Exercise-1

> Marked Questions may have for Revision Questions.

ONLY ONE OPTION CORRECT TYPE

* Marked Questions may have more than one correct option.

Section (A) : Development of Periodic Table, Period, Group and Block

- 1.>How many periods and vertical columns are there in the long form of the periodic table?(1) 8, 12(2) 6, 8(3) 7, 18(4) 6, 18
- 2. The period number in the long form of the periodic table is equal to :
 - (1) magnetic quantum number of any element of the period.
 - (2) atomic number of any element of the period.
 - (3) maximum Principal quantum number of any element of the period.
 - (4) maximum Azimuthal quantum number of any element of the period.
- 3. Which one of the following statements related to the modern periodic table is incorrect :

(1) The p-block has 6 columns, because a maximum of 6 electrons can occupy all the orbitals in a p-subshell.

(2) The d-block has 8 columns, because a maximum of 8 electrons can occupy all the orbitals in a d-subshell.

(3) Each block contains a number of columns equal to the number of electrons that can occupy that subshell.

(4) The block indicates value of Azimuthal quantum number (ℓ) for the last subshell that received electrons in building up the electronic configuration.

4.	The elements in which electrons are progressively filled in 4f-orbital are called :							
	(1) actinoids	(2) transition elements	(3) lanthanoids	(4) halogens				
5.	Which of the following e (1) ns ² np ⁶	electronic configuration re (2) ns²np⁵	epresent noble gas ? (3) ns²np⁴	(4) ns²np³				
6.	Which of the following g (1) Cu, Ag, Au	group of transition metals (2) Ru, Rn, Pd	is called coinage metals (3) Fe, Co, Ni	; ? (4) Os, IR, Pt				
7.≿	What is the characteristic valence shell electron configuration of 11^{th} group metals ? (1) ns ² np ⁶ (2) (n - 1)d ² ns ² (3) nd ⁹ ns ² (4) (n - 1)d ¹⁰ ns ¹							
8.	Pt, Ni, Au and Ti belong (1) f-block	js to : (2) d-block	(3) p-block	(4) s-block				
9.	Which of the following e (1) Bi	element is a metalloid ? (2) Sn	(3) Ge	(4) C				
10.≿	An element has atomic (1) s and 1 st	number 37. The block ar (2) p and 17 th	nd group of this element (3) s and 2 nd	are respectively : (4) p and 13 th				
11.	Atomic number of Ag is 47. In the same group, the atomic numbers of elements placed above and below Ag in Long form of periodic table will be :							
	(1) 29, 65	(2) 39, 79	(3) 29, 79	(4) 39, 65				

- 12. Which of the following statements is not correct regarding hydrogen :
 - (1) It resembles halogens in some properties.
 - (2) It resembles alkali metals in some properties.
 - (3) It can be placed in 17th group of Modern periodic table.
 - (4) It cannot be placed in 1st group of Modern periodic table.

13. In modern periodic table, the element with atomic number Z = 118 will be :

- (1) Uuo ; Ununoctium ; alkaline earth metal (2) Uno ; Unniloctium ; transition metal (3) Uno ; Unniloctium ; alkali metal
 - (4) Uuo; Ununoctium; noble gas

Section (B) : Shielding Effect & Z_

1. The order of screening effect of electrons of s, p, d and f orbitals of a given shell of an atom on its outer shell electrons is :

(3) p < d < s > f(1) s > p > d > f(2) f > d > p > s(4) f > p > s > d

- 2. Which of the following is generally true regarding effective nuclear charge (Z_{eff}) :
 - (1) It increases on moving left to right in a period.
 - (2) It remains almost constant on moving top to bottom in a group.
 - (3) For isoelectronic species, as Z increases, Z_{eff} decreases.
 - (4) Both (1) and (2).
- 3. From the given set of species, point out the species from each set having highest Z_{at}

(a) O ²⁻ ,	F⁻, Na⁺		(b) Li, Be, C		(c) He	e, Li⁺, H⁻	
	а	b	С		а	b	С
(1)	Na⁺	С	Li⁺	(2)	O ²⁻	Li	H-
(3)	F-	Na	He	(4)	Na⁺	Be	He

Section (C) : Atomic and Ionic Radius

1.2 Select correct statement about radius of an atom :

(1) Values of Vander waal's radii is larger than those of covalent radii because the Vander waal's forces are much weaker than the forces operating between atoms in a covalently bonded molecule.

