

Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2020

Subject Name: Thermal Physics and Statistical Mechanics

Subject Code: 4SC03TPS1

Branch: B.Sc. (Chemistry, Physics)

Semester : 3

Date : 05/03/2020

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1	Attempt the following questions:	(14)
	a) Give Max Plank's statements of second Law of Thermodynamics.	1
	b) Define Heat energy.	1
	c) System of N particles in Phase Space represented by which dimensions.	1
	d) Define Enthalpy.	1
	e) Define Degree of Freedom of a system.	1
	f) Give the Plank's Law which is bridge between Statistical Mechanics and Thermodynamics.	1
	g) What is meant by Mean free path?	1
	h) Give the first TdS Equation.	1
	i) Boson particle follows which Statistics?	1
	j) Give the total no of ways of obtaining distribution of the $n_1, n_2 \dots n_l$ particles among the states with energies $E_1, E_2, \dots E_l$ respectively according to Maxwell Boltzmann's Law.	1
	k) Define Joule- Thompson Effect.	1
	l) Define Viscosity.	1
	m) Give classification of Quantum Statistics.	1
	n) What are Fermions?	1

Attempt any four questions from Q-2 to Q-8

Q-2	Attempt all questions	(14)
	a) Explain in details application of First Law of Thermodynamics.	5
	b) Explain in details relation between Entropy and Thermodynamic probability.	5
	c) Explain in details Works-done during an adiabatic process.	4
Q-3	Attempt all questions	(14)
	a) Derive Maxwell's relation for Thermodynamics.	6
	b) Give comparison of three Statistics.	4
	c) Derive relation between C_p-C_v .	4
Q-4	Attempt all questions	(14)
	a) Define Carnot cycle and Explain in details Carnot Theorem with diagram.	7



	b)	Explain in details Bose Einstein Distribution Law.	7
Q-5		Attempt all questions	(14)
	a)	Explain in detail Fermi-Dirac Distribution Law.	7
	b)	Write a short note on Phase Space.	4
	c)	Derive relation of C_p/C_v using TdS equations.	3
Q-6		Attempt all questions	(14)
	a)	Explain in details Reversible and Irreversible process of Thermodynamics.	5
	b)	Explain in details Temperature-Entropy diagram.	5
	c)	Explain Transport Phenomena in short.	4
Q-7		Attempt all questions	(14)
	a)	Derive Maxwell's Law of Distribution of Velocity and give its experimental verification.	7
	b)	Write a short note on Clausius- Clapeyron relation.	4
	c)	Explain in details Law of Equipartition of Energy.	3
Q-8		Attempt all questions	(14)
	a)	Explain Macroscopic and Microscopic states in details.	5
	b)	Explain in details work-done during Isothermal process.	5
	c)	Write a short note on Third Law of Thermodynamics.	4

