# MPORTANTIII =

	FACTORS affecting strength at Litt kinds of BONDS Date No.
A.	Covalent Bord strength
Į.	no. at bonds between atoms
	T no. of bonds 7 T no. of chared elections -7 T electrostatic attraction between
	bord pairs and two nuclei -> 1 bord othersth
ζ.	size of atom and a state with the state of t
N. A.,	Trize of booking atom - Torbital rize - valence orbital more diffuse - arenap of
	arbitals less effective -> 1 bord strength
3-	difference in dectroregatively
2	1 difference in electronegativity of bonded atoms -> teleptrostatic attraction between boroung
	electrons, Thord strugth
	recommend to exercise as well as a second of the second of the
4.	Hybridisation, 's' character of hybrid orbital
	Tis' character (ie. sp3+sp'+ssp) -> is' orbital spherical, electrons doser to nucleus ->
	overlap of orbitals more effective -> About strength
- 3 k	e testabilities enemant is an a series of the enemant is a first terminal to an analysis of the enemant is
<b>★</b> R.	Ionic bands with COVALENT CHARACTER * can use interchangeably
1.	charge density of conion i.e. $ \frac{2}{r} $
	Tcharge, voice -> Tpolansing power on anion -> Toustortion -> Touvalent character
2.	size of anion
4	T charge, Trize -> Tpotarisability -> Tablettion of electron doud-> Toovoulent character
2	ionic Alf3 AleO3 AlCl3 AlBi3 covalent
	ionic Alf3 Al2O3 AIC13 Al813 covalent
₹c.	covalent bonds with IONIC CHARACTER (polar covalent bond)
	1 difference in electroregativity of bonding atoms - I bond dipole moment - mare polar if
	Let outpole moment is not zero! dipole moments do not cancel each other out
D.	(d-1d interactions (instantaneous -; n duced)
1.	
	The of dectrons   duction doud size -> Tpolarisability (distortion -> T strength of id-id interactions
2.	surface area for molecular interdiction
3	Tourface area -> Tid-id interactions (straight chained vs brenched)

Ĕ.	pd-pd interactions
	pular molecules have both pol-poland id-tol interactions, othorgen IMF than just 12-101
	in non-poter compounds. Lowever, Tho-of elections of Tid-id villstill be predominant factor
	. And the second of the second
F.	Hydrogen bonding
	proximity of election deficient H and FIOIN atom with lone poil
	- it rear enough > intra-molecular borowny > less siles available for intermolecular
	borony + less extensive intermoleular H-bording
G	Ionic Bond strength => lattice energy
<u>()</u>	lattice evergy $\propto \left  \frac{9t \cdot 9}{r^{1}1r^{-}} \right $
5 1.	i) higher charge -> greater dectrostatic attraction between ions
	ii) smaller rodby -> sharter distance betreen ions -> 1 attraction
	abome density
Н.	
١.	no ot valence elections available for bonding
	Tho of valence e - + Tho. of delocalized e - > Telectroslatic FOAbetreen positive ions and e-
	The of valence e - + The of delocalized e -> Telectrostatic FOAbetreen positive ions and e-
2.	The of valence e - I The of delocalized e - Telectroslatic FOAbetreen positive ions and e - size of cation.
2.	The of valence e - 1 The of delocalized e - ) Telectroslatic FOAbetreen positive ions and e -  size of cation  I bond strugth  V size - 1 charge density - 7 Tattraction for delocalized e - overlap of a length
2.	The of valence e - 1 The of delocalized e - ) Telectroslatic FOAbetreen positive ions and e -  size of cation  I bond strugth  V size - 1 charge density - 7 Tattraction for delocalized e -  Tralence orbitalmore and
2.	The of valence e - 1 The of delocalized e - ) Telectroslatic FOAbetreen positive ions and e -  size of cation  I bond strugth  V size - 1 charge density - 7 Tattraction for delocalized e -  Tralence orbitalmore and
2.	The of valence e - 1 The of delocalized e - ) Telectroslatic FOAbetreen positive ions and e -  size of cation  I bond strugth  V size - 1 charge density - 7 Tattraction for delocalized e - overlap of a length of polence of the positive for delocalized e - overlap of a length of polence of the positive for a length of the positive ions and e -
2.	The of valence e - IT no. of delocalized e - I electrostatic FOAbetreen positive ions and e -  size of cation  I boundaringth  I size - I charge density - I attraction for delocalized e - overlep of a length of palence orbital more and  covalent - no of bounds, - monothelectrons of atvarion blow boundparts, Tarkfree lectro, I size, Torbital -  2) Jone pair of e: e deficient H ratio => H2O > NH3 or HF
2.	The of valence e - IT no. of delocalized e - I electrostatic FOAbetreen positive ions and e -  size of cation  I boundaringth  I size - I charge density - I attraction for delocalized e - overlep of a length of palence orbital more and  covalent - no of bounds, - monothelectrons of atvarion blow boundparts, Tarkfree lectro, I size, Torbital -  2) Jone pair of e: e deficient H ratio => H2O > NH3 or HF
2.	The of valence e - 7 The of delocalized e - > Telectrostatic FOAbetreen positive ions and e -  Size of cation bonds of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the delocalized e - Overlep of a length of the length of
2.	The of valence e - 7 The of delocalized e - > Telectroslatic FOAbetheen positive ions and e -  size of cation
2-	The of valence e - 7 The of delocalized e - > Telectrostatic FOAbetreen positive ions and e -  Size of cation.  I bond strongth  I size - 1 charge density - 7 Tattraction for delocalized e - overlap of a length of the length o
2.	Tho of valence e - 7 Tho. of adocalized e -> Telectrostatic FOAbetreen positive ions and e -  size of cation.  I boundaryth  V size-> 1 charge density -> Tattraction for delocalized e -  Covalent - no of bonds, -most, electrons of afrontion blood parts, to little tectro, to rize, to root-of-  (covalent - no of bonds, -most, electrons of afrontion blood parts), to little tectro, to rize, to root-of-  * 2) lone pair of e: e: deficient H ratio => H2O > NH3 or HF  21p, 2H 11p., 3H 31p, 1H  3) Electroregativity: F>O2N
2.	The of valence e + The of defocalled e -> Telectroslatic FOAbetreen positive ions and e -  size of cation.  I bordstrugth  I size -> 1 charge density -> 1 attraction for delocalized e -  Covalent - no of bonds month electrons of attraction by bordparts, takk referred. Total forbital.  (avalent - no of bonds month electrons of attraction by bordparts), takk referred. Total forbital.  2) Ione pair of e: e: deficient H ratio => H2O > NH3 or HF  21p, 2H 11p., 3H 31p, 1H  3) Electroregat Min : f>O2N
2.	Thoo of valence e - 7 Tho. of delocalized e -> Telectroslatic FOAbetreen positive ions and e -  size of cation.  I bound strongth  I size -> 1 charge density -> Tattraction for delocalized e  Covalent - no of bonds, -> 10 of electrons of attraction blin bondpasts, Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction, Tatze, Torbital  (avalent - no of bonds, -> 10 of electrons of attraction blin bondpasts), Tattraction blin bondpasts, Tattraction blin blin bondpasts, Tat
2.	The of valence e - + The of delocalized e -> Telectrostatic FOAbetreen positive ions and e -  size of cation  U size-1 1 charge density -> Tatraction for delocalized e -  Covalent - Local bonds, most electrors of atvation blue bondparts, takknetecto, tarre; torbit-1 -  (avalent - Local bonds, most electrors of atvation blue bondparts), takknetecto, tarre; torbit-1 -  (avalent - Local bonds, most electrors of atvation blue bondparts), takknetecto, tarre; torbit-1 -  (avalent - Local bonds, most electrors of atvation blue bondparts), takknetecto, tarre; torbit-1 -  (avalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (avalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (bond strugth  (covalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (covalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (covalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (covalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (covalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (covalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (covalent - Local bonds, most electrors), takknetecto, tarre; torbit-1 -  (covalent - Local bonds, most electrors), tarre; torbit-1 -  (covalent - Local bonds, most electrors), tarre; torbit-1 -  (covalent - Local bonds, most electrors), tarre; tar
	The of valence e - The of delocalized e -> Telectroslatic FOAbetreen positive ions and e -  size of cation  I bondatingth  I size -> 1 charge density -> Tattraction for delocalized e -  Covalent - ho of bonds, -most electrons of attraction bloodpalls, Tolkfreezero, Torce, Torbit-1  (2) lone pair of e: e deficient H ratio => H2O > NH3 or HF  21 p, 2H 11 p. 3H 31p. 1H  3) ElectroregatMity: FOOSN
	The of valence e + The of addicalized e - Telectrostatic FoAbetreen positive ions and e -  size of cation.  I bound strugth  I size - The charge density - That attraction for delocalized e -  Carolent - we of bounds, - The off electrons of attraction by boundpalls, to the telectron, therefore, the care, to but - I was a superior of the boundpalls, to the telectron, the care, to but - I was a superior of the boundpalls, to the telectron, the care, to but - I was a superior of the care of the care, to but - I was a superior of the care of the

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## VSEPR THEORY

				-		•	Date.	No.
•	no. of regions	dectron-pair	no. 04	molecular	geometry	exa	mples	bond angle
	of e-density	geometry	lone		, ,			
		linear		linear		Bell2 CI	-Be-Cl	1800
	2	—A — a a a	0	A-			)= C = O	
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	3	- A-			1		F'	
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		tetrahadral	0		/A''',		H H	
		1		trigoral pyrimi	day	NH3		107°
	4	A)109°	1		- Ä'm,	1,0	H H H	
		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		bent	• ''',	H <sub>2</sub> O		105°
		7	2		À "",	1(20	H .H	103
								-
		tugorod	0	trigorod bipyrimidal	790°	PCI 5	and	90° or
		bipyini dal			7120°		9/1	120°
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		20					F I 'F	
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			,	pywindoy	<b>\</b> !; \		F	
			_	square planar	" A= 900	XeF4	P-Xe-F	900
			- 2	N/M II	11/2/10		Ex werE	
	Oio	normal bond, 70 is	s the a	perjal bond				
					المنطاع المنطا	rd ku	nt ČF3 150p3	hubidised.
		redral - upu		CH3 13	op nybum	, 60	11 0131307	The local fact.
		red planar - sp²						2
	line	ar -op						

		EXPERIMENTAL TECHNIQUES TO MONITOR CONCENTRATION Date. No.
•	A)	Sampling (quenching + titration)
	١.	The reactants are mixed and the stop watch is started simultaneously.
	2.	Aliquots of the regiont mixture are withdrawn and quenched at regular-line intervals (eg-2 mins)
	7	using excess (KI (ag)). ([]) macks with (MnOq-) instantaneously and quantitatively
		to form(I2)
2 P 3	3.	The amount of (Iz) found in each oliquot is found by titrating against standard (NazSzO3 (aq))
		Plot a graph of volume of (Nazszoscag) - titrant against time, which is similar to agraph
		of [[Mn04]] against time. (volume NazSzO3 (ag) & amount of I, formed & amount
		of unreacted MnOg & [MnOg] remaining)
	5.	Instantaneous rate is found by drawing a targent to the curre and finding its
2		gradient g, , where rote = -g1.
>	. 1 %	*with H2O2, use largerolum of coldwater, titrate with standard acidified KMnO4.
N		* cold water is added to half the reaction so that the composition of the myture in the aliquot does
		not charge anymore
		* with errer, use cold water, titrate with NaOH.
	8)	
	ŀ	(MnO4-) is violet. since colour intensity of [(MnO4-)), alarge in colour intensity of MnO4-
		over time may be used to determine rate of reaction.
	2.	colour intensity is measured with a colourineter at regular time intervals.
	3.	samples et (KMnO4)(aq) et ravious concentrations p.g. 0.001, 0.005, 0.010 moldm <sup>-3</sup> are
		prepared, with their colour intensities measured. Acalibration cure is obtained by plotting
		colour intensity against concentration. The concentration of ((Mn Ox) corresponding to each
		colour intensity obtained in 2. is found using the calibration curve. [KMn04] is prothed
		against time.
	4,	Instantaneous rate is tourd by drawing a largent to the curve and finding its grownent
		g. kane = - g.
		Groph for A&B:
		V00111
•		time .