(2) The metallic radii is smaller than the Vander waal's radii, since the bonding forces in the metallic crystal lattice are much stronger than the Vander waal's forces.

- (3) Both (1) & (2)
- (4) None of these

2. The atom larger in size as compared to oxygen is : (1) F (2) He (3) Ne (4) none of these Which of the following has the largest ionic radius ? 3.> (1) Na⁺ (2) Cs+ (3) Ca+ (4) Mg+ 4. 🖎 Which one of the following is the smallest in size ? (1) N^{3-} (2) O²⁻ (3) F⁻ (4) Na+ 5. Which has smallest size ? (1) Na⁺ (2) Mg²⁺ (3) Ne (4) O²⁻

6.	In whic (1) Br,	h pair, th Cl	ne secor	id atom i (2) Na,	is larger t Mg	than firs	t : (3) Sr,	Са		(4) N,F)	
7.	Which (1) Li <	of the fol Be < Mg	llowing c g	order of r (2) O ⁺ <	adii is co < O²⁻ < N	orrect ? ^{3–}	(3) O <	< F < Ne		(4) Na⁺		
8.⊠	Among (1) I⁻ >	g CI⁻, F⁻ E F⁻ > CI⁻	Br⁻ and I > Br⁻	- the cor (2) I⁻ >	rect orde Br⁻ > Cl⁻	r of incr >F⁻	easing (3) F⁻∶	atomic ra > Br⁻ > C	adii is : ⁻ > ⁻	(4) F⁻ >	> C⊦ > Br- >	I-
9.	The siz (1) nuc (2) vale (3) elec (4) non	ze of isoe clear chai ence prin ctron-ele ne of the	electronio rge (Z) cipal qu ctron int factors b	c species antum n eraction because	s O ⁻² , F- umber (n in the ou their size	and Na n) iter orbit e is the s	⁺ is affe tals same.	ected by	:			
10.	Atomic (1) 0.72	radii of l 2, 1.60	F & Ne ii	n Angstr (2) 1.60	om are ro), 1.60	espectiv	ely give (3) 0.7	en by : 2, 0.72		(4) 1.60	0, 0.72.	
11.	Match 7 S.No. (i) (ii) (iii) (iv) (v) (1) (i) – (3) (i) –	the corre - r, (ii) – c - r, (ii) – s	ect atomi Elemei Be C O B N q, (iii) – t s, (iii) – t	ic radius nt :, (iv) – s ;, (iv) – q	with the , (v) – p , (v) – p	elemen Code (p) (q) (r) (s) (t)	t : (2) (i) - (4) (i) -	Atomic - t, (ii) - : - t, (ii) -	c radius 74 88 111 77 66 s, (iii) – 1 p, (iii) –	r, (iv) – p r, (iv) – s	o, (v) – q s, (v) – q	
12.>>	Match List – I Ion (I) Li ⁺ (II) Na ⁺ (III) Br ⁻ (IV) I ⁻ Codes (1) (3)	list – I wi	th list – II b	II and se III d	elect the of List – II Radius (1) 216 (2) 195 (3) 60 (4) 95 IV c a	correct a	answer (2) (4)	using the I b	e codes i II c	given be III a b	low – IV d	
13.2	Which	of the fol	llowing c	order of a	atomic / i	onic rad	lius is n	ot correc	t ?	(4) 1 : .	Box D	
Section	י) ר< n (D) : la	onisatio	s I n Enera	(∠) t ^{o+} : V	> 01-' > 1	τυ'	(3) INC	ว≈าล		(4) LI >	, DG > D	
20000	· (=) · ·			,								

1. Which one of the following statements is incorrect in relation to ionisation enthalpy?

- (1) Ionization enthalpy increases for each successive electron.
- (2) The greatest increase in ionization enthalpy is experienced on removal of electron from core of noble gas configuration.
- (3) End of valence electrons is marked by a big jump in ionization enthalpy.
- (4) Removal of electron from orbitals bearing lower n value is easier than from orbitals having higher n value.

