	Utech
Name:	(4)
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Invigilator's Signature :	

CS/B.TECH(CT)(N)/SEM-3/CH(CT)-302/2012-13 2012 CHEMISTRY - II

Time Allotted: 3 Hours Full Marks: 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

(Multiple Choice Type Questions)

Choose the correct alternatives for any ten of the following:

				$10 \times 1 = 10$	
i)	Milk is an example of				
	a)	pure solution	b)	emulsion	
	c)	gel	d)	suspension.	

- a) sp²
- b) sp^3

c) sp^3d

1.

ii)

- d) $sp^{3}d^{2}$.
- iii) The d-orbital in sp 3d hybridisation is

Hybridisation of S atom in SF $_4$ is

a) d_{xy}

b) d_{yz}

c) d_z^2

d) $d_X 2 - y^2$.

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- The Lewis acidity order among the boron halides iv) follows
 - BF ₃ < BCl ₃ < BBr ₃ < BI ₃ a)
 - $BF_3 > BCl_3 > BBr_3 > BI_3$ b)
 - $BF_3 < BCl_3 < BBr_3 > BI_3$ c)
 - BF $_3$ > BCl $_3$ < BBr $_3$ < BI $_3$ d)
- Which of the following will have the highest coagulating v) power for As 2 S 3 colloid?
 - PO 4^{3 -} a)
- b) SO 4² -

Al ³ + c)

- d) Na +.
- Which one of the following is known as "fluxional vi) copound"?
 - a) CH₄

b) PCl₃

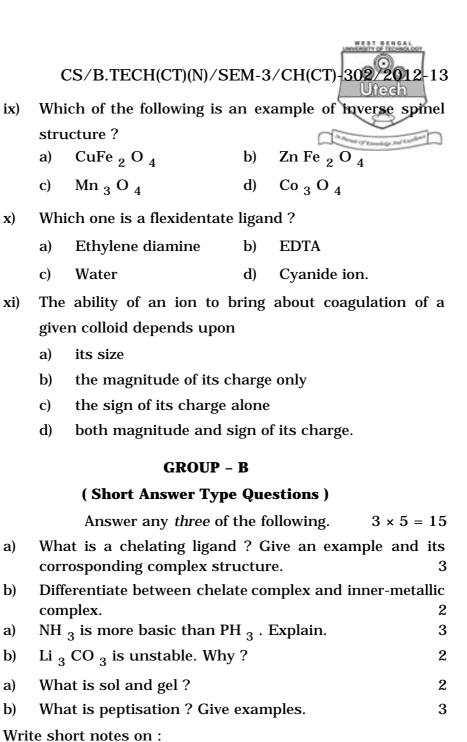
XeF ₄ c)

- d) Fe (Co)₅.
- vii) Dispersion of a solid in a liquid, a liquid in a gas and a liquid in a liquid are respectively known as
 - a) aerosol, emulsion, sol
 - b) sol, aerosol, emulsion
 - c) emulsion, sol, aerosol
 - d) aerosol, sol, emulsion.
- viii) CFSE for d^3 (oh) system is
 - a) 12 Dq

b) 4 Dq

0 Dq c)

d) 6 Dq.



ix)

x)

xi)

2.

3.

4.

5.

a)

b)

a)

b)

a)

b)

a)

b)

Frenkel defect

Schottky defect.

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GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

6. a) Define CFSE. Calculate CFSE value for the following octahedral cases.

 $d^{4}(h.s), d^{6}(l.s), d^{8}.$ 2+3

- b) Explain the factors upon which CFSE depends. 3
- c) Draw the nature of splitting of *d*-orbitals in octahedral, tetrahedral, tetragonally distorted and square pyramidal cases.
- 7. a) What is spinel ? Explain with example "normal spinel" and "inverse spinel". 2 + 5
 - b) $\left[\text{Cu (NH }_{3} \right)_{6} \right]^{2}$ is not stable. Why?
 - c) CoCl $_4$ 2 is blue, but the colour changes in presence of moisture. Explain.
- 8. Write short notes on the following : 3×5
 - a) Protective colloids and gold number
 - b) Emulsion
 - c) Lyophilic and lyophobic colloids.
- 9. a) Draw the M.O. diagram of halogen molecule (X_2) and explain the following :
 - i) Bond order, magnetic property.
 - ii) $\;\;$ F $_2$ is greenish yellow while I $_2$ is violet.
 - iii) Stability order of the polyhalides :

 $I_3^- > Br_3^- > Cl_3^- > F_3^-.$ 2 + 3 + 3

- b) Draw the orgel diagram of d^{-2} (octahedral) and d^{-6} (tetrahedral) cases.
- c) *Ortho*-phenanthrolein forms brown complex with Fe ^{2 +}, but it is colourless with Fe ^{2 +}. Explain. 3

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