U-I IMP questions (Sem-II)

Short questions:- Chapter-2

1) Explain internal energy of the system.
2) what are isothermal and adiabatic processes.
3) what are reversible and irreversible processes and give examples
4) obtain an expression for the workdone in an adiabatic & isothermal proces.
5) State and explain the first law of T.D.
6) " " " " second " "
7) what is entropy? show that in a reversible proces entropy remains constant.
8) write a short note on entropy and disorder.
9) Deduce an expression for the entropy of a perfect gas.
10) write a short note on entropy of universe.

chapter-1

1) Explain the postulates of kinetic theory of gases.
2) obtain expression for average speed, most probable speed and rms (root mean square) speed.
3) Explain the transport phenomena of gases on the basis of kinetic theory

Long questions:-

chapter-2

1) Explain Carnot's reversible engine and find the efficiency of Carnot's engine (η).
2) what are reversible and irreversible processes? write a short note on change in entropy in reversible & irreversible proces.

3) State and explain the second law of T.D. Describe Kelvin Scale of Temperature.

4) Define entropy. Calculate change in entropy when ice converted into steam.

5) what is Entropy - Temperature (T-S) diagram. Obtain the equation $\eta = 1 - \frac{T_2}{T_1}$ for a carnot engine from T-S diagram

Chapter - 1 (LQ).

1) Derive an expression for maxwell's law of distribution of molecular speeds in a gas.

2) what are transport phenomena in a gases? Derive an expression for the thermal conductivity of a gas on the basis of kinetic theory

3) Derive an expression for coefficient of viscosity of gas.

4) . . . . . diffusion.

U-II

Chapter-1 (SQ).

1) write a short note on thermodynamic potentials

2) obtain the ratio of specific heats. $\left(\text{i.e } \frac{C_p}{C_v} = \gamma\right)$

3) obtain $C_p - C_v = R$.

4) obtain the first T-ds eqn.

5) obtain second T-ds eqn.

6) State and explain Joule-Kelvin effect.

7) Show that $U = F - T\left(\frac{\partial F}{\partial T}\right)_V$

8) " $G = H + T\left(\frac{\partial G}{\partial T}\right)_P$

LQ:-
1)
2)
3)
4)
5)

Chapter
1)
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LQ
1)
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SQ
1)
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LQ:-

1) Define four thermodynamic potentials. obtain maxwell's thermodynamic equations using these potentials.
2) what is Joule-kelvin effect, describe the porous plug experiment, derive an eqn for Joule-kelvin coefficient.
3) Explain two specific heats of gas. obtain an expression for the difference blw two molar specific heats.
4) State & Explain Joule-kelvin effect. Obtain an expression for Joule-kelvin coefficient for vanderwaal's gas.
5) Based on maxwell's eqn, what is clausius-clayperon eqn & write it's applications.

Chapter-2 (SQ)

1) Explain Joul-Thomson effect.
2) Explain the principle of regenerative cooling.
3) problems. based on the formula $T_i = 2a/Rb$.

LQ:-

1) what is Joul-Thomson effect & obtain an expression for cooling produced when a gas suffers Joule-Thomson effect.
2) what is adiabatic demagnetisation. How is the principle used in producing low-temp.
3) what is Refrigeration? Explain the principle & working of a vapour compression machine.

U-III

SQ:-

1) write a short notes on Jery's & wien's blackbody.
2) write the properties of thermal radiation
3) write a short note on solar constant
4) Explain effective temp of sun.

5) Derive (or) Deduce wieny displacement law from planck's law
6) " " Rayleigh - Jeans " " "
7) " " Stefans law " "

Lec:-
1) what is black body? Explain energy distribution of black body radiation.
2) Derive an expression for wein's displacement law.
3) Explain planck's postulates of Radiation. Derive an expression of planck's radiation law.
4) Explain the construction & working of disappearing filament optical pyrometer with neat diagram.
5) what is sobal constant? How can you calculate the solar constant by using Angstroms pyrheliometer.

U-IV

Sol:-

1) write a short notes on phase space & ensemble.
2) Explain the different types of ensembles.
3) Explain the state of statistical equilibrium of the system
4) Give a comparison of M-B, B-E and F-D statistics.
5) Apply fermi dirac statistics to whitedwarfs
6) " " " neutron stars.

Lec:-
1) Derive the maxwell-Boltzmann distribution law.
2) Apply the maxwell-Boltzmann statistics to an ideal gas and speed distribution law
3) Derive an expression for Bose-Einstein distribution law and derive an eqn of planck's radiation law
4) Give the expression of fermi-dirac distribution law. Derive an expression for fermi energy of a system of free electrons.

[All the Best]