U-GRADE

	Date. No.
c)	Volume method.
•	2 H2 02(QQ) → 2H20(e) + 02(g)
1.	since gas is evolved, can mortlor charge involume over time.
2.	collect (Ozig) in a graduated gas syringe and measure the volume at regular-time intervals.
3.	volume of (02) < ((02)), so plot a graph of volume of 02 against fine.
4.	
	rate = -91.
70	OR
	plot a graph of Va-V+ against time, where
	V+ = volume at 02 evolved at time t,
	V <sub>v</sub> = " at end of reaction ,
	vo-ve= " yet to be evolved at time t.
	(VO-V-1) of CH2O2], so graph of Vo-V+ against time is similar to [H2O2] against time.
12	+ significance of (vo-v+): It is directly proportional to the CH2O2) present in the solution at
	time t.
	imb: k is affected only by temp. & presence of cortalyst.
-	

# ORGANIC CHEM

					Date. No.	
a)	Homolytic F	ission	• • • • • • • • • • • • • • • • • • • •	earlie note at a		
			. + R. ore	e- goes to each or	tom, form free radicals	
<b>b</b> )	Heterolytic		2 w 2 1 1 1 1	ba so so	t didi k	
	A—B	$\longrightarrow$ A	: + B+ both e-	goes to one ortom, for	ming tre and the long.	
e e						
(i)	Electrophile	- 10PG	electrons, are e-	deficient, attracted t	o e rich gites, have empty orbital	
	e.g. BF3, 1	H, Brt, NO	)2t, Rt, C=C 6	onds (e-rich 70 bonds	to accept e-	
Homolytic						
ii)	Nudeophile	— attractes	d to regions of pool	tive Charge, have at 1	east one pair of lone e.	
	e.g. OH-,	Br, CN	, NH3, H2O, R-N	Hz		
			y engangen ji	the hollessed out		
A)	Addition- occ	urs only to 1	unsaturated reactant	s, 2 substances give	one product,	
	bre	aking of o	ne TU bord to form	26 bonds	<u> </u>	
ß)	Substitution -	an atom I g to	up replaced by another	r, 2 substances give	two products	
c)	Elimination -	removal at a	atoms/groups from	two reighbouring car	tons	
	Mechanism			nctional Group	serious de la forte est	
	Nucleophilic substitution OH- + of - x6-, where XIJ any hologen					
	Mudeaphilic	addition	-c=0	carbony	distriction of the second	
	Electrophilic			>c€c′ alka		
	FlectiopLilte		4	1/3- benzere ling	, Oteres	
	Free radical	substitution	120g M. B. 2 18-	-c- alkanes		
	+ 5- or ,	st is in re	lation to carbon o	atoms!!!		
	-		Name	0.185	в.	
	Functioned	Group		SUSHIX	F.g.	
	- C*O		carboxylic aeta	-oic acid	butanoi C a cid	
	- C,O-R		ester	albyl oate	methyl ethanoate	
	-c*0 -c*0 -c*NH2		acid buide	-oyl balide	ethanoyl chloride	
			amide	-amide	butanamide	
	-C=N		ritnie alda i la	-nitrile - od	propanentrile butanol	
	- C,H		aldehyde			
	)c=0 -0H		ketone	-one	butanone	
,	-NH2		alcohol		popanol	
	-H		amine alkarel alkare	-amine	ethananine	
		•	· · · · · · · · · · · · · · · · · · ·	-0	propanel properel propytie	

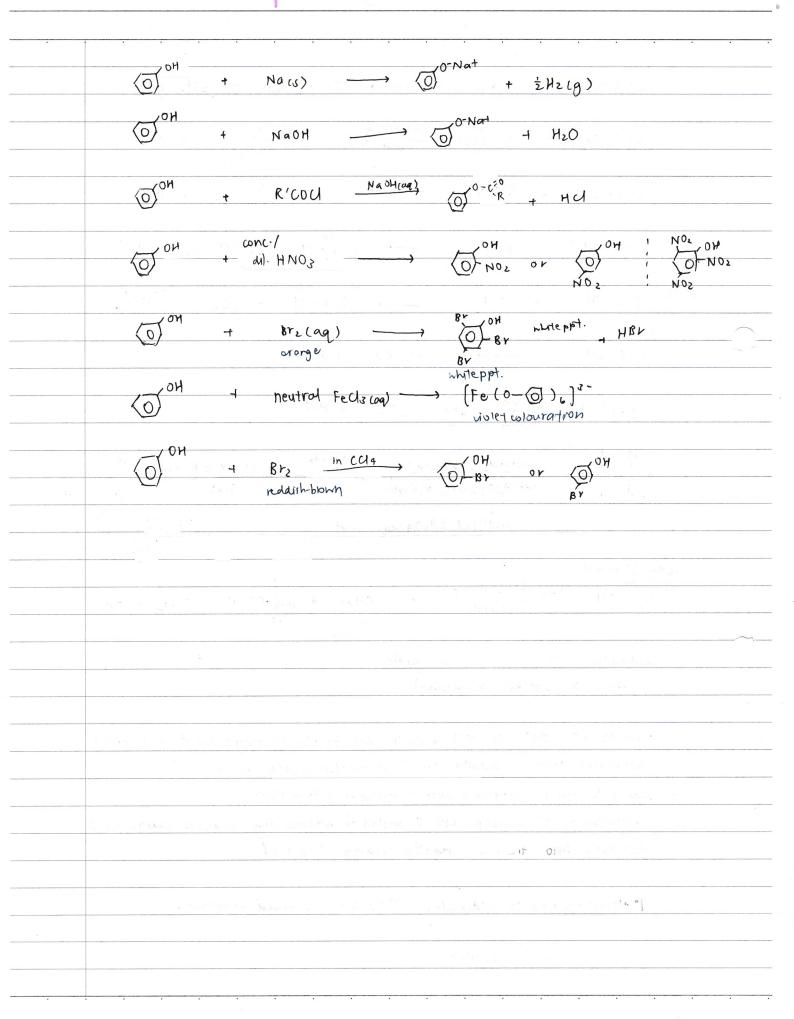
	ALKANES Date. No.
;)	Reduction of Alkeres to form Alkanes
	(nHzn + Hz Ni+rest OR, (znHzn+z alkere Pt OR Pd alkene
	conditions: Ni catalyst + heat OR Pt catalyst OR Pd catalyst
(17	Combustion
	$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
	$CH4 + \frac{2}{2}O_2 \rightarrow CO + 2H_2O$
	$CH_4 + O_2 \rightarrow C + 2H_2O$ , with cossoot.
(iii)	Free-Radical Substitution: Reaction with Halegers
	(n H2nt2 + X2 UV light OR ChH2nt1 X + HX Lorlogen haltole
	conditions. UV light or ourlight or hat - this supplies energy for homolytre
	fission of hologen-hologen hard (bond breating) to form the radicals
	Uz used: -devolourisation of yellow green Uz -formation of white HU fures that furn damp bluelithmus paperred.  Brz used: -devolourisation of bown Brz
2	- 11 white HBr fumes 11
	FreeRadical: A reactive openies that has a virgle unpaind electron
	the contract of the contract o
	are a company of the state of t
	British Company British Britis
	To go and the control of the control
	The same of the sa
	to the same state of
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				Date	No.
		Br. in CUa			
8	( = C	Brz in CU4  dark, roomtemp.	C — C BY BY		
		dar r) 100 m len	Br Br	2× 2	
	(= C	dry HX(g) roomtemp.	c-0	ethanolic NaOH	1 200
	(-(	room temp.	N 8r	reatunder rolly	
		Rr (ag)			
	c= C	Brz (aq)	C-C Br OH		
		dark, room temp.	Br OH	H-0,2,0	e - c.
		rald. ranc-H2504		C=C / S"0	OSO2H
	C= C	H2O, Mat	<u> </u>	(-( )	120 C-C
			HO H	Keozo	120 + H200
		conc N2304, OR	Al203, 400°C, or	H3P64, 250°C	
-		170°C			
	C=C	Hz/Ni,150°C/pt.rtp.) (pa/C, heat)	7		
		(Pa/C, heat)	Н И		
		- 1	No constant	Lack of the Little	
		KMn04, H2504,	<b>40</b>	Prayon a projet pr	No. 7
	C = C	KMn04, H2504,	R-COH	[strong oxidations] purple KMnO4 decolour	
		THE ACTIVITIES		purple kmnot accolory	
mbto		A Market			only for
salance 19th [0]	C=C	cold KMnO4, NaOH,	OH OH	Cmild oxida	tion) alkaline
and H2O		cold	он он	purple YMnO4 decolouri	
		VALOR NADY	. 0	.0	
	C=C	ICANOA / 1 000 17	R - C - Not	-> R-C Cutrong oxidati	on in
		KMn04, NaOH  Naturder reflux	O No.	alkaline me	diumJ
	Brz in CU4	- reddish brown			H.r.
	Br2(0g) -	- orange		structural	steoreoisomenism
	-	- purple	chain p	positional functional geome	trical optical
		- yellowish brown		goop	
					m orbitals and
			electrophile: e	deficient openies that , acce	ols love ports
			nucleophite: s	peures that is able to do	norte alore par
	Uzig) -	yellow green	to another sp	review to form apporalent k	ord
	Br2(g) -	- brown			
	•				

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,	
-	€ CH2J045.HNO3 €2004 € 54004
	CH3 C. H2504, c. HNO3 (CH3) 30°C (CH3) NO2 OF NO2
	Mightemp, high pressure
	(0) (12, A1C13), (1) (12 + A1C13) (1) A1C14
	O) CH3U, A1Cls, CH3
	(C) CH3COQ, AIQ3, (C) C-C+ 1AIQ4-
	CH3 KMn04, dil H2504 COOH devolourisation of purple KMn04
	CH3 KMn04, dil-NaOY (0) Alack ppt of MnO2 -> only inalkaline
	(a) Cl2, UVlight a cl free radical addition.
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	mates compound more stable
	activating, NH2, OH
	e donating. OCH3
	lone pair of e donated to CH3 combibute to
v= 7	resonance (F, CI, Br, I)
) = Mag	deactivating, COOH
	e withdrawing NO2
	Mada halipyo ili agus ocean cu Astranom — — — — — — — — — — — — — — — — — — —

