

F.Y.B.SC. SEM – II (2014 Course) : SUMMER - 2019
SUBJECT : PHYSICS: KINETIC THEORY AND THERMODYNAMICS

Day : Friday
Date : 12/04/2019

S-2019-0951

Time : 03.00 PM TO 05.00 PM
Max. Marks : 40.

N.B.:

- 1) All questions are **COMPULSORY**.
 - 2) Figures to the **RIGHT** indicate full marks.
 - 3) Use of electronic calculator/ log table is allowed.
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Q.1 Attempt any **TWO** of the following: **(10)**

- a) Define the terms reduced pressure, volume and temperature. Deduce reduced equation of state from Van der Waal's equation of state for real gases
- b) 1 Kg of water is converted to steam at 373°K at the same temperature. The volume of water increases to 1671 times its original volume on boiling. Calculate the change in the internal energy of the system if latent heat of vaporization is 50 cal/g.
- c) Describe Carnot's ideal engine.

Q.2 Attempt any **TWO** of the following: **(10)**

- a) Explain what do you understand by the 'temperature entropy' diagram.
- b) 10 gm of water at 10°C is mixed with equal amount of water at 77°C. Calculate the resultant increase in entropy.
- c) Describe the different types of thermometers.

Q.3 Attempt any **TWO** of the following: **(10)**

- a) The Van der Waal's constant **a** and **b** for N₂ are 1.39 atm-lit²/ mole² and 0.0039 lit/mole respectively. Calculate the values of critical constant and Boyle's temperature. (Given: R = 0.082 atm-lit/mol °K).
- b) Derive an expression for the work done during an adiabatic process.
- c) Heat transfer takes place from a reservoir at 500°K to another reservoir at 300°K. The quantity of heat transferred is 100kJ. What will be the change in entropy?

Q.4 Attempt any **FIVE** of the following: **(10)**

- a) What are the two corrections to the equation of state of an idea gas?
- b) What is internal enrgy of system?
- c) Draw the critical temperature isotherm and explain.
- d) What is meant by internal combustion engine?
- e) At what temperature Fahrenheit thermometer reads twice the Centigrade thermometer.
- f) Draw T-S diagram for a cyclic process and show isentropic process.
- g) Draw P-V diagram representing isothermal and adiabatic process.

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