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Roll No .....

ME-6002-CBGS

B.E. VI Semester

Examination, December 2020

Choice Based Grading System (CBGS)

Thermal Engineering and Gas Dynamics

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Use of steam tables and mollier diagram is permitted.

1. a) Describe with neat sketch the construction and working of La-Mont boiler. 7
   b) What is Natural draught? State the types of artificial draught and explain briefly various types of fan draught in use. 7

2. The following readings were obtained during a boiler trail of 6 hours duration,
   Mean steam pressure = 12 bar; Mass of steam generated = 40000kg; mean dryness fraction = 0.85; mean feed water temperature = 30ºC, coal used = 4000kg, calorific value of coal = 33,400 kJ/kg. Calculate: 14
   i) Factor of equivalent evaporation,
   ii) Equivalent evaporation from and at 100ºC,
   iii) Efficiency of the boiler.

3. a) State the methods of improving thermal efficiency of Rankine cycle. 7
   b) Explain binary vapour cycle with the help of T-S diagram. Obtain an expression for its thermal efficiency. 7

4. In a Rankin cycle, the steam at inlet to turbine is saturated at a pressure of 35 bar and the exhaust pressure is 0.2 bar. Determine: 14
   i) The pump work
   ii) The turbine work
   iii) The Rankin efficiency
   iv) The condenser heat flow
   v) The dryness at the end of expansion
   Assume flow rate of 9.5 kg/s

5. a) What is mach number? What is the significance of Mach number in compressible fluid flow? 7
   b) What is stagnation state? What do you mean by stagnation properties? 7

6. a) What do you understand by multi stage compressor? What are its advantages? 7
   b) Derive an expression for volumetric efficiency of a reciprocating compressor in terms of clearence ratio, pressure ratio and index of compression. 7

7. a) What are the effects of friction on performance of the steam nozzles? 7
   b) Classify with their uses various types of condensers. 7

8. Write short notes on any three of the following: 14
   i) Various sources of air leakage into steam condenser.
   ii) Classification and working of rotary compressors
   iii) Normal shock and its effect
   iv) Super critical boiler

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