

1340**Code : 15ME52T**Register
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V Semester Diploma Examination, April/May-2018**APPLIED THERMAL ENGINEERING****Time : 3 Hours]****[Max. Marks : 100**

- Note :**
- (i) Answer any **six** questions from Part – A and **seven** from Part – B.
 - (ii) Use of steam tables, Mollier charts is permitted.
 - (iii) Assume any missing data suitably.

BETA CONSOLE!**PART – A**

1. Define terms :
 - (i) Wet steam
 - (ii) Dry saturated steam
 - (iii) Dryness fraction of steam and mention the formula to find dryness fraction of steam along with notations used.
2. Explain separating calorimeter with a neat sketch.
3. Classify steam boilers according to various factors.
4. Define steam condenser and list any two objectives or main functions of a condenser.
5. List the functions of a cooling tower.
6. Draw the velocity diagram of a impulse turbine blades.
7. Explain working of simple De-Laval turbine with line diagram.
8. Classify the air compressors based on various factors.
9. List the factors affecting choice of refrigerants.



Diploma - [All Branches]

Beta Console 6 × 5 = 30



Diploma Question Papers [2015-



Beta Console Education



PART – B

 $7 \times 10 = 70$

10. Steam enters an engine at a pressure of 12 bar with a 67°C of superheat. It is exhausted at a pressure of 0.15 bar and 0.95 dry. Find drop in enthalpy of the steam.
11. Find the internal energy of 1 kg of superheated steam at a pressure of 10 bar and 280°C . If this steam be expanded to a pressure of 1.6 bar and 0.8 dry, determine the change in internal energy. Assume specific heat of super heated steam as 2.1 kJ/kg K .
12. Describe with the help of neat sketch the construction and working of a Cochran boiler.
13. (a) Distinguish between water tube and fire tube boilers. **BETA CONSOLE!** 5
(b) Differentiate between forced draught and induced draught. 5
14. Describe with a neat sketch the operation of an evaporative condenser. Diploma - [All Branches]
15. Dry saturated steam at a pressure of 8 bar expands through a convergent-divergent nozzle, if the discharge pressure is 1.5 bar, find the ratio of the cross sectional area at exit to that at throat for a frictionless adiabatic flow when the discharge is maximum. Beta Console Education
16. A steam jet enters the row of blades with a velocity of 375 m/s at an angle of 20° with the direction of motion of the moving blades. If the blade speed is 165 m/s . find suitable inlet and outlet blade angles assuming that there is no thrust on the blades. The velocity of the steam passing over the blades is reduced by 15%. Also determine power developed by the turbine per kg of steam flowing over the blades per second. Beta Console Education
17. The outlet area of the nozzles in a simple impulse turbine is 15.5 cm^2 and the steam leaves them 0.91 dry at 1.4 bar and at 920 m/sec . The blade angles are 30° at inlet and exit, and the blade velocity is 0.25 of the steam velocity at the exit from the nozzle. The friction factor 0.8. Find (a) Nozzle angle (b) The power developed (c) the diagram efficiency (d) The axial thrust on the blading.
18. A single acting reciprocating air compressor has a cylinder diameter and stroke of 200 mm and 300 mm respectively. The compressor sucks air at 1 bar and 27°C and delivers at 8 bar while running at 100 r.p.m. Find (1) Indicated power of the compressor (2) Mass of air delivered by the compressor per minute.
19. Explain vapour compression refrigeration with flow diagram and write two advantages and disadvantages.