

Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Thermal Physics and Statistical Mechanics

Subject Code: 4SC03TPS1

Branch: B.Sc. (All)

Semester: 3

Date: 06/12/2018

Time: 2:30 To 5:30

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) State the Zeroth law of thermodynamics.	1
	b) Define Microscopic state.	1
	c) What is Phase space?	1
	d) What do you mean by Enthalpy?	1
	e) Give the statement of Equipartition theorem.	1
	f) What is a Carnot cycle?	1
	g) Define compressibility.	1
	h) State the second law of thermodynamics based on Entropy.	1
	i) Which statistics is followed by bosons?	1
	j) Define Macroscopic State.	1
	k) Define Temperature.	1
	l) What do you understand by mean free path?	1
	m) Name the two types 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 briefly the application of First law of thermodynamics.	(05)
	b) Elaborate Reversible and Irreversible process.	(05)
	c) Explain the third law of thermodynamics in detail.	(04)
Q-3	Attempt all questions	(14)
	a) Derive the Maxwell- Boltzmann distribution law.	(07)
	b) Explain in detail the Temperature-Entropy diagram.	(04)
	c) How is Cp and Cv related to each other?	(03)
Q-4	Attempt all questions	(14)
	a) State and explain the Carnot Theorem in detail.	(07)
	b) Derive the Maxwell's relation for thermodynamics.	(07)



- Q-5** **Attempt all questions** (14)
- a) Derive the Fermi-Dirac distribution law. (07)
 - b) Write a note on Work-done during an isothermal process. (04)
 - c) Compare the three different statistics. (03)
- Q-6** **Attempt all questions** (14)
- a) Differentiate between macroscopic and microscopic states. (05)
 - b) Derive the Tds equation. (05)
 - c) Briefly explain Clausius- Clapeyron relation. (04)
- Q-7** **Attempt all questions** (14)
- a) Explain transport phenomena in detail. (06)
 - b) Elaborate Phase space in detail. (04)
 - c) Write a note on Work-done during an adiabatic process. (04)
- Q-8** **Attempt all questions** (14)
- a) Derive Maxwell's law of distribution of velocity and give its experimental verification. (07)
 - b) Explain what you understand by the law of Equipartition of energy. (04)
 - c) Briefly explain Gibb's Enthalpy in detail. (03)