2.	The first ionisation enthalpies (in eV) of N & O are respectively given by : (1) 14.6, 13.6 (2) 13.6, 14.6 (3) 13.6, 13.6 (4) 14.6, 14.6						: (4) 14.6, 14.6	
3.	The se (1) K >	et represe → Na > Li	enting th	e correct order for first i (2) Be > Mg > Ca	ionisatior (3) B >	n potentia > C > N	al is :	(4) Ge > Si > C
4.	The fir (1) Na	st ionisat < Mg > /	tion enth Al < Si	alpies of Na, Mg, Al and (2) Na > Mg > Al > Si	d Si are i (3) Na	n the ord < Mg < /	ler : Al < Si	(4) Na > Mg > Al < Si
5.	Which (1) 1s²	electron 2s ² 2p ⁴	ic config	uration of neutral atoms (2) 1s ² 2s ² 2p ³	s will hav (3) 1s ²	e the hig 2 2s ² 2p ²	hest firs	t ionisation energy ? (4) 1s² 2s² 2p¹
6.	The fir (1) ns²	st ionizat	tion enei	rgy is smallest for the at (2) ns² np⁴	om with (3) ns ²	electroni ² np⁵	c configu	uration : (4) ns² np³
7.>	The first ionisation energy will be maximum for (1) Be (2) He				: (3) Li			(4) Fe
8.	Which of the following has maximum ionization (1) P (2) N				n enthalp (3) As	у.		(4) ,Sb
9.	Which among the following elements have lowest value of IE1 ?(1) Pb(2) Sn(3) Si(4) C							(4) C
10.≿	The secare becaus (1) the (2) it is (3) ion (4) cat	econd ic se : cation is easier to ization is ion forme	onization s smaller o remov an ende ed alway	energies of elements than its parent atom. e electron from cation. othermic process. rs have stable half filled	are alv	vays hig letely fille	her thar ed valen	n their first ionization energies ce shell electron configuration.
11.	Which (i) Ba ((1) i, ii	of the fo < Sr < Ca and iv	llowing o a	orders are correct for the (ii) S²⁻ < S < S²+ (2) i, iii and iv	e ionization energies ? (iii) C < O < N (3) i, ii and iii			(iv) Mg < Al < Si (4) i, ii, iii and iv
12.๖	Which (1) (3)	represer X Z	nts alkal (IE)₁ 500 550	i metals (i.e. 1 st group m (IE) ₂ 1000 7500	netals) ba (2) (4)	ased on (Y M	IE) ₁ and (IE) ₁ 600 700	(IE) ₂ values (in kJ/mol) ? (IE) ₂ 2000 1400
13.১	Which potass	of the fo	ollowing calcium	relation is correct with r	espect to	o first (I)	and sec	cond (II) ionization enthalpies of
	(1) I _{Ca}	> II _K		(2) I _K > I _{Ca}	(3) II _{ca}	_a > ΙΙ _κ		(4) $II_{K} > II_{Ca}$
14.	Strong (1) K	jest redu	cing age	nt is : (2) Mg	(3) Al			(4) Ba
Section	n (E) : E	Electron	gain en	thalpy (Electron affini	ty)			
1.>	Electro	on affinity	/ is a :					

- (1) Relative strength to attract the shared electron pair
- (2) Necessary energy required to remove the electron from the ultimate orbit
- (3) Energy released when an electron is added to the outermost shell
- (4) Energy released when an electron is added to the inner shell

2.	Second electron effinity (1) Always exothermic (3) Exothermic for few e	v of an element is : elements	(2) Endothermic for few elements(4) Always endothermic					
3.浊	The correct order of ele (1) Be < B < C < N	ectron affinity is : (2) Be < N < B < C	(3) N < Be < C < B	(4) N < C < B < Be				
4. 🔉	For electron affinity of h (1) Br > F	nalogens which of the foll (2) F > Cl	lowing is correct ? (3) Br < Cl	(4) F⁻ > I				
5.	In which case the energe (1) $CI \rightarrow CI^{-}$	gy released is minimum? (2) $P \rightarrow P^-$	(3) N → N [_]	(4) $C \rightarrow C^{-}$				
6.>	Which of the following v (1) F, Cl	will have the most negati (2) Cl, F	ve electron gain enthalpy (3) S, Cl	v and which the least negative ? (4) Cl, P				
7.	Element having maxim	um electron affinity is : (2) Chlorine	(3) Bromine	(4) Iodine				
8.	Among halogens, the correct order of amount of energy released in electron gain (electron gain enthalpy) is:							
	(1) F > Cl > Br > l	(2) F < Cl < Br < l	(3) F < Cl > Br > l	(4) Cl > Br > F > I				
9.29	Which of the following v F, P, S, Cl.	will have the most negati	ve electron gain enthalpy	and which the least negative ?				
	(1) F, G	(Z) UI, F	(3) 01, 3	(4) G I, F				
10.১	The order of electron ga (1) O > S > Se	ain enthalpy (magnitude) (2) S > Se > O	of O, S and Se is : (3) Se > S > O	(4) S > O > Se				
11.	Electronic configuration (i) $1s^22s^22p^6$ Which of the following i (1) (i) < (iii) < (ii) < (iv)	is of four elements A, B, (ii) $1s^22s^22p^4$ (iii) $1s^2$ s the correct order of inc (2) (i) < (ii) < (iii) < (iv)	C and D are given below 2s ² 2p ⁶ 3s ¹ reasing tendency to gain (3) (iv) < (ii) < (iii) < (i)	/ : (iv) 1s²2s²2p⁵ electron : (4) (iv) < (i) < (ii) < (iii)				
12.	Which of the following s (1) Electron gain enthal (2) Second electron gai (3) $\Delta_{eg}H(K^+) = -IE(K)$ (4) All of these	statement is correct ? lpy may be positive for so in enthalpy always remai	ome elements. ns positive for all the ele	ments.				
Section	n (F) : Electronegativity	/						
1.∖&	Following the Mulliken (1) Only electronegativi (3) Electron affinity and	scale, what parameters a ty ionization energy	are required to evaluate e (2) Only electron affinity (4) Ionic potential and e	electronegativity ? y electronegativity				
2.౫	The electronegativity va (1) increase from carbo (2) decrease from carbo	alues of C,N,O and F : on to fluorine. on to fluorine.						

