Roll No:

BTECH
(SEM II) THEORY EXAMINATION 2021-22
ENGINEERING CHEMISTRY

Time: 3 Hours ***Total Marks: 100***

Notes:

- *Attempt all Sections and Assume any missing data.*
- *Appropriate marks are allotted to each questions, answer accordingly.*

SECTION-A	Attempt All of the following Questions in brief marks(10X2=20)	CO	BL
Q1(a)	Explain why helium is monotomic and hydrogen is diatomic?	1	2
Q1(b)	Arrange the following molecules or ions in increasing order of bond stability. N_2^+, N_2 & N_2^-	1	3
Q1(c)	A solution shows a transmittance of 20%, when kept in a cell of 2.5 cm thickness. Calculate its concentration if the molar absorption coefficient is $12100\ dm^3 mol^{-1} cm^{-1}$.	2	4
Q1(d)	What are Raman active molecules?	2	1
Q1(e)	Why KCl–NaCl – H_2O should be regarded as a 3 components system, Whereas KCl–NaCl–H_2O should be regarded as 4 components system?	3	4
Q1(f)	Calculate the E^0 of the cell reaction: Zn / Zn^{2+} (0.1M) // Cu^{2+}(0.25M) / Cu Standard reduction potential of Zn^{2+} and Cu^{2+} are -0.76V and 0.34V respectively.	3	3
Q1(g)	0.4 gm of a coal sample was used in Parlab calorimeter for the determination of calorific value .The ash formed in the bomb calorimeter was extracted with acid and the acid extracted was treated with $BaCl_2$ solution and a precipitate of $BaSO_4$ was formed .The precipitate was filtered dried and weighted. The weighted of precipitate was to 0.04 gm Calculate the percentage of sulphur in the sample?	4	4
Q1(h)	A sample of hard water has hardness 500 ppm. express the hardness in °fr and °Cl	4	3
Q1(i)	Write monomers of Buna-S and Nylon 66?	5	1
Q1(j)	Write structure of Ferrocene and Dibenzene chromium	5	1

SECTION-B	Attempt ANY THREE of the following Questions marks(30X10=30)	CO	BL
Q2(a)	(i) Explain the applications of Graphite and structure upon the electrical and lubrication property of Graphite?	1	2
Q2(b)	Define the principle of Raman spectroscopy. Explain the term chromophore and auxochrome in UV Spectroscopy?	2	1
Q2(c)	Explain the mechanism of electrochemical theory of corrosion with the help of hydrogen evolution and oxygen absorption reactions. Describe cathodic protection in detail.	3	3
Q2(d)	(i) Write the process of lime soda softening (ii) Calculate the amount of lime and soda required for the treatment of 20000 lts. of water whose analysis is as follows: $Ca(HCO_3)_2$ = 40.5, $Mg(HCO_3)_2$ =86.5 ppm; $MgSO_4$= 30 ppm; $CaCl_2$= 27.75 ppm.	4	4