam turbines?

8. Compare the gas turbines with IC engines.

9. What are the advantages of jet propulsion units over other systems?

10. What are the requirements of an automobile transmission system?

PART—B 10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. A pressure vessel contains 4 kg of wet steam which is 85% dry at a pressure of 660 KPa. Determine its entropy, enthalpy and internal energy using steam tables.

12. Describe with a neat sketch the construction and working principle of Benson boiler.

13. A piston cylinder arrangement contains 10 kg of 100% dry steam at 1·8 MPa and it expands to a pressure of 0·13 MPa. If the index of expansion is 1·25, determine the *(a)* final dryness fraction, *(b)* work done during expansion and *(c)* heat transferred.

14. A convergent nozzle receives steam at 50 bars and 400 °C with an initial velocity of 80 m/s. Determine the diameter of the nozzle at the exit if the mass flow rate of the steam through the nozzle is 10 kg/s. C_P for superheated steam is 2·1 kJ/kg-K.

15. In an impulse turbine, the nozzles are inclined at 18° and deliver 30 kg/s of steam at a velocity of 900 m/s while the blade velocity is 350 m/s. Calculate the *(a)* blade angles, *(b)* power developed and *(c)* diagram efficiency neglecting friction.

16. Explain the working principle of constant pressure gas turbine with a neat sketch.

17. Write the working principle of RAM jet engine with a neat diagram.

18. Explain with a neat sketch the working principle of the differential of automobile.

★ ★ ★