BACHELOR OF SCIENCE (CBCS-2018 COURSE)
F. Y. B. Sc. Sem-II : WINTER- 2022
SUBJECT : PHYSICS : KINETIC THEORY & THERMODYNAMICS

Day : Wednesday | Time : 02:00 PM-05:00 PM

Date : 7/12/2022 | **W-18319-2022** | Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Draw neat and labeled diagrams **WHEREVER** necessary.

Q 1. Attempt any **Two** of the following. **(12)**

(a) Derive an expression for first latent heat equation.
(b) Write down the construction and working of diesel engine.
(c) Drive an expression for work done during an adiabatic change.

Q 2. Attempt any **Two** of the following. **(12)**

(a) Explain the construction and working of refrigerator with diagram.
(b) Explain the efficiency of diesel engine and derive its expression.
(c) With neat diagram, explain Carnot heat engine.

Q 3. Attempt any **Two** of the following. **(12)**

(a) Explain the values for the critical constants Vc, Pc, and Tc.
(b) Explain indicator diagram.
(c) Explain Van-der-waal's equation of state.

Q 4. Attempt any **Three** of the following. **(12)**

(a) Prove that PV = RT for an ideal gas.
(b) Write down the assumptions for an ideal gas.
(c) Explain temperature-entropy diagram.
(d) 0.5 mol of perfect gas at 27 °C is compressed isothermally to 10 times to that of its initial pressure. Find the work done by the gas (Given $R = 8.3$ J/mole ^{o}K) .

Q 5. Attempt any **Four** of the following. **(12)**

(a) Obtain the relation between Boyle's temperature and critical temperature.
(b) Differentiate between reversible and irreversible process.
(c) Write a short note on isobaric change.
(d) Determine the critical temperature for helium from the following data
$a = 3.44$ J m^3 K $mole^{-2}$, $b= 0.0234$ m^3 K $mole^{-1}$ and $R= 8.31$ J / $mole^{-1}$ K^{-1} .
(e) With neat suitable diagram, explain the reversible process.
(f) Explain the variation of melting point and boiling point.

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