



BRAINWARE UNIVERSITY

Term End Examination 2023-2024 Programme - B.Tech.(CSE)-AIML-2022/B.Tech.(RA)-2022/B.Tech.(CSE)-AIML-2023/B.Tech.(CSE)-DS-2023/B.Tech.(RA)-2023 Course Name - Engineering Chemistry Course Code - BSCM201/BSCR201/BSCD201 (Semester II)

Full Marks: 60 Time: 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

x 15=15

		Group-A	
	(Multiple Ch	noice Type Question)	1
1.	Choose the correct alternative from the follow	wing:	
(i)	For the reaction, $PCl_5(g)=PCl_3(g)+Cl_2(g)$,	which equation is true?	
	a) ΔH = ΔU	b) ΔH>ΔU	
	c) AH <au< td=""><td>d) can not be said</td><td></td></au<>	d) can not be said	
(ii)	A galvanic cell is used for the conversion	of	
	a) Chemical energy to heat energy	b) Chemical energy to electrical energy	
	c) Electrical energy to chemical energy	d) Heat energy to chemical energy	
(iii)	On treatment with NaOH, what is the ma	ijor product produced from CH ₂ -CH ₂ -	
	CH(NMe ₃)-CH ₃ ?	3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
		The state of the second section (III a) and	
	a) 1-butene	b) 2-butene	
	c) Ethylene	d) Propene	
(IV)	Cis 2-butene and trans 2-Butene are examp	oles of	
	a) Geometrical isomers	b) Enantiomers	
	c) Conformational isomers	d) Position isomers	
(v)	Indicate the compound that is more effect	tive in nucleophilic addition reaction.	
	a) CH ₃ CHO	b) CH ₃ COCH ₃	
	c) PhCHO	d) HCHO	
(vi)	Identify the compressibility factor of an ide		
	a) 0	b) infinite	
	c) 1	d) -1	
(vii) Predict the element with greatest atomic ra	adius from the following	
	a) N	b) B	
		w/ w	

(viii) Choose the correct bond order of ${\rm H_2}^+$ molecule from the following.

(ix	a) 0 c) 1 Identify the number of IR active and inactive vib	b) 0.5 d) 2 brational mode of XeF ₂ molecule are	
(x)	respectively a) 2, 2 c) 1, 3 Select which of the following molecules und	b) 3, 1 d) 4, 0 dergo n -> σ* transition.	
(xi	a) Water c) Methane Predict the compound with the lowest boiling	b) Ammonia d) Both the options a and b g point from the following options.	
	a) HF c) HBr	b) HCl d) HI	
(XII	Select the substance which shows maximum following.	van der waai force of attraction from the	
	a) PH ₃ c) SbH ₃	b) AsH_3 d) BiH_3	
(xii	Select the no of nodes present in the 6 th ener	gy level of a particle in a 1-D box.	
	a) 0 c) 5	b) 4 d) 6	
(XIV	The spin state of the complex $[MnCl_4]^{2-}$ is		
(xv	 a) is high spin c) Can not be predicted One mole of an ideal gas was allowed to exp this expansion can be expressed as: 	b) is low spin d) is moderate spin oand from 1 L to 10 L. The work done for	
	a) -2.3RT c) -4.05RT	b) -RT d) -3RT	
	Gi	roup-B	
		er Type Questions) 3 x 5=15	
2. State th	ne pressure correction term and volume correc	tion term for real gases.	(3)
3. Pred	ict the following products		(3)
	NaOH	Heat (-H ₂ O)	
	a)CH ₃ CHO>	The Market Laboratory of the Company	
	b)CH₃CH₂Br —NaOH →	C (with mechanism)	
	C) CH ₃ CHO HCN	$D = H_3O^+$	

4. Compare the ionization energy of nitrogen (N) and oxygen (O).

(3)

5. Predict the products (A and B) with mechanism for the following reaction steps:

(3)

 $CH_3CHO + PhMgBr \longrightarrow A + H_2O \longrightarrow B$

6.

(3)

$$H \longrightarrow Br$$
 $CN \longrightarrow Br$ E

Assign R or S nomenclature to the above compounds.

OR

Diagrammatically represent the following into Newmann projection formulae.

(3)

Group-C

(Long Answer Type Questions)

5 x 6=30

- 7. i) Examine the shift in absorption maxima of the UV-VIS spectra, when phenol is treated with an (5) alkaline solution.
 - ii) Between 2- butanone and but-3-en-2-one, identify the compound with higher carbonyl stretching frequency in IR radiation. Give an explanation for your answer.
- 8. Explain why [Fe(H₂O)₆]²⁺ is paramagnetic complex but [FeCN₆]⁴⁻ is diamagnetic from the view (5) point of CFT.
- 9. Prove that $(\delta H/\delta P)_T = -C_p \cdot \mu_{JT}$. Where the terms have there usual meaning. (5)

 Illustrate the two enantiomers of 2- phenyl 2-bromopropanoic acid through Fisher projection formulae and convert them in Flying wedge projection formula. 	(5)
11. Comment on the possibilty of existence of Be ₂ molecule from M.O. theory.	(5)
12. 1 mole of an ideal gas, at a temperature 100 K absorbs heat 3710 J. Evaluate the entropy change in the expansion process.	e (5)
OR	(=)
Justify the following statement by deriving a chemical equation	(5)
"The electrode potential of a Saturated Calomel Electrode (SCE) is reversible only with respect to the concentration of chloride ion in the electrolytic solution".	