C-C-OH + Na (a) — C-C-O-Not + \$H_2(g)  C-C-OH + R'(COOH) Not   C-C-OH + R'(COOH) Not   C-C-OH + R'(COOH) Not   C-C-OH + R'(COOH) Not   C-C-OH + POLS (1) — C-C-OH + POLS + HC/ Not   C-C-OH + JOC/ — C-C-OH + HO  C-C-OH + JOC/ — C-C-OH + HO  C-C-OH + JOC/ — C-C-OH + HO  C-C-OH - H2604, 170°C  C-C-OH - H2604, 170°C  C-C-OH - H2604, 170°C  Not H2604, 170°C  C-C-OH - H2004, 170°C  Not H2604, 170°C  C-C-OH - H2004, 170°C  Not H2004, 170°C  C-C-OH - H2004, 170°C  C-C-OH - H2004, 170°C  Not H2004, 170°C  Not H2004, 170°C  Not H2004, 170°C  Not H2004, 170°C  C-C-OH - H2004, 170°C  Not H2004, 17		Date No.
C-C-OH + R'COOL PTP R-C'O-C-C + HCl  (C-C-OH + POLs (s)		C-C-OH + Na (0)
C-C-OH + BOG, — C-C-Cl + BOG, + HCl  LYPA3  C-C-OH + BOG, — C-C-Cl + BO2 + HCl  C-C-OH + BOG, — C-C-Cl + BO2 + HCl  C-C-OH + BOG, — C-C-Cl + BO2 + HCl  C-C-OH + BOG, — C-C-Cl + BO2 + HCl  C-C-OH + BOG, — C-C-Cl + BO2 + HCl  C-C-OH + BOG, — C-C-Cl + H2O  C-C-OH + BOG, H2SOA, K2Ch2OT(mg) + HCl + C-C-O acidified k2(h0)(max) + HCl + C-C-O acidified k2(h0)(		$C-C-OH + R'COOH \xrightarrow{CON(-H_2GO_4)} R-C^{>0}, + H_2O$
C-C-OH + 50Cl2		C-C-OH + R'COCI 1+ HCI )
C-C-OH + 50Cl2	V 2 2 3 2	(C-C-OH + PUs(s) -> C-C-U + POUs + HU stramy white funes
C-COH    C-COH	WPQ3	
methyl 2° alcohol  methyl 2° alcohol  methyl 2° alcohol  mort acidit companies acidit companies acidit companies com		C-C-BY 1 H20
methyl? alcohol or  C-C-OH  AI2, 6NaOH(ag)  Warm  CHI3 + H-C  O-Nat +5NaI + 5H2O  Yellow  crystals  most acidle  phenol > water > olcohol   alkoxide ion, RO-, is most unstable due to e-donating effect of alkyl group,  intensifies election density on O atom, destabilises anion.  phenoxide ion is most stable due to resonance stabilises anion.  phenoxide ion is most stable due to resonance stabilisation  - p-orbital of O- onclops with To orbitals of henzene ring, negative charge on O  delocalises into the ring, regative charge 1/15 persed.		C-COH excess conc. C=C + H20  42004, 170°C
methyl 2° alcohol or  C-C-OH  AI2, tNaOH(aq)  Norm  CHI3 + H-C  Norm  This this this this this this this this t		A-C-C-OH dil. H2504. K2Cr207.000) H-C-C=O acidified K2Cr207.000) H-C-C=O  H H H Least w immediate distillation H hat H OH
C-C-OH  Horm  CHI3 + H-C  O-Nat +5NaI + 5H2O  Yadon  crystals  most acidic  least acidic  phenol > water > olcohol   alkoxide ion, Ro-, is most unstable due to e-donating effect of alkyl group,  intensifies election density on 0 atom, destabilises anion.  - phenoxide ion is most stable due to resonance stabilisation  - p-orbital of 0- onclops with To orbitals of benzene ring, negative charge on 0  delocalises into the ring, regative charge tispersed.		1
mostacidic  phenol > water > odcohol   alkoxide ion, RO-, is most unstable due to e-donating effect of alkyl group,  intensifies election density on 0 atom, destabilises anion.  phenoxide ion is most stable due to resonance stabilisation  - p-orbital of O- overlaps with To orbitals of benzene ring, negative charge on 0  delocalises into the ring, regative charge tispersed.	me1	C-C-OH 412, 6NaOH (aq)  Worm + H-C, 0-Nat + 5NaI + 5H2O
→ alkoxide ion, RO-, is most unstable due to e-donating effect of alkyl group, intensifies election density on O atom, destabilises anion.  → phenoxide ion is most stable due to resonance stabilisation  - p-orbital of O- overlaps with To orbitals of benzene ring, regative charge on O  delocalises into the ring, regative charge 1/15 persed.		most acidic least acidic
intensifies election density on 0 atom, destabilises anion.  - phenoxide ion is most stable due to resonance stabilisation  - p-orbital of 0° overlaps with To orbitals of benzene ring, regative charge on 0 delocalises into the ring, regative charge trispersed.		phenol > water > alwhol
- p-orbital of 0° overlops with The orbitals of henzene ring, regative charge on 0 delocalises into the ring, regative charge trispersed.	->	alkoxide ion, RO-, is most unstable the to e-donating effect of alkyl group,
- p-orbital of 0° overlaps with TV orbitals of benzene ring, regative charge on 0 delocalises into the ring, regative charge tropersed.		intensifies election density on 0 atom, destabilises anion.
delocalises into the ung, regalive charge tropersed.	<b>→</b>	phenoxide ion is most stable due to resonance stabilisation
		O Û
1° alcoholoviaised to oldehyde, 2° alcohol oxidized tolectore.		delocalises into the ung, regative charge tis persed.
		1° alcoholoviaised to aldehyde, 2° alcohol oxidized tolectore.
solubility: £5C, soluble.		solubility: 55C, soluble.



<del>,</del>			Date	No
preparation	et halogeno alkani	eS		5 V
e addi	ilon: alkeres -	-> halogenoalkanes		
C=0	HX(g), dy Leat	C-C H X		
C=C	x,,cu4	c-c * * *		
nudeophilic	substitution: alcoh	ol -> halogenoalkanes	. t. v	
c- ç	HX(g), dy keat	→ C - C + N.	٥ 0	
		dry 3R-X		
R-0	4 + PUs -	roomtemp R-CI roomtemp  Amy R-CI	+ PO C + HC	(steamy whate
R-01	+ 500/2 -	any R-Cl	+ 502 + HU	fumes
		OF HALOGENOALKANES		• 7/2
C - C	1 0H - NaO	heat C-	С + X <sup>-</sup>	*a * .
C- C	(		CN + X-	r 30 Ta VV
i)	C-c + 4[H]	Li Al Maindry etter,	N-	(primary andre)
ii)	C-C + 2H2	to, Nicataly st	E-C-C-N-	(primary amire)
rii)	C-C + H-1	41 Ha/H2504	→ (-c-c,0H	+ NH4+ (carboxy)
ív)	C-C + OH-	+ H2O NaOH/KOH (	C- C-C 0.	+ NH3
C- C	+ (- 0	Na, R-OH Leat	$\frac{carboxylore}{c-c}$	(ether)
		c-c C		

	C-C + NH3 excess, c. NH3 in ethanol (-C + HX (10 gm/re)
	C-C + NH3 - Leatin sealed tube (10 gm/re)
	3 - 3 - 3 - 1 - 1 - 1 - 1
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	× NM3+
	in presence of excess halogenoalkake, polyalkylation occurs.
	R-X + NH3 -> RNH2 + HX due to e-donating alky) group
	RNN2 + R-X -> R2NH + HX even stronger nu deophiles because
	RINH + R-X -> RIN -> HX -> + more alkyl groups
	$R_4N + R^-X \rightarrow R_4N^+X^-$
	elimination
	$C = C + X + H_2O$
	different from t and NaOH/KOH, that gives C-C, an alcohol. (substitution)
	Honerer both usually occur at the same time
	hologenoalkones
	(x) is less reactive as x is e withdrawing, rendering it deactivated.
	- C-X bond has partial double bond character because p-orbital of X grown overlops with
	The doud of benzere sing. lone point et in porbital of X can delocalise into benzene hity.
	:- C-X bond storg, more energy required to break
	- repulsion between e- nich benzere irg & nucleophile, nucleophilic attack hindured.
	O(C) + 2NaOH 350°C/1509Hm, O(O'Nat) + NaC) + H2O
	(a) + Mauri (b) + Mauri (b) 10 h 7
	(alfficult as C-x bond ivery strong)
	DISTINGUISHING TEST FOR HALOGENOALKANES.
	1- Add Naok (aq), Leat, then cool (topierent decomposition of Aginas)
	2. Add excess tinos to neutralise excess NOOH.
	3. Add Agnoz: get Ag U(whie), AgBr(cream) or AgI(yellow)
	* cannot add AgNQ3 directly as C-X bond is hard to break, charge to CTOH bord first.
1 11	The state of the s
	to the second se

				Date	No.
	Formation (oxidation)				Navyda a
		504	_		
	R-C-OH K2Cr2O7, dilHa/H H Had w immediate	2)U	R - C 0		
3 " "	H read in Immediate	digillation	'n		
			н		
	R-C'N GAINA in dy etter NaBNA / Hz/N		R-C-0H	reduction	6 - 6 - 2 - 2
	'H MaBN4 / H2/N	1,100+	H		
	R-C, H KMn04/K2(1207)	acidified,	K-C,00	oridation	
	R-C-0 + H-N-N-O	Condens	sation 1	R, NO <sub>2</sub>	102 + H2O carbonyl geppl compounds
	R-C, H + H-N-N-O-	Noz	<del></del>	H C=N-N-(0)-1	102 + M20 carbony
	ж п			oran	ge ppt compouras
		-	- 4	cn	
	R-C=0 HCN, trace and KCN Logy	ot k CN(aq)/KOH	(aq)	2-C-DH Inuclei	ophilic
	H K CN cag	H2504(aq)		H	HION
	i) cN R-C-0H _		ther	H-C-N-H H H	green en de
	K-C-0H	HAINA IN AND E	reart	R-C-OM redu	iction)
	H .	F12/ V1 1		H	
	ii) CN HCI/H. AC	Ta wilute.	320 540 500	COOH	1 - 2 m
	ii) CN Ha/H200	art .	R-	C-OH addic	hydrolysis
	Н		200	Н	
		(10° 18° 18° 18° 18° 18° 18° 18° 18° 18° 18			u I
	H3C-C" 312(aq), 4	M90H(09) +Na	0-C'H	A 1 1 7	ethanal
	н цаг	m	` 'Н	1810W -	ethy) ketores
		tinal	+ 3H20	aystals lo	xidation]
	Tollens rage	nt 1 <sup>+</sup> , 204 <sup>-</sup>	hat	D- 610	1 4000 1 214 0
	H Zerry dividis	,,, + 0011	3 /4.24 = 24 4	'0- Fil	rev
	R-C***O + 2 [Ag(NH3)2  + positive test for all abbehydes,	this is oxidation	n	carboxylate mi	mor
		13 3 (700)		3-11	oxidation
	R-(70 + )(2+	U- heat.	40	. ( )	1 0(100(((o)))
	R-C'H + 2(42+ + 50)  Fehling's volution	11 ——)	R-C,0-	H ddich-bown	neo
	retrulou		carboxylate	ppf	
	* positive test for all aliphatic ald	enydes	00011		
	solubility: <50 soluble				
,	V				

<del> </del>	
	nucleophilic addition to form cyanohydurs
	step 1: KCN -> Kt + CN- (not HCN-> Ht + CN- as it is areak acid, dissociatespoartially)
	HCN, KOH => HCN + OH -> H2O + CN
	[2KCN + H2004 → K2004 + 2HCN]
	step 2:
	Now I racemic
	K-C CN WHATE
	H M OF THE RESERVE OF
	Step 3: CN
	R""C + H-CEN Fort CN  R""C OH + FCN
	H
	Aliphatic aldehydes > Aromatic aldehydes > ketmes
	most reactive least reactive
	1. Alkyl/anyl groups bonded to the carbonyl carbon are e-donating and reduce
	the partial positive charge on the carbon, decrease attraction for nudeophies
	-> alkyl groups through inductive effect, anyl groups through resonance (e-from 70 e-
	cloud delocalise into porbital of carbonyl (, make it less of)
	-> benzere ning to bulky, stend Lindrance, and canoony? C less et deficient due to
	The doud at carbony group and benzere ring
. 10	2 Alkyl /Aryl groups increase steric hindrance hindra nucleophilic atlack.
	Carried the Carried Control of the C
	Setting and the first setting and the setting

