First Sessional Examination, Even Semester (AS: 2022-23)

B. Tech: CS-11 to 18

Year:1 **Semester: 2**

Course Title: Chemistry

Course Code: BAS3203

M.M.: 30

Time: 1 hr

Instructions if any: Read the question Carefully.

		Course Objective	Marks
	SECTION 'A'		
	Q.N.1. Attempt all parts of the following:		
a)	Define order of a reaction.	1	1
b)	Give all four quantum numbers for $4f^{14}$.	2	1
c)	A face-centered cubic element (atomic mass 60) has a cell edge of 400 ppm. What is its density?	1	1
d)	Define structure of Fullerene.	2	1
e)	He_2+ exits or not.	2	1
	SECTION 'B'		
	Q.N.2. Attempt any two parts of the following:	Course Objective	Marks
a)	What do you understand by liquid crystalline state? Discuss the classification of liquid crystals and write their application.	1	7.5
b)	What are the Nanomaterials. Give sol gel method for the synthesis of nanoparticle	1	7.5
c)	An increase of 10k temperature doubles the rate of reaction, why. Bodenstein by studying the kinetics of decomposition of gases HI gave the values of specific reaction rates to be 3.52×10^{-7} and 3.95×10^{-7} at 556 k and 781 k. Calculate the energy of activation of the reaction.	1	7.5
d)	Describe Nernst's Equation for simple electrode potential and explain the terms involved in it.	2	7.5
	SECTION 'C'		
	Q.N.3. Attempt any one part of the following	Course Objective	Marks
a)	Write down the electronic configuration, bond order and magnetic behavior of NO, NO+ and NO- molecule and arrange them in their increasing bond length.	2	10
b)	Derive second order reaction when the concentrations of reactants are different.	2	10
c)	Define stoichiometric and non-stoichiometric defects in solid crystal.	2	10

Table 1: Mapping between COs and questions

(Number of COs may vary from course to course)

COs	Questions Numbers	Total Marks
CO1	1(a),1(c), 2(a), 2(b), 2(c)	1+1+7.5+7.5+7.5=24.5
CO2	1(b),1(d), 1(e), 2(d), 3(a),3(b),3(c)	1+1+1+7.5+10+10+10 =40.5
CO3	NA	