

① Set - VI
 Sem II Chemistry - I

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Q. No.

Marks

Q.1 A]

12

- i] - b iii] - c iii] - b
- iv] - a v] - b vi] - c
- vii] ① AgNO₃ viii] brown ix] greenish yellow
- x] ① amphiprotic xi] ① Delechrompaly xii] ① NH₄⁺
- xiii] c xiv] a xv] b
- xvi] a xvii] a xviii] c

B]

03

- i] - True ii] - False iii] True
- iv] True v] True vi] False

C]

05

- i] - e ii] - c iii] ①
- iv] N³⁻ = ② base v] ② vi] ① .imittodfing
 o dour.

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Marks

D2

A. Explanation of Compressibility Factor with equation 2 1/2 marks

Explanation of inversion temperature with equation 2 1/2 marks

B. Ideal gas equation
Volume correction
Pressure correction due to force of attraction } 4 marks

Derivation of Van der Waals equation 1 mark

C. $\Delta G^\circ = \Delta G_f^\circ(\text{CO}_2) - \Delta G_f^\circ(\text{N}_2\text{O}_4)$ } 2 marks
 $= -4.78 \text{ kJ}$

$-\Delta G^\circ = 2.303RT \log K_p$ — 1 mark
 $\log K_p = -0.837$ — 1 mark
 $K_p = 0.146$ — 1 mark

D. Thermodynamic Derivation of equilibrium constant $K_p = e^{-\frac{\Delta G^\circ}{RT}}$ 5 marks

E. No. of moles of $\text{CO}_2 = 11.0/44.0 = 0.25 \text{ mol}$ } 1 mark
 $V = 1.5 \text{ dm}^3 = 1.5 \times 10^{-3} \text{ m}^3$

1 using Ideal gas equation — 1 mark

$P = nRT/V$
 $P = 4.129 \times 10^5 \text{ Nm}^{-2}$ — 1 mark

2 using Van der Waals equation — 1 mark

$P = \frac{nRT}{(V-nb)} - \frac{an^2}{V^2}$
 $P = 4.059 \times 10^5 \text{ Nm}^{-2}$ — 1 mark

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Q3

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Marks

Q. No.

Q2
F.

Statement of Le-Chatelier Principle - 1 Mark
Effect of temperature / pressure / volume / - 4 marks
Concentration / catalyst
(any four variables)

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Marks

Q. No.

Q.3

a)

Explain the addition of buffer in separation of Sr^{+2} and Ba^{2+} .

Explanation of Ba^{+2} precipitated

as $BaCO_3$. imp of Buffer,

Explanation. pH is 5. at higher

acidity, the precipitation of Ba^{2+}

is incomplete, and lower Sr^{+2} is also

precipitated. To avoid these complications

Ba^{+2} is precipitated from acetic

acid solⁿ in presence of sodium

acetate with the help of CH_3COOH

CH_3COONa . to maintain the required

pH

02

02

3]

Various types of qualitative analysis is explain with sample weight each with one mark

05]

1) Write a note on common ion effect:-
define —

01m,

Explanation —

02m

Example —

02m,

Questions should be —
WRITTEN IN LEGIBLE HANDWRITING IN BLACK INK.
SIGNS, SKETCHES OR FIGURES IF ANY BE DRAWN IN NEAT BLACK INK,
so as to avoid mistakes in the printed question papers.

Duration Hours.

Total Marks assigned to the paper

Q. No.	N.B.:	Marks
Q3	HSAs concept	
D)	Class a & class b metal ions & examples	2x2=4M
	Explanation	1M
E)	Titration curve	1M
	SA & SB Example	3M
	various steps	3M
	curve	1M
F)	Solvent system — Autoionisation concept	1M
	Definition	2M
	Explanation	2M
	Reactions	2M

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Set 6

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Duration Hours. Total Marks assigned to the paper

Q. No.	Marks
4	
A] N.B. : Methane → Methyl chloride → Dichloromethane Carbon tetrachloride ← Chloroform ↓ The compounds can be separated by fractional distillation.	1m for each step.
B] E, C, B full form C ₂ H ₅ CN ₂ Presence of -I groups makes removal of H ⁺ to form carbanion easier. Stabilization of carbanion by -I groups	1m 1m 1 1/2 m
C] Statement of Saytzeff's rule. Reaction with production of major & minor product w.r.t. to Saytzeff's rule. Explanation of why regioselective	3 1 1 1/2
D] i) Formation of Ozone ii) Formation of epoxide Formation of diol	1 1/2 + 1/2 m 1 1/2 m 1m

[PTD]

E] i) Formation of tertiary carbocation and $1^{\circ} + 1^{\circ}$
stabilization

ii) Hydration of higher alkyne (propyne or any other) 1°
to form enol 1°
Tautomerism to form ketone 1°

F] i) ~~Reaction to form acetylide~~ 1°
reaction to form propyne 1°
ii) ~~Reaction to form propyne~~ $1^{\circ} + 1^{\circ}$
stepwise dehydrohalogenation $1^{\circ} + 1^{\circ}$
structure of 1,2-dibromopropane $1^{\circ} + 2^{\circ}$

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053
A.

$$\Delta H^\circ = -55.8 \text{ kJ/mol} = -55800 \text{ J/mol} \quad \text{--- 1 Mark}$$

$$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ \quad \left. \vphantom{\Delta G^\circ} \right\} \text{ 2 marks}$$

$$\Delta G^\circ = -79900 \text{ J/mol}$$

$$\Delta G^\circ = -RT \ln K \quad \left. \vphantom{\Delta G^\circ} \right\} \text{ 2 marks}$$

$$K = 1.01 \times 10^{-14}$$

B. Statement of Joule-Thomson effect 1 Mark

Joule-Thomson effect experimental 2 marks

Derivation to show Joule-Thomson effect is isenthalpic in nature } 2 marks

$$\Delta H = 0$$

Set 6

Sem II Chemistry I

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Duration

Hours. Total Marks assigned to the paper

Q. No.

N.B. :

Marks

- Q.5) The solubility product of Magnesium hydroxide is 1.4×10^{-11} at 298 K. Calculate its solubility.
- mg(OH)_2 dissociated. 01 m.
- $K_{sp} = (S)(2S)^2$ 01 m.
- $S = 1.518 \times 10^{-4} \text{ mol dm}^{-3}$ with 03.
units.

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Marks

Q. No.

Q5 D7

LB concept
3 advantage & any 3 limitations SM

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Marks

- 5 E] Reaction for benzylic bromination
Each step of mechanism
Stabilization by resonance
- E] i] correct reaction
ii] stepwise addition (2 steps)
iii] Reaction
correct conditions for dehydration
- 1m
1+1+1m
1m
1m
1+1m
1m
1m