

- (ii) The efficiency of the plant.....with the mechanical draught. **1**
- (a) Increases
 - (b) Decreases
 - (c) Remain constant
- (iii) The ratio of actual vacuum to ideal vacuum in a condenser is called : **1**
- (a) Condenser efficiency
 - (b) Vacuum efficiency
 - (c) Boiler efficiency
 - (d) Nozzle efficiency
- (iv) The density of supersaturated is about.....that of the ordinary saturated vapour at the corresponding pressure. **1**
- (a) Same as
 - (b) 2 times
 - (c) 4 times
 - (d) 8 times
- (v) For the Parson's reaction turbine, the degree of reaction is : **1**
- (a) 20%
 - (b) 30%
 - (c) 40%
 - (d) 50%

Roll No.

Total Pages : 05

J-21-0065

B. Tech. EXAMINATION, 2021

Semester VI (CBCS)

THERMAL ENGINEERING

ME-605

Time : 2 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

Note : Attempt *Four* questions in all, selecting *one* question from any of the Sections A, B, C and D. Q. No. **9** is compulsory. Use of steam table is allowed.

Section A

- 1.** Discuss briefly, the working of an economiser in a boiler plant giving a neat sketch. **15**
- 2.** A 30 m high chimney is used to discharge hot gases at 297°C to the atmosphere which is at 27°C. Find

the mass of air actually used per kg of fuel, if the draught produced is 15 mm of water. If the coal burnt in the combustion chamber contains 80% carbon, 6% moisture and remaining ash, determine the percentage of excess air supplied. **15**

Section B

3. Derive an expression for maximum discharge through convergent divergent nozzle for steam. **15**
4. Prove that the efficiency of a Rankine cycle using superheated steam is greater than the efficiency of a corresponding Rankine cycle using steam without superheat. **15**

Section C

5. 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 the suitable inlet and outlet blade angles assuming that there is no thrust on the blades. The velocity of steam passing over the blades is reduced by 15%. Also determine power developed by the turbine per kg of steam flowing over the blade per second. **15**

6. Explain the term 'Compounding of steam turbine' what are the different methods of reducing rotor speed ? **15**

Section D

7. Calculate the vacuum efficiency from the following data :
Vacuum at steam inlet to condenser = 700 mm of Hg; Barometer reading = 760 mm of Hg; Hot well temperature = 30°C . **15**
8. What part is played by a cooling tower ? What are the different types of cooling towers ? Mention advantage and disadvantage of each type. **15**

(Compulsory Question)

9. Attempt all the following :
 - (i) An air preheater : **1**
 - (a) Increases evaporative capacity of the boiler
 - (b) Increases the efficiency of the boiler
 - (c) Enables low grade fuel to be burnt
 - (d) All of the above

- (vi) What do you mean by mounting and accessories of boiler ? Give some examples. **3**
- (vii) What is the difference between water tube and fire tube boilers ? **3**
- (viii) Explain the functions of the blading of a reaction turbine. **4**