*Total No. of Questions :8]* *[Total No. of Printed Pages :2*

**Roll No** .....

# MMTP-102

## M.E./M.Tech., I Semester

Examination, December 2016

## Thermodynamics and Combustion

***Time : Three Hours***

***Maximum Marks : 70***

***Note:*** i) Solve any five questions.
ii) All questions carry equal marks.

1. a) From a heat reservoir 16000 kJ of heat in with drawn at 227°C while the sink temperature is at 1°C. Calculate the availability and unavailability of heat.
   b) Write down zeroth, first and both the statement of second law of thermodynamics.

2. Discuss phase and reaction equilibrium what is equilibrium constants? How equilibrium constant's are calculated for multi component gaseous mixtures?

3. Explain rate of reaction of first, second and higher orders.

4. Deduce Van der Waal's Equation? Calculate the values of constants 'a' and 'b'.

5. Discuss followings :
   i) Pre mixed and diffusion flames.
   ii) Laminar and turbulent flames.









6. a) Explain any one theory of flame propagation.
   b) What are differences in combustion taking place in Open and close systems.

7. a) Discuss Gibb's phase rule.
   b) Write down law of corresponding states.

8. Write short notes on followings :
   a) Chaperon's Equation
   b) Combustion of flue drop lets and fuel sprays.

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