



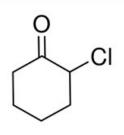
BRAINWARE UNIVERSITY

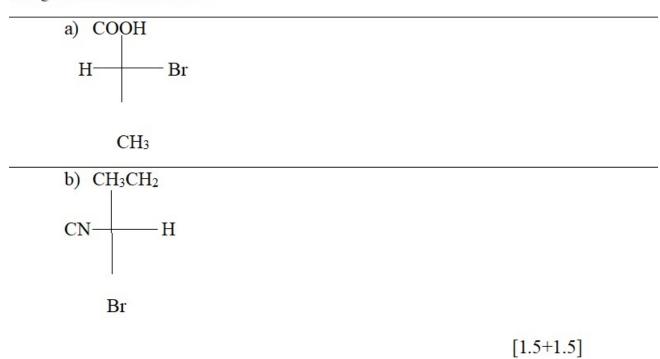
Term End Examination 2022 Programme – B.Tech.(CSE)-DS-2022 Course Name – Engineering Chemistry Course Code - BSCD101 (Semester I)

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.] Group-A (Multiple Choice Type Question) 1 x 15=15 1. Choose the correct alternative from the following : (i) The energy is absorbed by the body in the form of a) Photons b) quantas c) Wave d) None of these (ii) Acetone reacts with $Ba(OH)_2$ to produce a) Aldol b) Mesityl oxide c) Diacetone alcohol d) Mesitylene (iii) The wave associated with the particle in 1-D box can be formed in the region a) x > 0 b) x < 0 c) 0 < x < L d) x > L (iv) Let there be four groups COOH, D, H and CONH₂ attached to the chiral carbon, Evaluate which one will have highest priority sequence a) D b) CONH₂ d) COOH c) H (v) The sum of internal energy and pressure volume product is called a) entropy b) enthalpy c) heat supplied d) work done (vi) For an ideal gas , (dU/dV) is a) negative b) positive d) none of these c) zero (vii) Electrons should be filled in energy sub shells in order of increasing energy values, is the principle of a) Aufbau b) Pauling's d) Hund's rule c) Pauli's exclusion principle (viii) All the naturally occurring processes proceed spontaneously in a direction which leads to a) decrease of entropy b) increase in enthalpy d) c) decrease of free energy increase of free energy (ix) Which one is better used in Friedel craft reaction. a) Acetyl chloride b) Nitrobenzene c) Methyl chloride d) Aniline (x) What describes energy bands in solids? a) It is the single allowed energy level. b) It is a set of closely spaced allowed energy levels c) It is a set of widely spaced allowed energy levels d) It is collection of energy of all allowed energy levels (xi) Standard hydrogen electrode has been assigned to a potential of a) 1.5 Volt b) 1.0 Volt c) 0.5 Volt d) 0.0 volt (xii) In which of the following coordination entities the magnitude of ?0 (CFSE in octahedral field) will be maximum?

(xiii)	a) [Co(H2O)6]3+ c) [Co(CN)6]3- Which is the correct order of second ionization potential o	b) [Co(NH3)6]3+ d) [Co(C2O4)3]3- f C, N, O and F in the following?		
(xiv)	a) O > F > N > C c) C > N > O > F Which of the following elements has the greatest atomic r	b) O > N > F > C d) F > O > N > C adius?		
(xv)	a) N c) O The lanthanide contraction is responsible for the fact that	b) B d) F		
	a) Zr and Y have about the same radiusc) Zr and Hf have about the same radius	b) Zr and Nb have similar oxidation stated) Zr and Zn have the same oxidation		
Group-B (Short Answer Type Questions)			3 x 5=15	
2. What is a	a reference electrode? Give examples.			(3)
 3. Calculate magnetic moment of the following complexes. Give explanation of your answer. [2+1] i) [Co(NH₃)₆]²⁺ ii) [Co(CN)₆]⁴⁻ 				(3)
4. When silicon is doped with arsenic which type of semiconductor do you expect? Explain.				(3)
5. Among F and Cl which one has higher electron affinity? Why?				(3)

OR Predict the product with mechanism when the below compound is treated with OH⁻? ⁽³⁾





OR

Predict the following products

7.

8.

9.

10.

 $\begin{array}{cccc} NaOH & Heat (-H_2O) \\ a)CH_3CHO & \longrightarrow A & \longrightarrow B \\ b)CH_3CH_2Br & & MaOH \\ \hline C (with mechanism) \\ C) CH_3 CHO & & HCN & D & & H_3O^+ \\ \hline \end{array} E$

	Group-C	
	(Long Answer Type Questions)	5 x 6=30
	What happens when Formaldehyde and Acetaldehyde react with NH3separately?	(5)
	What happens when tertiary butyl bromide is treated with OEt-? Predict the product with mechanism.	(5)
	Write down the vanderWaal's equation for n mole of a real gas. Write units of vanderWaal's constant a and b.	a (5)
•	$Zn + Cu^{2+} = Cu + Zn^{2+}$ [2+3]	(5)
	Construct a galvanic cell using this reaction.	
	Calculate pH of quinhydrone electrode.	

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11. Derive an expression for work of expansion against constant pressure.

(5)

	OR Comment on the magnetism of oxygen from the M.O diagram of oxygen molecule.	(5)
12.	Using Carnot Cycle, prove that efficiency of a heat engine is always less than one. (5)	(5)
	OR Comment on the existence of Be ₂ molecule from M.O theory.	(5)