## carboxylic acids

		ate	No.
•	Formation:		
			- 3 - 2
	R = C = C $R = C = C$ $R = C$		
	R' KANO4 OH		
	altene		
	R-C, H or R-C-ON KMn04/K2Cr207, R-C=0		£
	dil Hasoa, heart 10H		
	at denydo at cohol		
	$R-C-CI \longrightarrow R-C$		
	R-C-Cl  and chloride r.t.p. R-C-OH		
	9		
	$R-C-OR'$ or $R-C-N'$ or $R-CN$ $\frac{dil H_2 80a, kort}{NaOH(ag), kort}$	R-C OH	
	Hasoacon)	<b>V</b>	
	Reactions:		<u> </u>
	, but NOT @ oH, phenol		<u> </u>
	$R-C-OH$ + $R'OH$ $\xrightarrow{\omega \cap C}$ $H = 0$		
	R-C-OH + R'OH wnc. Hwoa R-C O-R'		
	0.01		
	3 R-C-OH TO3 3 RCOCK + HBPO3		
		Tan Y	
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
	a cyl chioroc	steamy	
	R-C-OH (0012 ) REOCI(1) + 502 (9) + 401 (9)	fumes	
	acyl charde		
		ter y	
	$R-C-OH + Na(s) \longrightarrow R-C-O'Na' + \frac{1}{2}H_2$		
	acid metal		
	$R-C-OH$ + NaOH (mg) $\longrightarrow$ $R-C-O-Na+$ + H2O acid base		
	o o		
	R-C-OH + Naz (3) / NaH (0365) R-C-O-Na+	+ H20 + 0	0219)
	£ 700		
-	$R-C-OH$ + NH3 (ag) $\longrightarrow$ $R-C-O-NH4+$		
	acid base		>
	O GALLA S. due other		
	R-C-OH +4[H] GOIDOND BY H20 R-C-OH + H20	Burth And	
	summary of reduction reactions:	a nlu thing (	19844 can kduce:
	GAIHAIN NI, 42,150°C		
	$0 \qquad H \qquad 0 \qquad C=C \rightarrow C-C  (alkere \rightarrow alkane)$	R-C . H	$\rightarrow R - \xi - \sigma_{y}$
	R-Cin and Coal		7
	H R-C-H (carbonyl -) alcohol)	caroony	17 alcohol)
	(carboxylic acid -> alcohol) OH		A'ZONE

(nnuile → amine)

R-C-CH + R'OH  R-C-OR' + HU  Security R-C-OR' + HU  R-C-CH + (DONA) + forest R-C-OR' + HU  R-C-CH + M-N'R  R-C-NK2 + HU  R-C-CH + M-N'R  R-C-N'R + HU  R-C-CH + M-N'R  R-C-ONA + HU  R-C-CH + H-N'R  R-C-ONA + R'OH  R-C-CH + HOO  Solubling R-C-ONA + R'OH  Solubling Security R-C-ONA + NOO  Sol		<del></del>
SOLOH + NaOH - @-O-Nat +H2O  R-C-U + @-O-Nat +A40  R-C-U + M-NH - R-C-NH2 +H4  R-C-U + H-NH - R-C-NH2 +H4  R-C-U + H2O MATOLYGIS R-C-O-Nat + H4U  R-C-U + H2O MATOLYGIS R-C-O-Nat + H4U  R-C-U + H2O MATOLYGIS R-C-O-Nat + ROH  Allower R-C-ONA + ROH  Allower R-C-O-Nat + ROH  Another R-C-O-Nat + NOOH  Another R-C-O-NAT + NOOH	$R-C-CI$ + $R'OH$ $\longrightarrow$ $R-C-OR'$ +	Turninger ed
(most across of the company of the c	1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	7.44
R-C-U+ (00-Not)  R-C-U+ H-N/H  R-C-N/H	3 . 3 . ,	Δ.
R-C-U+ (00-Not)  R-C-U+ H-N/H  R-C-N/H	(0)-0H + N90H → (0-0-Nat +H20	OR R-C-CI + (0)-OH - R-C"
R-C-U+ H-N/H  R-C-N/H + HU  R-C-U+ H-N/H  R-C-O-NOT + HU  R-C-U+ H-N/H  R-C-O-NOT + R'OH  R-C-O-NOT + R'OH  R-C-O-NOT + NOOH  R-C-O-NOT + NOOH  R-C-O-NOT + NOOH  R-C-O-NOT + NOOO  Solubility: <4 C Soluble  (leostautic)  Classification Roo-, forms 2 equivalent resonance structures with the regaritive  Charge delocalised over two highly e-re-outoms. Resonance stabilised.  carboxylate ions nort stable, rence most accords.  > pheroxide ion also beoresonance-stabilisation: - recharge on a dispersed.	g faster 1)	`O-
R-C-U+ N-N-R  R-C-N-R+ + HU  R-C-U+ N-N-R  R-C-N-R+ + HU  R-C-U+ N-N-R  R-C-U- N-R  R-C-U+ N-N-R  R-C-U- N-R  R-C-U+ N-N-R  R-C-U- N-R  R-C-U-	R-C-U + (0-0 Nat	+ 44
R-C-U+ N-N-R  R-C-N-R+ + HC  R-C-U+ N-N-R  R-C-N-R+ + HC  R-C-U+ N-N-R  R-C-U- N-R  R-C-U+ N-N-R  R-C-U+ N-N-R  R-C-U- N-R  R-C-U+ N-N-R  R-C-U+ N-N-R  R-C-U- N-R  R-C-U+ N-N-R  R-C-U- N-R  R-C-U- N-R  R-C-U+ N-U- N-R  R-C-U+ N-U- N-R  R-C-U+ N-U- N-R  R-C-U+ N-U- N-R  R-C-U- N-R  R-C-	9	
R-C-U+ NaOH  R-C-U+ H=N R  R-C-U+ H=20 MAININGTO R-C-O-Nort + HU  R-C-OP MAININGTO R-C-OH + R'OH  R-C-OP MAININGTO R-C-OH + ROH  R-C-OP MAININGTO R-C-OH + ROH  R-C-OP MAININGTO R-C-OH + HO-O)  R-C-O-O NaOH  R-C-O-O NaOH  R-C-O-Nort + 1 NAOO  Cleeptauture  (leeptauture)  Cleeptauture)  Cleeptauture	R-C-NHZ +MY	
R-C-U+ NaOH  R-C-U+ H=N R  R-C-U+ H=20 MAININGTO R-C-O-Nort + HU  R-C-OP MAININGTO R-C-OH + R'OH  R-C-OP MAININGTO R-C-OH + ROH  R-C-OP MAININGTO R-C-OH + ROH  R-C-OP MAININGTO R-C-OH + HO-O)  R-C-O-O NaOH  R-C-O-O NaOH  R-C-O-Nort + 1 NAOO  Cleeptauture  (leeptauture)  Cleeptauture)  Cleeptauture	9 8	
R-C-C1 + Nagoh Alacticis R-C-O-Nort + HCl  R-C-C1 + H2O MATORYSTS R-C-OH + HCl  acidic yets  patrolysts  R-C-OH + R'OH  natrolysts  R-C-ON + R'OH  hadrolysts  R-C-OH + HO-O):  R-C-O-O)  Nagoh  patrolysts  R-C-OH + HO-O):  R-C-O-O)  Nagoh  R-C-OH + HO-O):  R-C-O-O)  Nagoh  R-C-OH + HO-O):  R-C-OH + HO		
R-C-C1 + Nagoh Alacticis R-C-O-Nort + HCl  R-C-C1 + H2O Mydrolysis R-C-OH + HCl  acidicysis  Podrolysis  R-C-OH + R'OH  Nagor R-C-OH + ROH  Nagor R-C-OH + HO-O):  R-C-O-O)  Nagor R-C-OH + HO-O):  R-C-O-O)  Nagor R-C-OH + HO-O):  Solublity = <4 C 101 lible  (leestautic)  Alcohols < Nater < phenols < carboxylic actors.  - (arboxylate ion, R60-, forms 2 equivalent resonance stactures mith the registive carboxylicte ions most stable, rence most diddic.  - phenoxide ion also has resonance stabilitation: - recharge on 0 ausperses	R-C-N-R THO	
R-C-C1 + H2O MARIOTYSIS R-C-OH + HCI  acidic padrolysis R-C-OH + R'OH  R-C-OR  ANALY  Altroline R-C-ONAL + R'OH  hydrolysis R-C-OH + HO-O)  R-C-O-O  NAOH:  2molset Nooth required R-C-O-NAL + 1 Não-O)  solubility: \( \left\) 4 C soluble.  (leep tautalic)  carboxylate ion, Roo-, forms 2 equiralent resonance stabinised.  carboxylate ions most stable, when most audic.  > phenoxide ion also has resonance stabinised.  > phenoxide ion also has resonance stabinised.  - phenoxide ion also has resonance stabinised.	R-C-G	
R-C-CH + H2O MARIONALIS R-C-OH + HCH  acidic CHOOL  R-C-OR, AND R-C-OH + R'OH  R-C-OR, AND R-C-OH + ROH  AND R-C-OR + ROH  AND R-C-O-ON + ROH  R-C-O-ON + HO-ON  R-C-O-ON + HO-ON  Solubility: <4 C Soluble.  (leep tautalic) (most across)  alcohols < Hater < phenols < carboxylic across  - carboxylate ion, Roo-, forms 2 equivalent resonance structures with the regative carboxylic across.  carboxylate ions most stable, where most audic.  - phenoxide ion also has resonance stabilisation: - re charge on a dispersed.	olkalire 0	1.4
acidic hydrolysis  R-C-OR, althoris R-C-ON + R'OH  R-C-OR  Nach  R-C-ON + HO-O)  R-C-O-O  Nach  Nach  R-C-O-Nat + NoO  Nach  R-C-O-Nat + NoO  Solubility: <4 C Soluble  (leestaudic)  alcohols < Hater < phenols < carboxylic acids.  - carboxylate ion, Roo-, forms 2 equivalent resonance structures min the regative charge delocalised over two highly e-re datons. Resonance stabilised.  - phenoxide ion also too resonance stabilisation: -re charge on a disperses	R-C-O + NaOH PONOT TO PROPERTY	(9
R-C-OR, whole R-C-ON + R'OH  altoline R-C-ON + R'OH  bydrolysts  altoline R-C-ON + ROOH  productive R-C-ON + HO-O);  R-C-O-O)  NAOH;  2molsetNaoH required R-C-O-Not + 1 Não-O)  solubility: <4 C soluble  (leeotaudic)  alcohols < Hater < phenols < carboxylic aeros.  - carboxylate ion, Roo-, forms 2 equivalent resorance structures with the registive charge delocalised over two highly e-re agrows. Resonance stabilised.  carboxylate ions most stable, rence most audic.  - phenoxide ion also hos resonance stabilisation: -re charge on a ausperses	R-C-C1 + H20 MONTH R-C-OH + HC	И
R-C-OR, whole R-C-ON + R'OH  altoline R-C-ON + R'OH  bydrolysts  altoline R-C-ON + ROOH  productive R-C-ON + HO-O);  R-C-O-O)  NAOH;  2molsetNaoH required R-C-O-Not + 1 Não-O)  solubility: <4 C soluble  (leeotaudic)  alcohols < Hater < phenols < carboxylic aeros.  - carboxylate ion, Roo-, forms 2 equivalent resorance structures with the registive charge delocalised over two highly e-re agrows. Resonance stabilised.  carboxylate ions most stable, rence most audic.  - phenoxide ion also hos resonance stabilisation: -re charge on a ausperses	netan	All the state of t
Alkaline R-C-O Nort + ROH  hydrolysis 0  R-C-O+ + HO-O;  R-C-O-O Naoth  moth R-C-O-Nort + 1 Nao O;  Solubility: <4 C soluble.  (leestaudic) (most acrotic)  alcohols < Hater < phenols < carboxylic aeros.  -(arboxylate ion, R50-, forms 2 equivalent resonance structures might the regardine carboxylate ions most stable, rence most acrotic.  -> phenoxide ion also has resonance stabilityation: -re charge on a suspenses	acidic,	
Alkaline R-C-O Nort + ROH  hydrolysis 0  R-C-O+ + HO-O;  R-C-O-O Naoth  moth R-C-O-Nort + 1 Nao O;  Solubility: <4 C soluble.  (leestaudic) (most acrotic)  alcohols < Hater < phenols < carboxylic aeros.  -(arboxylate ion, R50-, forms 2 equivalent resonance structures might the regardine carboxylate ions most stable, rence most acrotic.  -> phenoxide ion also has resonance stabilityation: -re charge on a suspenses	0 120013 8-C-OH 1 81-OH	
alkaline R-C-O Nat + ROH  hydrolysis  R-C-O+ + HO-O;  R-C-O-O;  Naoth;  2molset NaoH required R-C-O-Nat + 1 Não O;  Solubility: <4 C soluble.  (leestaudic)  Chost acratic)  alcahols < Hater < phenols < carboxylic aeras.  -(arboxylate ion, Roo-, forms 2 equiralent resorance structures might the regative charge delocalised over two highly e-re o atoms. Reso nance stabilised.  carboxylate ions most stable, where most dudic.  -> phenoxide ion also has resonance otabilisation: -re charge on a disperses	R-C-OR, airman	
hydrolysts  R-C-O+ + HO-O)  R-C-O-O)  NaOH:  2molsotNaoH rquind  R-C-O-Nat + 1 Não-O)  Solubility: <4 C soluble  (leestaurdic)  alcohols < Hater < phenols < carboxylic aerols  -(arboxylate ion, R60-, forms 2 equivalent resonance structures min the regative charge delocalised over two highly e-re varoms. Revo nance stabilised.  carboxylate ions most stable, rence most accordic.  -> phenoxide ion also has resonance atabilisation: -re charge on a ausperses		
hydrolysts  R-C-OH + HOO)  R-C-OO)  NaOH:  2molsotNaoH rquind  R-C-O-Nat + 1 Não O)  Solubility: <4 C soluble  (leestaurdic)  alcohols < mater < phenols < carboxylic aeros.  -(arboxylate ion, R6O-, forms 2 equivalent resonance structures min the regative charge delocalised over two highly e-re o aroms. Revo nance stabilised.  carboxylate ions most stable, rence most acidic.  -> phenoxide ion also has resonance atabilisation: -re charge on o ausperses	alkaline R-C-ONAT + ROH	
Solubility: <4 C soluble.  (leesotaurdic)  alcohols < Hater < phenols < carboxylic aerols.  -(arboxylate ion, RGO-, forms 2 equivalent resonance structures with the regative charge delocalised over two highly e-re agrows. Resonance stabilised.  carboxylate ions most stable, rence most dudic.  -> phenoxide ion also has resonance stabilization: -re charge on a disperses		
Solubility: <4 C soluble.  (leesotaurdic)  alcohols < Hater < phenols < carboxylic across.  -(arboxylate ion, RGO-, forms 2 equivalent resonance structures with the regative charge delocalised over two highly e-re parows. Resonance stabilised.  carboxylate ions most stable, rence most dudic.  -> phenoxide ion also has resonance stabilization: -re charge on a disperses	Q WIH25097 R-C-OH + HO-(0)	Company the street
Solubility: $\leq 4$ C soluble.  (leestandic)  chortactore)  alcohols < mater < phenols < carbonylic actors.  -carboxylate ion, RGO-, forms 2 equivalent resonance structures with the regative charge delocalised over two highly e-re o atoms. Resonance stabilised.  carboxylate ions most stable, hence most accord.  - phenoxide ion also has resonance stabilisation: -re charge on a ausperses	K-C-0-(0)	- 4 4 5
solubility: (leeotavidic) alcohols < mater < phenols < carboxylic aetas. -> carboxylate ion, R60-, forms 2 equiralent resonance structures with the regardire charge delocalised over two highly e-re datoms. Resonance stabilised: carboxylate ions most stable, rence most acidic> phenoxide ion also has resonance atability ation: -re charge on a disperses	NaOH: 0	
(leestavidic)  alcohols < mater < phenols < carboxylic aerds.  -(arboxylate ion, R60-, forms 2 equivalent resonance structures mith the regative charge delocalised over two highly e-re datoms. Resonance stabilised.  carboxylate ions most stable, rence most accidic.  -> phenoxide ion also has resonance stabilisation: -re charge on a ausperses	2 mols of NaOH required > R-C-0-Nat + 1 NaO (0)	for the first transfer of transfer o
(leestavidic)  alcohols < mater < phenols < carboxylic aerds.  -(arboxylate ion, R60-, forms 2 equivalent resonance structures mith the regative charge delocalised over two highly e-re datoms. Resonance stabilised.  carboxylate ions most stable, rence most accidic.  -> phenoxide ion also has resonance stabilisation: -re charge on a ausperses		
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charge delocalised over two highly e -re parons. Resonance stabilised.  carboxylote ions most stable, where most dudic.  -> phenoxide ion also has resonance stabilisation: -recharge on a disperses		
charge delocalised over two highly e -re parons. Resonance stabilised.  carboxylote ions most stable, hence most dudic.  -> phenoxide ion also has resonance stabilisation: -recharge on a disperses	-) carboxylate ion, ROO-, forms 2 equivalent resor	rance structures with the regative
carboxylate ions most stable, sence most audic.  -> phenoxide ion also too resonance stabilisation: -recharge on a disperses		ů,
- phenoxide ion also has resonance stabilisation: - recharge on a disperses		
	11110100	and the second s

