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**Question Paper Code:95903**

B.E./B.Tech. DEGREE EXAMINATION, AUGUST 2021

Fifth Semester

Chemical Engineering

19UCH303- HEAT POWER ENGINEERING

(Regulation 2015)

Duration: 1:45 hour

Maximum: 50 Marks

PART A - (10 x 2 = 20 Marks)

**(Answer any ten of the following questions)**

1. State Zeroth law of thermodynamics. Brief Internal energy, enthalpy and energy with expressions. CO1 R
2. What are intensive and extensive properties? Give Examples CO1 R
3. State and explain the Zeroth law of thermodynamics with an illustration. CO1 R
4. Write down the air standard efficiency for Otto and Diesel cycle. CO2 R
5. Define Air Standard efficiency CO2 R
6. Draw Brayton Cycle (Joule's Cycle) in T-S and P-V planes CO2 R
7. List the essential factors for the selection of a boiler. CO3 R
8. What is blowing off in boilers? CO3 R
9. How are boilers classified? CO3 U
10. Draw the Mollier chart and mention the different steam conditions. CO4 U
11. Recall the concept behind steam distribution systems. CO4 R
12. Define the terms saturation pressure and saturation temperature. CO4 R
13. Define steam turbine. What is the function of steam turbine? CO5 R
14. Classify steam turbines? CO5 R
15. Give the limitations of gas turbines. CO5 R

PART – B (3 x 10= 30 Marks)

**(Answer any three of the following questions)**

16. Five kilogram of CO<sub>2</sub> gas is contained in a piston cylinder assembly at a position of pressure of 7.5 bar and a temperature of 300K. The CO1- U (10)

piston has a mass of 6000kg and a surface area of 1m<sup>2</sup>. The friction of the piston on the wall is significant and cannot be ignored. The atmosphere pressure is 1.01325 bar. The latch holding piston in position is suddenly removed and the gas is allowed to expand. The expansion is arrested is when the valve is double the original volume. Determine the work appearing in surroundings.

17. Derive an expression for air-standard efficiency of dual-combustion, Cycle. CO3- U (10)
18. Explain the construction and working of fire tube boilers, chain grate stoker with a layout CO1- U (10)
19. Discuss briefly about different types of thermodynamic steam traps CO3- U (10)
20. Explain in detail about the working of rotary vane vacuum pump with a neat sketch CO1- U (10)