

F.Y.B.SC. SEM – II (CBCS - 2016 Course) : WINTER - 2018
SUBJECT: PHYSICS: KINETIC THEORY & THERMODYNAMICS

Day: Friday
Date: 12/10/2018

Time: 03.00 P.M. To 06.00 P.M
Max. Marks: 60

W-2018-0695

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

Q.1 A) Select the correct option and rewrite the complete sentence: (06)

- i) The second latent heat equation is applicable at _____.
 - i) Melting point
 - ii) Boiling point
 - iii) Sublimation point
 - iv) Freezing point
- ii) Rusting of iron is an _____.
 - i) Adiabatic change
 - ii) Irreversible change
 - iii) Isothermal change
 - iv) Isochoric change
- iii) The temperature above which the gas cannot be liquefied is _____.
 - i) Curie temperature
 - ii) Boiling temperature
 - iii) Critical temperature
 - iv) Vander Waal's temperature
- iv) The decrease in entropy at constant temperature results in _____.
 - i) Heat absorption
 - ii) Adiabatic
 - iii) Heat emission
 - iv) Explosion
- v) In Otto engine the working substance is _____.
 - i) Air
 - ii) Air and petrol
 - iii) Petrol
 - iv) CNG
- vi) The slope of the adiabatic curve as compared to isothermal curve is
 - i) Gradual
 - ii) Same
 - iii) Steeper
 - iv) No slope

B) Answer in one sentence each: (06)

- i) State advantages of thermometer.
- ii) State the principle of heat engine.
- iii) Define the term entropy.
- iv) Define the terms: i) Open system ii) Closed system in Thermodynamics.
- v) State the importance of indicator diagram.
- vi) State any two differences between real and ideal gases.

P.T.O.

Q.2 Attempt **ANY THREE** of the following: (12)

- a) Derive the first T-dS equation for reversible adiabatic process.
- b) Calculate the change in entropy when 1 mole of an ideal gas is allowed to expand from a volume of 1 liter to a volume of 10 liters.
- c) Derive an expression for the efficiency of the Carnot engine.
- d) Explain the reduced form of equation of state.

Q.3 Attempt **ANY FOUR** of the following: (12)

- a) Differentiate between ideal and real gas.
- b) 0.5 mole of a perfect gas at 27⁰c is compressed isothermally to 10 times that of its initial pressure. Find the work done by the gas. (Given: R = 8.3 J/ mole ⁰K).
- c) State second law of thermodynamics with explains with example.
- d) Determine the critical temperature for helium from the following data:
a = 3.44 Jm³ K mole⁻²
b = 0.0234m³ Kmole⁻¹
R = 8.31 Jmole⁻¹ K⁻¹
- e) Explain adiabatic change in short.

Q.4 Attempt **ANY TWO** of the following: (12)

- a) Explain the Diesel engine including construction working and neat suitable diagram.
- b) Derive an expression for work done during an isothermal process.
- c) Explain Vander Waal's constants.

Q.5 Attempt **ANY TWO** of the following: (12)

- a) What is the Refrigeration? Explain with schematic representation of Refrigerator.
- b) Prove that the relation between Boyle temperature and critical temperature.
- c) Explain how entropy of a system increases during irreversible process.

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