•	Date No.
	Formertun:
	WALLAIN CARCHELL AREA CALLED
	CH3CN GALHAIN CH3CH2NH2 OR CH3CONH2 GALHAIN CH3CH2NH2  Processit. NH3
	* CH3 CH24 Excessit. NH2  Hatin scaled tube (H3 CH2NH2 + NH4+4)
	Reactions
	CH3CH2NH2 + HUcaq)> CH3CH2NH3+Cl-
	weak base strong actd ealt
	CH3 CH2NH2 + (H3 COOH
	hear base realcaetd
	снз сн2 мн2 + сн2 см3 сн3 сн2 - N - C - сн3 + нч
	CH3CH2NH2 + @-COCI CH3CH2-N-C-@ + HCI
	nudeophilicardo
	CH3CH2NH2 Lead in sealed tube CH3CH2-N-H + HRY OR CH3CH2-N+-H BY
	CH3CH2NH2 limited CH3CH2Brin alcohol  CH3CH2NH2 HBY OR CH3CH2-N+-H BY  CH2CH3  CH2CH3  CH2CH3
	CH3CH2NHz excess CH3CH2Br (CH3CH2)4NBr
	hat CH3(H2)411
	* similar to excess CH3CH2 (1 insealed-tube (CH3CH2)4N+ (1)
	5 Cs orless of installed leaves of purgent gos  R'contracted leaves of purgent gos  R'contracted leaves of purgent gos  R'contracted leaves of purgent gos
	Nach (car) warm
	CH2 (H2NH2 NaOH (coa) warm  gently purgent gas evolved turns moist red literus blue > R'(coo + RNH2)  R'(coo - RNH2) + OH-
	or CN3(N2NH3+ +OH- > RNH2+ +OH- > RNH2+ H2O  Solublein R'COO- + RNH2+ H2O  Solution R'COO- + RNH2+ H2O
	.V C
	gas if <5C,
	(O) CHNO3, C-H2504, (O) NO; MICONE-HU HEATURE, (O) NH2 OUT IT > 6 C
	NaOH(aq)
	(O)-NH2 CH3(H2Br) (O)-N-CH2(H3) or (O)-N-(CH2(H3), Br
	Leaf Leaf
	(0)-NHz + RCOCI
	(b) NH2 Broad) Br (b) NH2
	(0)-NH2 HOLAR) (0)-NH3+C1-
	Na OH (aq)
	solubility: 550 soluble
	3-, 5, 9



	CH3 CONH2 NOH (aq), strong heating
	heating
	CH3(ONH2 HC) CH3(OOH + NH3+
	(O)-NH2 < NH3 < CH3 CH2 NH2
	least basic most basic
	the lateral of the light of the lateral of the late
	larger Kb → smaller pKb → greater basic strength
	- CH2(Hs group is e donating, increasing e density at the N atom,
	making the lone pour of e on N more available for coordination with a
	proton.
	- in phenylamine, lone pair of e- on N delocalises into TV e- cloud of benzere
	virg, decreasing the e density at the N atom, making the love power of e on
	n leus available for coordination with a proton.
	n less avoidable to i coordination ath a proton.
	to arides do not have baste properties as the lone pair of er on N delocaling
	into the Th-e-doud of the C=0 group, making the love pair of e-on N delocaling
	to arides do not have baste properties as the lone pair of er on N delocaling
(m) * 1 (m)	into the Th-e-doud of the C=0 group, making the love pair of e-on N delocaling
	into the Tt-e-doud of the C=O group, making the love point of e-on N delocating unavailable for coordination with a proton
	into the The double the C=O group, making the love pair of e on N delocaling unavailable for coordination with a proton
	into the The double the C=O group, making the love pair of e on N delocaling unavailable for coordination with a proton
	*- amides do not have baste properties as the lone pair of e on N delocaling into the TV-e- cloud of the C=0 group, making the love pair of e on N unavailable for coordination with a proton
	*- amides do not have baste properties as the lone pair of e on N delocalisms into the TV-e-dovd of the C=0 group, making the love pair of e on N unavailable for coordination with a proton
	into the The dovid of the (=0 group, making the lone point of e on N delocaling unavailable for coordination with a proton
	into the TV-e-dovid of the C=O group, making the lone point of e-on N unavailable for coordination with a proton
	into the TV-e-dovid of the C=O group, making the lone pair of e-on N unavailable for coordination with a proton
	into the The dovided the (=0 group, making the lone point offer on N delocaling unavailable for coordination with a proton
	into the The cloud of the (-0 group, making the lone pour ofe on N delocaling unavailable for coordination with a proton
	into the toe down basic properties as the lone pair of e on N delocaling into the toe down of the (=0 group, making the lone pair of e on N unavailable for coordination with a proton
	*- arrides do not have baste properties as the lone pair of e on N delocaling into the The of dovided the C=0 group, making the lone pair of e on N unavailable for coordination with a proton
	*- arrides do not have baste properties as the lone pair of e on N delocaling into the The e doud of the C=O group, making the lone pair of e on N unavailable for coordination with a proton
	*- arrides do not have baste properties as the lone pair of e on N delocaling into the The of doubt of the C=0 group, making the lone pair of e on N unavailable for coordination with a proton
	*- arrides do not have baste proporties as the lone pair of e on N delocaling into the The e doubt of the C=O group, making the lone pair of e on N unavailable for coordination with a proton

