Enrollment No: _____   Exam Seat No: _____

C. U. SHAH UNIVERSITY
Summer Examination-2022

Subject Name: Physical Chemistry-IV

Subject Code: 4SC06PCH1   **Branch: B.Sc. (Chemistry)**

Semester: 6   **Date: 06/05/2022**   **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)	Write the Nernst's statement for third law of thermodynamics.	01
	b)	What are the colligative properties?	01
	c)	Write the equation of half life for the first order reaction.	01
	d)	Give the definition of order of reaction.	01
	e)	What is isotonic solution?	01
	f)	Explain the term nuclear reactions.	01
	g)	What is ideal solution?	01
	h)	The rate of decay is depends on_____	01
	i)	Which type of water is more efficient as a coolant in nuclear reactor.	01
	j)	Define: Reversible reaction	01
	k)	What is the molecularity of the decomposition reaction of N_2O_5?	01
	l)	Beta particles travel about 100 times faster then alpha particles. True or False?	01
	m)	Define: Radioactivity	01
	n)	A reactant whose concentration does not affect the reaction rate follows which order of reaction?	01

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

Q-2		**Attempt all questions**	**(14)**
	a)	Write a note on boiling point elevation.	07
	b)	Derive the rate constant equation for first order reaction.	07
Q-3		**Attempt all questions**	**(14)**
	a)	What is transition state theory? Explain with diagrams.	07
	b)	Calculate the half-life of radium-226 if 1 g of it emits $3.7* 10^{10}$ alpha particles per second.	03
	c)	Discuss the reverse osmosis.	04
Q-4		**Attempt all questions**	**(14)**
	a)	Explain the Nernst Heat theorem in detail.	07
	b)	How to determine the osmotic pressure? Write any two methods.	07

Q-5 (14)

Discuss the Le Chatelier's principle in detail.

Q-6 **Attempt all questions** (14)

a) The value of K_p at 20^0C for the reaction 02

is $1.9 * 10^3 atm^{-1}$. Calculate the value of K_c at the same temperature.

b) Write the differences between order of reaction and molecularity. 05

c) Write a note on Nuclear Fission Reactions with all the examples. 07

Q-7 **Attempt all questions** (14)

a) Explain the properties of Alpha and Beta rays. 07

b) Derive the Raoult's Law with figure. 07

Q-8 **Attempt all questions** (14)

a) Explain the law of mass action. 07

b) Explain the collision theory of reaction rate. 07