# B.Sc. (Part—II) Semester—IV Examination 4S-CHEMISTRY

Time : I	hree	Hours]	[Maximum Marks: 80
Note :-	(2) (3)	Question No. 1 is compulsory.  Solve ONE question from each unit.  Draw diagram and give equation wherever necessary.  Use of calculator is allowed.	
1. (A)	Fill	in the blanks :	2
	(i)	Elements lying between s and p block elements are l	(nown as
	(ii)	The pH at which the amino acids in the solution has	zero charge is
	(iii)	Unit cell of NaCl contains molecules of N	aCI.
	(iv)	The presence of solute the boiling point o	f the solvent.
(B)	Cho	ose the correct option from the given alternatives :-	2
	(i)	Zinc exhibits oxidation state.	
		(a) $+1$ (b) $+2$	
		(c) +3 (d) +4	
	(ii)	Acetoacetic ester on reaction with urea gives	'
		(a) 4-methyl uracyl (b) Malo	nyl urea
		(c) Thiourea (d) Meth	yl urea
	(iii)	Aniline is in nature.	
		(a) Acidic (b) Basic	
		(c) Neutral (d) Amp	hoteric
	(iv)	The total number of atoms per unit cell of Face cc is	ntered cubic crystal (FCC)
		(a) 1 (b) 2	
		(c) 3 (d) 4	
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(C)	Answer the following	in ONE senter	ice :-			4
, ~,		7				
	. ,	ff factor.				
			p ?			
	(iv) What is ignored					
(A)	Write the electronic of			elements.		4
						4
	-				7	
(0)		-		-		4
	(1)			(*	.,	
(P)	Calculate the magnet	ic moment of fe	llowing io	ns of transition	series :	
	(i) Ti <sup>2+</sup>	(ii) Cr³-		(iii) Fe <sup>2</sup>		6
(Q)	What are minerals?					2
(R)	Explain the catalytic	property of 3d	series elem	ents.		4
	,					
$\langle A \rangle$	What is Lanthanide of	contraction ? Wh	nat are its o	causes ?		4
(B)	Write electronic conf	figuration of Act	inides.			4
(C)	Explain Froth Floata	tion method.				4
			)R			
(P)	Explain Magnetic ser	paration method	for the cor	ncentration of c	ore.	4
(Q)	Discuss Ion Exchang	e method for the	e separation	n of Lanthanide	es.	4
(R)	Define:					
	(i) Calcination		(ii) F	Roasting.		-1
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(A)	Discuss open chain s	structure of Glue	ose.			4
(B)	Explain molecular or	bital structure o	f Naphthale	ene.		4
(C)	How will you convert acetoacetic ester into					
	(i) Acetic acid		7337 6	Succinic acid?		1
	(i) Acetic acid		(11) 3	decime acro :		7
	(i) Acent acid		)R	decime acre :		7
	(A) (B) (C) (P) (Q) (R) (A) (B) (A) (B) (B) (B)	<ul> <li>(i) Define Ore.</li> <li>(ii) Define Van't Ho</li> <li>(iii) Define plane of</li> <li>(iv) What is reactive</li> </ul> (A) Write the electronic of <ul> <li>(B) Give general character</li> <li>(C) Which of the following</li> <li>(i) Cu<sup>2</sup></li> <li>(ii) Cu<sup>3</sup></li> </ul> (P) Calculate the magnet <ul> <li>(i) Ti<sup>2+</sup></li> </ul> (Q) What are minerals? <ul> <li>(R) Explain the catalytic</li> </ul> (A) What is Lanthanide of <ul> <li>(B) Write electronic confine</li> <li>(C) Explain Froth Floata</li> </ul> (P) Explain Magnetic set <ul> <li>(Q) Discuss Ion Exchang</li> <li>(R) Define:</li> <li>(i) Calcination</li> </ul> (A) Discuss open chain set <ul> <li>(B) Explain molecular or</li> </ul> (B) Explain molecular or (C) Explain molecular or (D) Explain molecular or (E) Explain molecular or (E) Explain molecular or (E) Explain molecular or	(i) Define Orc.  (ii) Define Van't Hoff factor.  (iii) Define plane of symmetry.  (iv) What is reactive methylene grow  UNI  (A) Write the electronic configuration of  (B) Give general characteristics of Transf.  (C) Which of the following ions are para  (i) Cu <sup>2</sup> (ii) Mn <sup>2-</sup> (P) Calculate the magnetic moment of for  (i) Ti <sup>2+</sup> (ii) Cr <sup>3-</sup> (Q) What are minerals?  (R) Explain the catalytic property of 3d in th	(ii) Define Van't Hoff factor.  (iii) Define plane of symmetry.  (iv) What is reactive methylene group?  UNIT—I  (A) Write the electronic configuration of 3d series of B Give general characteristics of Transition eleme (C) Which of the following ions are paramagnetic of (i) Cu <sup>2</sup> (ii) Mn <sup>2+</sup> (iii) Ni <sup>2+</sup> OR  (P) Calculate the magnetic moment of following ion (i) Ti <sup>2+</sup> (ii) Cr <sup>3+</sup> (Q) What are minerals?  (R) Explain the catalytic property of 3d series elem UNIT—II  (A) What is Lanthanide contraction? What are its of (B) Write electronic configuration of Actinides.  (C) Explain Froth Floatation method.  OR  (P) Explain Magnetic separation method for the cort (Q) Discuss Ion Exchange method for the separation (R) Define:  (i) Calcination (ii) Functional (III) F	(ii) Define Orc. (iii) Define Van't Hoff factor. (iii) Define plane of symmetry. (iv) What is reactive methylene group?  UNIT—I  (A) Write the electronic configuration of 3d series elements. (B) Give general characteristics of Transition elements. (C) Which of the following ions are paramagnetic or diamagnetic (i) Cu <sup>2</sup> (ii) Mn <sup>2-</sup> (iii) Ni <sup>2-</sup> (iii) OR  (P) Calculate the magnetic moment of following ions of transition (i) Ti <sup>2+</sup> (ii) Cr <sup>2-</sup> (iii) Fe <sup>2-</sup> (Q) What are minerals? (R) Explain the catalytic property of 3d series elements.  UNIT—II  (A) What is Lanthanide contraction? What are its causes? (B) Write electronic configuration of Actinides. (C) Explain Froth Floatation method.  OR  (P) Explain Magnetic separation method for the concentration of of QD Discuss Ion Exchange method for the separation of Lanthanide (R) Define: (i) Calcination (ii) Roasting.  UNIT—III  (A) Discuss open chain structure of Glucose. (B) Explain molecular orbital structure of Naphthalene.	(i) Define Van't Hoff factor. (iii) Define Van't Hoff factor. (iii) Define plane of symmetry. (iv) What is reactive methylene group?  UNIT—I  (A) Write the electronic configuration of 3d series elements. (B) Give general characteristics of Transition elements. (C) Which of the following ions are paramagnetic or diamagnetic? (i) Cu <sup>q</sup> (ii) Mn <sup>2+</sup> (iii) Ni <sup>2+</sup> (iv) Co <sup>2+</sup> OR  (P) Calculate the magnetic moment of following ions of transition series: (i) Ti <sup>2+</sup> (ii) Cr <sup>2+</sup> (iii) Fe <sup>2+</sup> (Q) What are minerals?? (R) Explain the catalytic property of 3d series elements.  UNIT—II  (A) What is Lanthanide contraction? What are its causes? (B) Write electronic configuration of Actinides. (C) Explain Froth Floatation method.  OR  (P) Explain Magnetic separation method for the concentration of ore. (Q) Discuss fon Exchange method for the separation of Lanthanides. (R) Define: (i) Calcination (ii) Roasting.  UNIT—III  (A) Discuss open chain structure of Glucose. (B) Explain molecular orbital structure of Naphthalene.