1)	F.R.S. Double bord: bord to bord or love pour to bord
	stepl: Imitiatien
	$q \rightarrow 2 q$
	9-91-320
	step 2: Propagation
	a) CH3CH3 + CH3CH2· THCI
	b) CH3 CH2+ C12 -> CH3 CH2 C1 + C1.
	Then (a), b), a), b) actern machion occurs.
	Stap 3: Termination.
	$a \cdot + a \cdot \rightarrow a_2$
	Cl. + CH3 CH, -> CH3 CH2 C
	CH3(H2 CH3(H2> CH3 CH2(H2(H3
2)	E-Adamon.
	H-C=C-H + H-Br - 510W + C-C-H + :Br - fort H   H   Kr
12	H H 6 00 0000 H H H CONT H H
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
ري	E- Substitution
3)	Gorraton of electrophile. HNO3 + 242504 - NO2 + +24504 - 1 H30-
	+ NO2+
	$R = \stackrel{\circ}{l} = 0$ + Alu <sub>3</sub> $\rightleftharpoons$ $R = \stackrel{\circ}{l} + 1$ Alu <sub>4</sub>
	(Q) + R-C+ -> (E) C-R + A1U14> (O) C-R + A1U3 + HU
4)	SN - mans unmolecular nucleophilic sub, 2 steeps , 1 product (farours tertrary)
	Ri Ri i for halogenoalkans + mulaophile or
	t armire.
	Rz'ak
	Cost Cost
	$R_2$ $R_3$ $R_3$ $R_4$ $R_2$ $R_3$ $R_4$ $R_4$ $R_4$ $R_4$ $R_4$ $R_4$ $R_5$ $R_5$ $R_5$ $R_5$

UN2 - bimolecular nucleophilicoubstitution, I step, 2 productu (farous primary)

STABILITY of Alcohol/Phenol/Carboxy IIC Acid: (dispersal of the change on ion)

- Alkovide ion , RO", here-donoting alky) groups that intensify the -te charge on 0 atom, least stable
- pheroxide ion, (0-0-, Los bosonance otabilisation, -re charge on 0 delocalitus into Tu e doud at benzere ring, disperses -re charge, more stable
- carboxy lotte ion, RCOO, forms Zequivalent resonance otherwhere, with the charge delocalising over two Lightly et the O atoms, disperses the charge, most otable.

REACTIVITY OF CARBONY L COMPOUNDS: ( of charge on carbony 1 C)

- alkyl groups are e-donating, decrease of charge on carboryl C, decrease attraction for nucleophies.
- phenyl groups cause e-from The-cloud of benzere ung to delocalize into prontitulate carbonyl C, decrease of charge, decrease attaction for hudeophiles.
- akyl k anyl groups are bulky, came stem Lindrance

BASICITY of anides/pherylamire/amine (avoilability of love pair)

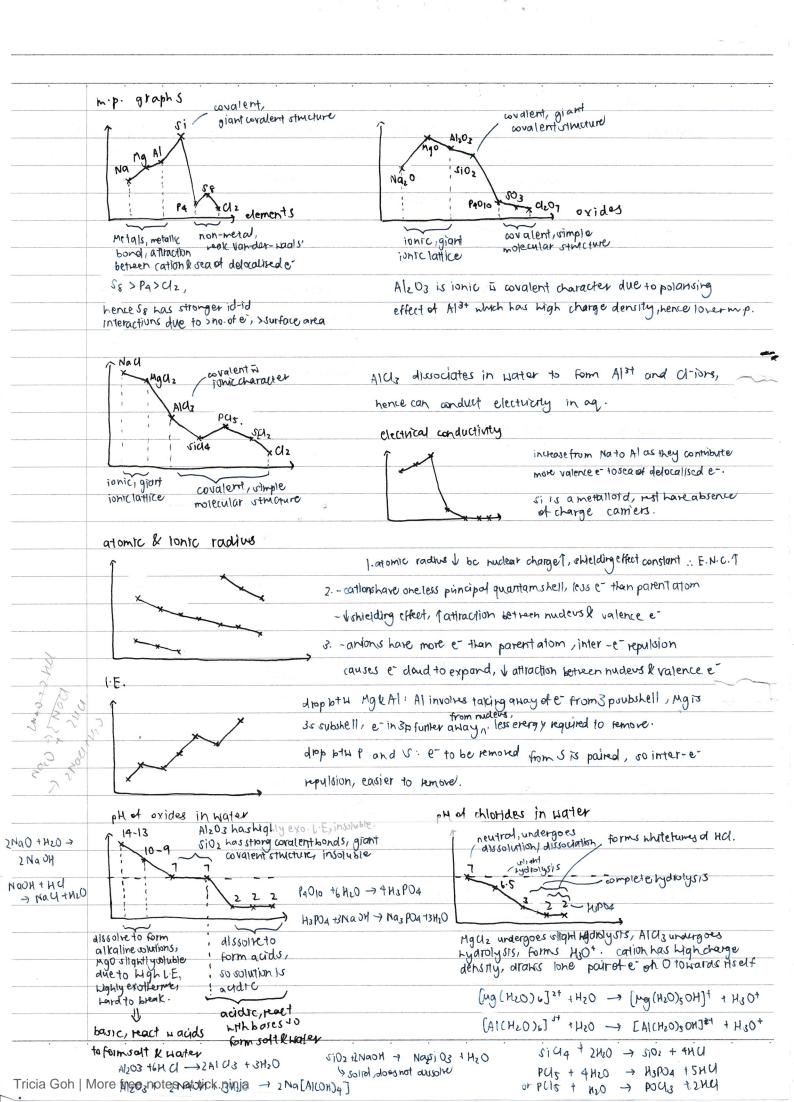
- love position N delocatives into TV e cland of C=0 group in andes, making the love pair unavailable for coordination with proton.
- -love pair on N delocalities into Tu e- cloud at benzere virg, less available for coordination
- alkyl groups are e donating, intensity e density at N atom, increase avoitability of lorepoir.

1) PRIMARY STRUCTURE (apolypeptide chain) definition: refers to the sequence of amino o Gds in the polypeptide chain. -> determines overall shope, functions and properties Hydrolysis 1) acid/base-catalysed mydrolysis. a complete hydroly sts conditions: conc-HC/L6moldm-3), 100-200°C, 10-36h in a realed tube 2 enzymatic hydroly 51s > selectively hydrolyse opecific poptide bonds. SECONDARY STRUCTURE definition: the way inwhich regnerts of the polypeptide backbone orientate into aregular pattern through H bording between N-H K C=O groups of the peptide links ges inthe polypeptide backbone. 1) or-helix - It has a regular (vight-harded) coiled spiral polypeptide chain held together by intra-chash H-bonds between the (=0 group of the 1th anino acid NH goop of the (nt4)th amino acid residue. - R-goups point outsands of the helix, perpendicularly. They form bonds to stabilise the orerall folding of the chain. residue Hoord ( MA) Th' AArcaldue @ B- preated sheets (mytiple polypepide chains combined) -polypeptide chains aligned vide-by-side inrows, connected by H-bording between all peptide linkages. -intra chain Abording between C=0 group of peptide in one strand and N+H group of another group in adjacent strand. peptide - Rapps project above and below the sheet perpendicularly. - ontill more stable as N-H.... O atoms their straightline, stabilises Hoords. In 11, NH--- 0 atoms lieat an argle.

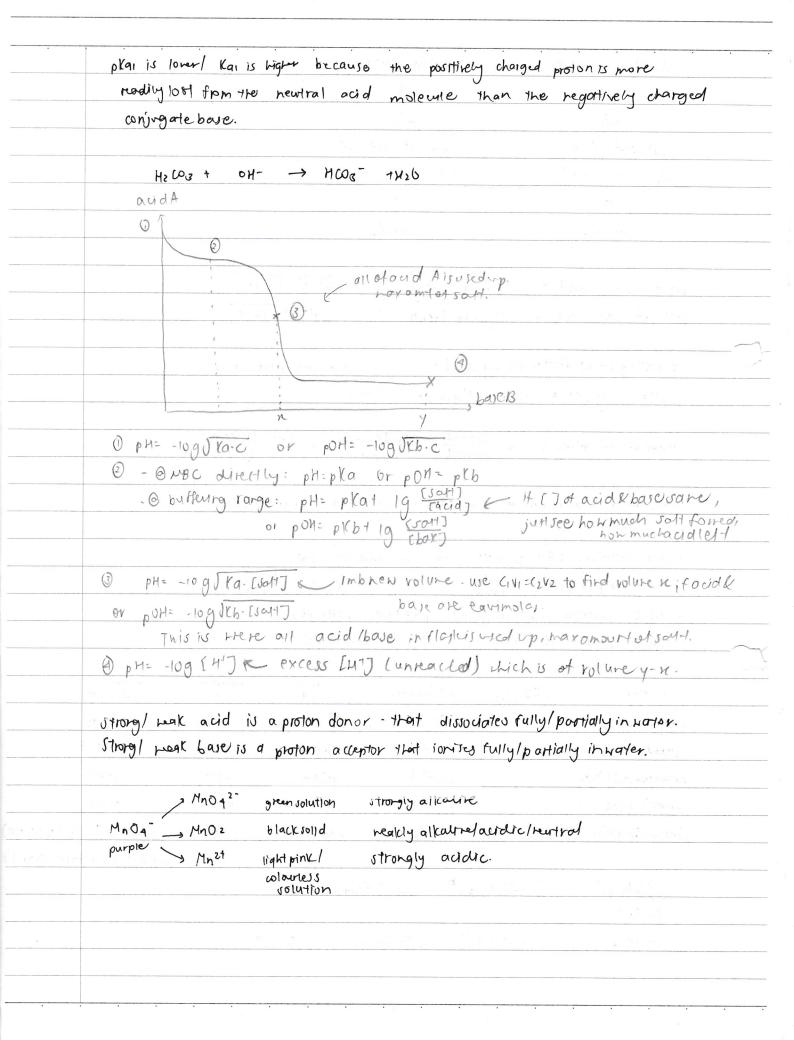
	TERTIARY STRUCTURE (folding of the combined polypepolide chains / 2° 04m crune)
	definition: 3D - arrangement of protein due to folding of recordary of mutures to getter with
	spatial disposition of R-groups. Folds are teld to getter due to R-group interactions.
	1) H-bond between polar R-groups
	the confidence of the confidence of the confidence of
	{- CH <sub>2</sub> -0: 111111 H-0- CH <sub>2</sub> -{
	@ loric interactions between appositely charged groups ((00-, NHz+))
	3 VDW forces between nonpolar grups.
	a dinifide linkages
1490° x 20°	}-CH2-6H+ H5-CH2+ + [0] (0) + CH2-5-5-CH2-{ + 420
	QUATERNARY STRUCTURE (multiple 3° structures had top by R goup interactions)
	definition: spatial arrangement and association of polypoptide subunits. combinational
	several protein chains into larger 3D structure, held together by R-gramp interdictions.
	H demodobin
	- a protein made up of 4 poppopolide chains (2 x-oubunits, 2 p-subunits).
	-considerable Rapupinter actions
	-cach subunit dative covalently burded 10 a haem keidup.
	- one haemoglobin notecule can bind to 4 02 motecules.
*,	Hb + 402 - Hb O8.
	DENATURATION
	10 Heavy metal ions
	-1.g. (42+, Agt, compete with -NHz+ to form tonic interactions with coo-groups (in Rypourps)
	- Hg2+ racks H R-grups containing -sh groups, disrupt disulfidelinkages.
	@ Heating - strong molecular vibrations agitate polypeptide chains, and orunone both
	VDW forces and H-bonding.
	1) pH charges atterionic charges on Rgmps containing (00- KNHst gpmps.
	COO- +H1→ COOH, NH3+ + OH- → NH2+H2D, destroy is the interactions
	1 organic soments / detergents - contain hydrophobic & hydrophilic groups can
	dismpt the hydrophobic (VDW) and hydrophilic (H-board) interactions.
	1 Oxidising / Peducing agents - form or derloy disultide linkages.

