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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**M.Tech I Year I Semester Regular & Supplementary Examinations May/June-2022**  
**THERMODYNAMICS AND COMBUSTION**

(Thermal Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 a What is enthalpy of combustion? How does it differ from the enthalpy of reaction? **L1 6M**  
b What is enthalpy of formation? How does it differ from the enthalpy of combustion? **L1 6M**

**OR**

- 2 An insulated gas cylinder of volume  $0.1 \text{ m}^3$  contains air (an ideal gas) at 5000 kPa and 300 K. The valve of the cylinder is opened allowing the air to escape till the air pressure in the cylinder reaches 3000 kPa. Determine the temperature of the air left in the cylinder and the mass of the air that escaped from the cylinder. **L5 12M**

**UNIT-II**

- 3 Acetylene  $\text{C}_2\text{H}_2$  is burned with stoichiometric amount of air during a combustion process, assume complete combustion determine air-fuel ratio on a mass basis and on a mole basis. **L1 12M**

**OR**

- 4 a What are the approximate chemical composition of gasoline, LPG, diesel, natural gas & methanol? **L1 4M**  
b How presence of moisture in air does affects the outcome of a combustion process. **L5 8M**

**UNIT-III**

- 5 Octane  $\text{C}_8\text{H}_{18}$  is burnt with dry air. The volumetric analysis of the product on a dry basis is 9.21 percent  $\text{CO}_2$ , 0.61 percent  $\text{CO}$ , 7.06 percent  $\text{O}_2$  and 83.12 percent  $\text{N}_2$ . Determine air-fuel ratio and the percentage of theoretical air used. **L5 12M**

**OR**

- 6 a How are the absolute entropy values of ideal gases at pressure different from 1 atm determined? **L1 8M**  
b Express the increase of entropy principle for chemically reacting system **L3 4M**

**UNIT-IV**

- 7 What are the factors affects the burner efficiency and give remedial action to overcome those effects. **L1 12M**

**OR**

- 8 What is mean by vaporizing burner? Explain its working with neat sketch. **L2 12M**

**UNIT-V**

- 9 Define the principle of magneto Hydro Dynamic Generator and explain the working of closed power cycle with neat sketch. **L1 12M**

**OR**

- 10 Explain with neat sketch the working of nuclear combined magneto Hydro Dynamic Generator. **L2 12M**

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