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	7.	(P)	How	will	you	prepare	
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- (i) α-naphthyl amine from α-naphthol
- (ii) α-naphthol from α-naphthalene sulphonic acid?

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- (Q) How will you prepare following from naphthalene:
  - (i) l-acetylnaphthalene
  - (ii) 1-chloromethyl naphthalene?

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(R) Write short note on Epimerization.

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(S) How will you convert Glucose into Fructose?

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#### UNIT-IV

8. (A) Discuss the diazotization reaction with its any two synthetic applications.

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- (B) How will you prepare following from aniline:
  - (i) ortho and para bromoaniline
- (ii) phenyl isocyanide?

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- (C) Write short notes on:
  - (i) Isoelectric point

(ii) Strecker synthesis for amino acids.

OR

### 9. (P) How will you prepare:

- (i) Benzene from Benzene diazonium chloride
- (ii) 2, 4, 6 tribromoaniline from Aniline.

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(Q) Complete the following Reactions:

(i) 
$$O_2$$

$$O + 6[H] \xrightarrow{\text{NaOH/H}_2O}$$
?

(ii) 
$$C_6H_5N_2Cl + H_2O \xrightarrow{H^{\oplus}\Delta} ? + ? + HCl$$
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(R) Write short account on Gabriel Phthalimide synthesis.

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### UNIT-V

(A)	Describe Cottrell's method for the determination of elevation of boiling point.
(B)	Melting point of Camphor is 449.5 K. The melting point of solution containing
	$5.22 \times 10^{-6}$ kg. Camphor and $3.36 \times 10^{-5}$ kg of an unknown substance is 431.5 K
	Calculate the molar mass of the unknown substance.
	$(K_f \text{ of camphor} = 37.7 \text{ K kg mol}^{-1})$
(C)	Derive equation of Van't Hoff factor when the solute undergo Association.
	OR
(P)	Define:
	(i) Van't Hoff factor (ii) Colligative properties.
(Q)	Derive relation between depression of freezing point and molecular weight of solute
(R)	A solution containing $2.44 \times 10^{-3}$ kg of solute dissolved in $75 \times 10^{-5}$ kg of water boiled at 373.413 K. Calculate the molar mass of solute ( $K_b = 0.512$ Kg mol <sup>-1</sup> ).
	UNIT—VI
(A)	Define:
	(i) Unit cell (ii) Axis of symmetry.
(B)	Describe the Bragg's spectrophotometer method for the determination of crystal structure
(C)	The first order reflection maxima was noted at 5.90° from 100 planes of SCC. Calculat the wavelength of X-rays if interplanar spacing was 0.282 nm.
	OR
(P)	Explain the structure of NaCl on the basis of X-ray diffraction.
(Q)	Define:
	(i) Space Lattice (ii) Centre of Symmetry
(R)	Sodium has bee lattice with density of $1 \times 10^{-3} \text{ kg}^{-3}$ and molar mass $23 \times 10^{-3} \text{ kg mol}^{-1}$ find out length of edge of its unit cell.
	(Given $N_0 = 6.023 \times 10^{23}$ ).
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	(B) (C) (P) (Q) (R) (C) (P) (Q)