periodicity

Charmonal Periodicity  Inplap.  Na → Al  Na → Al  Si Sp>p2 Cl2>Ar  Chargedanyly no of Lightet  of retaction  of retaction  2. I.E.  3. electrical Nacyacal Simetallard insulators  conductivity  (sw o' conductivity  1. electronogority  The due to Teffecthe nuclear charge  3. romac & Nathaman Al Si  ionic radius  Na Ma Al Si P S Cl  anpholimic ampholimic conductivity  Na Ma Al Si P S Cl  oxide basic ionic & (covalent oxides oxides oxides oxides oxides)  oxide confect (covalent oxides oxides)  sales soluble partially  H2O  Na OH  X X X  ANA OH  X X X  AMPHOTERIC OXIDES: LAZ (Icad, chamium, rinc)		(14. 4. 1 6	e. Licitu		N 18.8 %
conductivity  Na — Al Si gort Light object of retation of tretation valence e.  2. I.E.  3. electrical Nacyge Al Simetalloid injuriators conductivity  (ow e canductivity  The electronogativity The to Teffecthe ruclear charge  5. atomic & Nathangari Alit into tradius  Na May Al Si P S Cl  Notice to tradius  Na May Al Si P S Cl  Notice to tradius  Na May Al Si P S Cl  Notice to the ruclear charge  (curatural charges of the post of the p	1/				a la calcula IA K
chargedurally no. of Lightet of retation of retation training to the total or action of the total of the total or action of the total of the total or action of the total of the total of the total or action of the total of	4.	mp./lap.		•	
of intertaction valence e  2. I.E.  3. electrical Nacing(A) Simetallaid invulators  conductivity (ow o conductivity)  1. electronegativity Tale to Teffective nuclear charge  5. atomic & Nathania 122 13  ionic radius 122 13  Na My Al Si P S Cl  Nathania 122 13  Na My Al Si P S Cl  ampholane  oxide baste ionic & actaic  (ionic oxides actaic covalent oxides are booked)  Water, soluble partially finsoluble  H20 Soluble partially finsoluble  H41					S8>P4>C12>AV
2. I.E.  3. electrical NacMycAl Simetalloid invulators conductivity  4. electronegativity Take to Teffecthe nuclear charge  5. atomic & Nathymath Alist ionic radius  I DI IS  No My Al Si P S Cl.  Aphstoric oxide ionic R acidic (condern oxides charge oxides)  Cionto oxide oxides oxideri conductivity  Hall Y X X X  Na OH X X  chloride ionic Angerially insoluble goluble  Alistolicis Angerially  Aphroteric oxides  Aphroteric oxides			or and comments	Mghest	
8. electrical NacygeA  Simetallaid invulators  conductivity  1. electronegativity  1. el			of metalion valera	C C C C C C C C C C C C C C C C C C C	9 <sup>2</sup>
The electronegativity  The electronegative reduces the electronegative r	2 ·	1-E.			
The electronegativity  The electronegative reduces the electronegative r				·	
Tidue to Teffecthe rudear charge  5. where & Notanger Salet  ionic radius  Na Mg Al Si P S Cl  amphotoric  oxide  basic ionic R  cionic R  cionic R  acres of covadent oxides  are bosic covadent oxides  Another, saluble partially  H20  NaOH  X  X  X  X  NaOH  X  AMPHOTERIC OXIDES: LAZ (Icad, aluminum, zinc)	3.		Nacmacal	si metalloid	insulators
S. Atomic & Notanger > Alet   13   52   52    ionic radius   12   13   13   13    No My Al Si P S Cl  amphistoric   actaic    cride   bastc   conic R   actaic    (ionic oxides   covalent   covalent oxides    antoric   saluble partially   insoluble   Gotable    Hul		conductivity	the same than the same that the same	(ow e-conductivity	
S. Atomic & Notanger > Alet   13   52   52    ionic radius   12   13   13   13    No My Al Si P S Cl  amphistoric   actaic    cride   bastc   conic R   actaic    (ionic oxides   covalent   covalent oxides    antoric   saluble partially   insoluble   Gotable    Hul					*
5. Atomic & Notanget > Althorized in 12 13  No My Al Si P S Cl  amphotoric acidic  covide boasic inic R acidic  (inic aribest covedent character are acidic)  Harier, soluble partially insoluble soluble  HO Soluble invalent character are acidic)  HO Soluble insoluble soluble  AMPHOTERIC OXIDES: LAZ (Icad, aluminium, zinc)	4.	electronegativity	1 due	to Teffective nuclear char	ge
ionte radivs  Na Ma Al Si P S Cl  amphitair  baste ionic R acric  (junte oxides  covadent character are acidee)  Morter, soluble partially  H2O soluble  HU / X X X  chloride ionic C avadent oxides  are acidee)  H A OH X X X  chloride ionic C avadent  dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, atuminum, zinc)	•	V		.3	
Na Mg Al Si P S Cl  amphotoric  oxide  basic ionic R  (junic oxides covalent oxides are bosic)  worter, shuble partially H2O soluble  HU / x x x  NaOH x x  chloride ioxit mydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminum, zinc)	٠,	atomic &	Natzmazt > Alst	1	\ S <sup>2</sup>
Na Mg Al Si P S Cl  amphotoric acipic (ionic exides (ionic exides) covalent (covalent oxides Are bosic) character are acidic)  Horier, soluble partially finsulable soluble  HU / X X X  NaOH X X  Chloride jovic avalent dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminjum, zinc)	2		11 12 13	4 × 50 ×	a d-
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Na My Al Si P S Cl  amphistoric  amphistoric  ariale  (junic oxides covalent oxides  art booth) character are acides  water, soluble partially insoluble soluble  HU / X X X  Na OH X X  chloride joric avalent  dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminum, zinc)				Na Mazt	
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amphotoric avidic  (junt oxides jonic le avidic  (junt oxides covadent (covadent oxides are bosic) character are aviduc)  Hatter, soluble partially finsuluble soluble  HU / x x x  NaOH x x  Chloride joric avalent  dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminum, zinc)			and a grade has a grade		
amphotoric  amphotoric  acidic  covalent oxides  (jonic oxides  are bosic)  covalent oxides  are deidec)  worter, soluble partially  H2O  soluble  H4U  X  X  NaOH  X  AMPHOTERIC OXIDES: LAZ (Icad, aluminum, zinc)		# 100 Fas 1	Na Ma Al	si PS Cl	
Oxide    bastc   ionic R   acidic     (junto-oxides   covalent   (covalent oxides     are bostc   character   are acidic     water, soluble   partially     H2O   soluble     HU		1 2 2	J		
(junte oxites) are bosic) covalent character are aciduc)  Worter, soluble partially  H20 soluble  H40 / x x x  Na OH x x  chloride jorit availent  dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminium, zinc)		oxide	basic jonic &	acidic	=
HOTERIC OXIDES: LAZ (Icad, aluminium, zinc)			(junic oxides covalent	(covalent oxides	
HU / / X X  Na OH X X  chloride joric wratent  dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminum, zirc)	7	(-10	at the partially		
NaOH X X  chloride jovic avalent  dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminium, zinc)			soluble insoluble	soluble	
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chloride iovic avalent  dissolves hydrolysis  AMPHOTERIC OXIDES: LAZ (Icad, aluminium, zinc)				× /	
AMPHOTERIC OXIDES: LAZ (Icad, aluminium, zinc)		NaOH			
AMPHOTERIC OXIDES: LAZ (Icad, aluminium, zinc)		chloride		oralent	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	*		412201/67	hydrolysis	
					×
		AMPHOTERIC	OXIDES: LAZ (Icad, alu	minjum, zinc)	
		÷		* * * * * * * * * * * * * * * * * * *	
	1 V				The second section is a
to the second se				21121	
			, is The aller	to the second se	



			7	Date	No.			
,	Acidic solution	Alkaline Solut	ion		· · · · · · · · · · · · · · · · · · ·			
	SA	2 B	to the leaders	21 211	et ja ja ja			
	WA	WВ		rjina a a	es, use			
	sattet UB/CA	soft of W	A 1CB					
	WA + CB (salt)	WB + CA (	salt)	spiral a ga				
	H+	OH-						
	use Ka	use K	6					
	pHot wear and = -log	VKa·cotma =	> [Ht]= J	Ka·C				
	pot of heak base = -10	g UKb. Cof WB =	> CDH-J = J	KP.C				
~								
	calculating pH at dilute stron	g acid '	assume pH	of water=7				
	pH= -log[H+]= -log(	[ [H + [ + 2 + 1.0 X 1 ]	77)					
	degree of ionisation, a, = -	niunised : nnight	on-/V = CM1;	J OR COH-J				
	when conc. is unknown, of	when conc. is unknown, of e.g. CH+Jor COH-J, let it ben & solve.						
	Buffer solution: WA k its so	rt , or WB ar	d 11s solt	×				
	4 pH= pVa+ 19 Esc	Chia	H= pKb+ 1g E	base)	per -			
	at M.B.C., [salt] = [acid] or							
~	La half equi point if WAIW			CAKB in flac	ι <b>γ</b> .			
	indicator p K I	pH range	colour in acid	oolourin base	colour at end point			
	methy) orange	3.1-4-4	red	y ellou	orange			
	screened methy) orange	3.1-4-4	violent	green	дку			
	bromothy mol blue	6.0-7.6	yellow	blue	green			
	thymol blue	8.0-9.6	yellow	blue	green			
	phenolphthalein	8.3-10.0	colourless	pink	light pink (alkaline titran			
	· ·	988 6	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		colourless (acidic titrant			
	(Ag(NH3)2)+, [CUCNH PBC142-	3)4]24, (Zh(N	V3)4J2+					
		)4J-, [P6(OK)	47 2 , (or W	DH)6]3-				
		planolphith	halem					
	<del></del>				A'ZONE			



#### electrochem

	Date No.
•	FUEL CELL
	0215 reduced (02+4H+4e= > 2420)
	Fuel (sometimes Hz) is oxidized. (Hz -> 24++2e-)
	-can be replaced with vay (2H6 1+len 2(2H6 + 702 -> 2002 +6H20
	(half eq 13 (246 + 4420 -> 2002 + 14nd + 4e-
	Battery cells are rechargeable as the maction can be mading reversed
	and electrons can flow in the opposite direction when current 13
	passed through it.
	elevisical evergy chemical evergy
	discharging
	purpose of softbudge: to maintain electrical rentrality by preventing accumulation
	of charges in both half rells through allowing migration of ions
	4TH aquers solution, don't write [HZO], just more CHI]
	H <sub>2</sub> ->
	laim pt 1 voltaic electrolytic
	Ht (aq) - electrolyte
	-fuel -cathode is -ve
	-> cathode is tre ) when -> anode is tre
	→ cathode is tre ) when → anode is tre  → anode is re ) atocharging

