Name.	**Printed Pages:01**
Student Admn. No.: _____	

School of Basic and Applied Sciences
Backlog Examination, June 2023

[Programme: B.Tech] [Semester: II] [Batch:]

Course Title: Engineering Chemistry	**Max Marks: 100**
Course Code: CHEM1001	**Time: 3 Hrs.**

Instructions:
1. *All questions are compulsory.*
2. *Assume missing data suitably, if any.*

		K Level	COs	Marks
	SECTION-A (15 Marks) 5 Marks each			
1.	Explain Rutherford model and his observation with gold foil experiments. Write its major limitations?	K2	CO-1	5
2.	Explain Black body radiation and UV catastrophe?	K2	CO-1	5
3.	Explain the concept of nuclear fission and nuclear fusion with suitable examples?	K2	CO-2	5
	SECTION-B (40 Marks) 10 Marks each			
4.	Explain the concept of hybridization and its rules. Draw the geometry of ClF_3 and XeF_4?	K2	CO-3	10
5.	Develop the concept and differentiate between Valence band theory and Molecular Orbital Theory with suitable example?	K3	CO-3	10
6.	Simplify and draw the MO diagrams of O_2 and N_2^+. Calculate their bond order and predict their magnetic character?	K4	CO-4	10
7.	Simplify the concept of hydrogen bonding. Distinguish the terms intra and inter-molecular hydrogen bonding with example and explain why density of water is maximum at 4°C? OR Simplify Half- life of a radioactive material? Examine and drive relation between decay constant and number of particles left at time 't'. Show that for a radioactive decay, the half-life of the material is independent of its initial concentration?	K4	CO-3	10
	SECTION-C (45 Marks) 15 Marks each			
8.	Simplify the principle of carbon dating. How we can find out the age of any carbon containing objects. Calculate the age of a piece of wood from an archaeological source shows ^{14}C activity which is 60% of the activity found today. (half-life period for C-14 is 5770 years) ?	K3	CO-5	15
9.	Determine the first law of thermodynamics with its various special forms. Derive a relation between heat, internal energy and work done by the system. What is the sign convention for heat and work? Calculate the change in the internal energy of a system which absorbs 500J of heat, and does work equivalent to 200 J on the surroundings?	K5	CO-5	15
10	Determine an integrated rate equation for a first order reaction. Show that the half-life of a first order reaction is independent of the initial concentration of the reactant? OR Explain nucleic acid and structure of DNA and RNA?	K5	CO-5	15