

**B. Tech.**

Paper: AE 205 Applied Thermodynamics

Paper ID- A0704

Time allowed: 3 Hrs.

Max. Marks: 60

Note: Section A is compulsory, attempt any 4 questions from section B & Attempt any 2 questions from section C.

**Section A**

1. I. What is meant by term fuel? What are its constituents?  
II. Define compound.  
III. Define degree of reaction.  
IV. What do you understand by term 'siip factor'.  
V. Write the difference between heat transfer and thermodynamics.  
VI. Define the overall heat transfer co-efficient.  
VII. Discuss the importance of heat exchanger for industrial use.  
VIII. State and explain the Dalton's law of partial pressure.  
IX. What are the essential properties of good refrigerant?  
X. Differentiate between primary and secondary refrigerant.

**2X10=20****Section B**

2. Define and explain Gross and Net calorific value of fuels.
3. Sketch and explain use of Orsat apparatus used in determining the percentage of flue or exhaust gases. Does it help in controlling combustion?
4. Describe with a neat sketch, the working of vane blower compressor and show its p-v diagram. For what applications, it is used.
5. Define the following:  
I. Specific humidity                      II. Absolute humidity  
III. Relative humidity                    III. Dew point temperature
6. Classify heat exchanger & discuss their elements.

**5X4=20****Section C**

7. A blast furnace gas has the following volumetric composition:  
CO<sub>2</sub>= 11%; CO=27%; H<sub>2</sub>=2% and N<sub>2</sub>=60%. Find the theoretical volume of air required for the complete combustion of 1 m<sup>3</sup> of gas. Find the percentage composition of dry flue gas by volume. Assume that air contains 21% of O<sub>2</sub> and 79% of N<sub>2</sub> by volume.
8. Draw p-v and T-s diagram for a single stage reciprocating air compressor, without clearance. Derive the expression for the workdone when compression is (a) isothermal, and (b) isentropic.
9. Explain and show the following processes on psychrometric chart:  
I. Cooling and dehumidification                      II. Heating and humidification

**10X2=20**