#### demical energetics

	Date No.
•	OHO = OMc (readoms) - OMc (products)
	OHO = OH + (products) - OH + (reactarts)
	AHC => when are more of substance is completely combuoled
	Attent => acid and base reacting to form one more other
	An atom => randord state to one mole of gos
	e-g- Nacs>> racg), \( \frac{1}{2} U2(g) -> U(g)
	B.E. => braking bonds in gaseous storle
	P-9 CH4 cg) -> C(g) -1 4H(g) 4.B.E. (C-H)
	1. E=> Her one mole of goseous atoms loses one mole of e-
	E.A.=> Hun openale of gaseons often goins are male ofe-
	L.E. => oremole of solled ionic compound found from constituent gaseous ions
	Altsoln => one mole of substance completely dissolved in solvent
, mark 13	e-g. Mg804W) -> Mg2+ coq) + e00q2 (oq)
	Alloyd => one mole of gaseous jons by diarted.
	mgztcg) + aq -> mgzt caq)
	the second traction to get the second traction of the second tractions are second to the second traction of the se
	L.E = OHngd - OHsoin
	$q = medT$ , $H = -\frac{q}{n}$ mass atsolution $C$ atsolution
	mass atsolution totsolution
	Secretarian and the secret
	A graning is

## group I

Date No.
Metal + $0z$ : M + $\frac{1}{2}0_2$ $\rightarrow$ MO
mg: while flowe, (a: brick red flame, or: crimson flame, Ba: palegreen glame.
Alega   discuss   Madalian   Mada
Metal + Water: M+2H2O -> M(OH)2 + H2 (bubbles of M2 gos)
Be does not react, Mg mains slowly with cold matter, Ugour increases down the grap
metal + NU/H2004: gires solt and M2.
+ solubility of sulfaces decrease down the group: Basoqis INSOLUBLE.
MO + water: MO + H2O -> MCON)2 (fisses and wisses, near given out)
BEO does not ract, Mg o reacts closely, the most vigorously.
* BED 13 amphoteurs, the rest are baste (torre). Mg Obes slight covaled character.
soitherapes a solid
M(OH)2 1 mater: solubility increases down the grap, dissolute give alkaline solutions
Mg(OH)213 slighty roluble: Mg(OH)2cos = Mg2t(aq) + 20H (aq) PH:9
cacox)2 is slightly coluble: cacox)2cs) = ca2tcae) + 20H-cae) py:10
SY/Ba (OH)2 are more soluble: M(OH)2 cod+ aq -> M21(aq) 1 204- (aq) pH: 13
And a member of the configuration of the configurat
BED + 2HU -> Bellz + H2D
BEO + 2NaOH + HEO -> NaCBelon)47
A1203 + 2 Maox + 340 -> 2ma (A(COH)4)
ntogra kanteko ja metojoko ja kostoko ta kiloko na pombeja i to apokana 1995. Parikano in 1995. mi
A control of the first of the second of the

#### transition metals

	Date No.
٠	Heterogenous catalyofs: T.M. have panially filled 3 doubster which allows for ready
	exchange at electrons to and from mail art molecules, facilitating formation of
	walchords 474 reactary molecules.
	e-g. N2, N1, Leat for hydrogenational allower or Fe for N2 + 3 H2 -> 2 MH3
	Homogenous catalysts: T.M have variable oxidation states and have relative easelin
	convertige from one 0-5. 10 another, which facilitates formation of intermediate compounds
	between T.Mions and madares.
	e-g. Fells in E.S. of benzere, Fezt in 52082- + 2] -> 25042- + Is
	for a superior of the first stock and the first of the first stock and the first stock
	Transition held: Ad-block element they can form one or more stable ions with at least
	one pariary filled od orbital/with a partrally filled od outsted.
	Complex: It is a central metal atom/ion linked to one or more surrounding ions/molecules
	(ligands) by dative covalent bonds. If the species carries an overall charge, sis a complexion.
	ligard: Anton molecule which contains at least one donor atom bearing at least one lone pair
	of electrons which can be donated into a low lying vacant orbital (usually 3d orbitals) of a
	central metal atom/ion, forming a coordinate/dathe covalent bord.
	coordinated Dative covalent bond: Represents bond formation as occurring between filled orbitals on
	altgard overlopping with valant orbitals on the central netal atom.
	coordinate number: Total number at coordinate bords that central retail atom/10th forms withligards
12	
	3d electrons provide poor visielding effect as they are occupying lighty diffused 3d orbitals
	compared to is and ip



				Date	No	).
month is an	and the safe	. F <sub>2</sub> =	Q <sub>z</sub>	Br2	- 1	22
el e	Physical appearance at r.t.p.	, rale yellow gas	pale greengas	readish-brown lio	quid !	black solid
	colourin water	colourless	Tellowish-green	orange	as Val.	yellowish-brown
	colourin organic solutions	1 colouriess	! yellowish-green!	reddish-brow	m :	violet
	X2 - overland bonding,	simple molecular	structure, non-1	odar, diatomic	, Nis	
0	M.p./B.p. increases down	•	3.2 . 3	or i galand	-6-2-1.4.	<u> </u>
grather.	. Telectron cloud vize ->	Tpolarisability A	electron doud ->	stronger id-id	t intera	ictions.
2	Radi T, Electroregati	uty 1, I.E.V	ing godine	ety in a more que ix	nasti je u	
	Tno-of principal quantom	rells - valence	e- further away	from nucleus -	a less atti	raction
	L, bonding e	further away fro	m nucleus -> 1	ability of atomic	o attract	bording et
3	B.E. deckases down the gra	rup.	TOLK HOLD TO SEC			
	- Tatomic size → valence or	botals more diffuse	-> less effective	overlap between 1	bording c	orbitals
	* F-F not as strong due to	unall atomic size	, gratepulsion k	setreen 1-p ete o	neach F	-atom
(4)	solubility in water - oxid	ation of H2O	ero ette SA per	r Var state	al Kim	
	Fz reacts with cold water	readily: 2Fz 72Hz	.0 → 4HF +	0 2	egā XII.	
9	az ausproportionates partially: Uz 1 H20 = Hd + H04					
	-HOCI is aweak acid, deco	mposes to form:	2400 = 2HU	toz	i e g.	
	Brz is moderately soluble,	12 13 slightly o	oluble.	swift Made		
(5)	oxiditify power decreases	down the group.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	el, y serge	* *14	
		- 2 \ () ()(a) a (	3 <-			
(A , , , A)	) Displace nent Reaction					
	- more reactive halogen displaces less reactive halogen from its compound by oxidising it.					
,	r.g. 012 1 Br - → B	1274-, note 7	he colour A (sha	ice wincula of	ter test	)
<b>B</b> )	Reaction with Thiosulfate	Care I .	+) +h	1,0 6 <u>2</u> 1.		
	- Uzkbrz are strongeno	ugh OAs to exidize		: 52032- + SH2	20 -> 250	42- +10H+ + BE-
	-Izis a weak OA, only oxto	Mses 52082- 10	12.5	032> 54062-	-12e-	
c)	reaction with OH- (cold &	hot)	. 1. any 2	and the training		
.5-	15°C	175°C	cold 04- @1500:	42 +20H> (	4-1 40	- + H2O
	dz   do-	408	hot ON- @75°C:	3ao → 2a-	- + 40	<b>3</b>
	Brz Bro B	r0 <sub>8</sub> -	overall in hot OH-	: 3U2 +60H	→ 201- +	U03-+3x20
	12 103	= the factor	n acidic medium	: Y- + Y03- +	64+ →	X2 + 3 H2O
) ( D	Reaction with Hydrogen-	forming HX	j * 8 37	Marie of the	4	
	-less vigorous rans down the o	pup as Doxidisin	g porur l @ H-X b	ord strength 1 - 1	OHrless	typ
	Fz- r.t.p, dark. Uz- UV	119ht Brz - 300°	C, pt catalyst.	N2 + 12 7 2 H ]	[-head 5	trongly using
0	fost & explosive	•	now		•	, , , , , , , , , , , , , , , , , ,

### hydrogen halides

	Date No.					
	Iz is voluble in I - as: Iz(0) = Iz(aq)   formation of Iz complex V[Iz(aq)					
	Izeaq) + I- (aq) = Is- (aq)   P.OE of 1st eq. shifts hight.					
	HX are colourless gases of r.t.p.					
0	M.p. / B.p. 7 down group					
	* HF exception as a forms intermolecular H-bording, hotjust rand.					
@	Themal stubility I down group, B.E. V					
	- 1 halt de size -> vavence orbitalmore diffuse -> 1033 effective overlap between bording orbitals					
	- Lelectroregativity difference - I bord polarity - I electrostatic FOA between bording e knudei					
1	- Fz & Uz stable, Brz slight decomposes, Iz readily					
3	Acid strungth 7 - Allercepol HF arestrong acids					
	-for absociation to occur Callaissociate completely except HF), H-x bord must be broken					
A)	Reaction M7h conc. acid					
	soild haude, wax, forms MX with c. H2004: NaX + H2004 -> NaH504 + HX					
	. HX can be further oxidized to X2 by H2004.					
	- reducity power of X increases down the group, so H2004 gets reduced further.					
	U-: NaU + 42004 -> HU(0) + NaH504.					
	HU not ortained further by c. H2004, steamy white funes of MU.					
	Br : NaBrt 42004 -> HBr cg) + NaHOO4					
	2HBrcg) + H2804 → Brz(e)+ 802 + 2H20					
	Redatsh-brown liquid/vapour observed. Colouness gas with bushing sulfur uneu turns					
	most bue lithus red. Myture of MBr and Brz.					
	I-: ZHI + H2004 -> Iz(s) + 502 + 2H20					
	$6HI + H2004 \rightarrow 3Z20) + S + 4H20$					
	84I + H2004 ->4I20)+ H2S + 4H20					
	Black crystals / violet vopour formed. (olourles) gas with rothen egg snew turns					
	motor blue lithus red.					
	* To prepare pure HBr & HI, use C-H3PO4 as H is not as volatile & oxidusing as H2004.					
B)	Reaction with ABNO3 and then excess/cone. MH3					
	Aga soluble in excess NH3 Ag XCS) = Ag1 + X-					
	Ag Br soluble in conc. NH3 Agt + 2NH3 = (Ag (NH3)2]+					
	Ag I insoluble in core. NHs - formation at complex, CAg1 JJ, P.O.E. off st eq shifts vialit,					
	I.P et AgX decreases till below Ksp. voluble.					
	However, KSP of AgI is tery low, 1.P. cannot be smaller.					

# dot & cross diagrams

		<del></del>	······································	Date	No.
				0	
	Same of the same o	N O-	1/2 +	1	
	.230	0 0-	1) 1) 1) 0	-0 0	
	NO2	-102		03 moonanu	1
w v	14.02	1.05	14.05	- Las or action	<b>,</b>
				0	
	0=n: 0=h:	j	<u> </u>	N - N+	
	No <sup>+</sup>	10		6. 0-	
				N203	
		E			
		% √N−1	70		
	0 + H - 0 - H > 0	// // /	1)		
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		-0'			
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	5208	2> 5042-			
		- > SAO62-			
	720				
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	7		- MOS.	-> R-C"	+ 2 Ag + 4 Mb3 + 24
	R-C"	1 2 (1g cm3)2 ]+	0 - 1		
	R-C79	1 2 (1g CM3)2 57			
	,				VNZO
	,	1 2 (1g CM/3)2 5T			3 M 20
	,				V M 20
	,				V H 20
	,				3 M 20
	,				V H 20
	,				3 M 20
	,				V N 20
	,				V N 20
	,				V H 20
	,				V H 20
	,				V N 20
	,				V N 20
	,				V N 20
	,				V M 20
	,				V H 20
	,				VHLO

CH3-CH20H + 4I2 + 6NaOH -> H-C=0
O NAT
CH3-C-H + 372 + 4 NAOM -> H-C10-NOT + CH23+3NOI+3N2
$R - C_{H}^{0} + 2[Ag(NH_3)2]^{+} + 30H^{-} \rightarrow R - C_{0}^{0} + 2Ag + 4NH_3 + 2H_2O$
R- C'H + 242+ + SOH- → R-C'O- + 420 +3M20