

**Eighth Semester B.Tech Degree Examination, Apr/May 2016**

**(2008 scheme)**

**Branch: Aeronautical Engineering**

**08.805.03: COMBUSTION TECHNOLOGY**

Time:3 Hours

Max.Marks:100

*Answer all questions from part-A and one full question from each module of Part-B.*

**PART-A**

1. Define Heat of Formation and Heat of Reaction.
2. Write and explain the chemical equilibrium equation for water from hydrogen and oxygen.
3. Define Law of mass action.
4. What is Arrhenius Law? And define Activation Energy.
5. Define Flame Quenching with neat sketch..
6. State and explain inflammability.
7. Explain about flame stabilization.
8. What are the various principles involved in combustion chamber design?
9. What is combustion Instability?
10. Explain various methods to determine self-ignition temperature of a fuel.

**(10X4=40 marks)**

**PART-B**

**MODULE-I**

11. (a) Methane is burned with air at an equivalence ratio of 1.2. The process is a steady flow reaction process at a constant pressure of 1 bar. The initial temperature is 298 K and the total flow rate of methane and air is 1 kg/s. If the products are assumed to be CO, H<sub>2</sub>O, CO<sub>2</sub> and N<sub>2</sub>, and the process is adiabatic, what is the final temperature? (20)  
(or)  
(b) (i) Explain in detail about Collision theory of reaction rates. (8)  
(ii) Explain in detail about Transition state theory of combustion. (12)

## **MODULE-II**

12. (a) Explain in detail about various methods of ignition in combustion with neat sketch. (20)  
(or)
- (b) (i) State and explain thermal ignition with neat sketch. (10)  
(ii) State and explain spark ignition with neat sketch. (10)

## **MODULE-III**

13. (a) Explain in detail about after burners and ramjets (Bluff body stabilization). (20)  
(or)
- (b) (i) With neat sketch explain in detail about gas turbine combustion system. (10)  
(ii) State and explain the theory of laminar flame propagation. (10)

**(3X20=60 marks)**