- (3) increase up to oxygen and is minimum at fluorine.
- (4) is minimum at nitrogen and then increase continuously.

3.≥	The electronegativity of (1) C < N < Si < P	the following elements in (2) N < Si, < C < P	ncreases in the order : (3) Si < P < C < N	(4) P < Si < N < C				
4.	The correct set of decre (1) Li, H, Na	easing order of electrone (2) Na, H, Li	gativity is : (3) H, Li, Na	(4) Li, Na, H				
5.>	Increasing order of elec (1) Bi < P < S < Cl	tronegativity left to right i (2) P < Bi < S < Cl	is : (3) C > F > N > O	(4) F > N > O > C				
6.>	The outer most electron (1) ns ² np ⁵	nic configuration of the m (2) ns²np ⁶	ost electronegative atom (3) ns²np⁴	is : (4) ns²np³				
7.	 Which of the following is affected by the stable electron configuration of an atom ? (1) Electronegativity (2) Ionisation enthalpy (3) Electron gain enthalpy Correct answer is : (1) only electronegativity (2) only ionisation enthalpy (3) both electron gain enthalpy and ionisation enthalpy (4) all of the above 							
8.	 The electronegativity values of C,N,O and F on Pauling scale : (1) decrease from carbon to fluorine. (2) increase from carbon to fluorine. (3) increase upto oxygen and then decrease upto fluorine. (4) decrease from carbon to nitrogen and then increase continuously. 							
9.	Correct order of electro (1) N > P > C > Si	negativity of N, P, C and (2) C > Si > N > P	Si on Pauling scale is : (3) N < P < C < Si	(4) N > C > P > Si				
10.	The correct order of ele (1) $F > CI > O > S$ (3) $Be < B < N < C$	ctronegativity on Pauling	scale is : (2) Li > Na > K > Rb > 0 (4) Both (1) and (2)	Cs				
11.๖	Which of the following is (1) Li	s most electronegative el (2) Mg	ement. (3) H	(4) Na				
Section	n (G) : Oxidation states	& Inert pair effect						
1.	The atomic number of a (1) 13	an element which can not (2) 32	t show the oxidation state (3) 33	e of +3 is- (4) 17				
2.	The most common oxid most shell is - (1) 2	dation state of an eleme	ent is -2. The number c (3) 6	of electrons present in its outer (4) 8				
3.2	Most stable oxidation st (1) + 1	ate of gold is : (2) +3	(3) +2	(4) zero				
4.	Which can have both +v (1) F	ve and –ve oxidation stat (2) I	es in their compounds (3) Na	(4) AI				

5.	The oxidation state of nitrogen varies from :								
	(1) –3 to + 5	(2) 0 to +5	(3) –3 to 1	(4) +3 to +5					
6.	Which metal exhibtis m	ore than one oxidation s	tates in their compounds						
	(1) Na	(2) Mg	(3) Al	(4) Fe					
7.	Electrons of which subshell do not participate in bonding due to inert pair effect ?								
	(1) 6s	(2) 6p	(3) 5d	(4) 4f					
8.	Thallium shows different oxidation states because :								
	(1) of its high reactivity		(2) of inert pair of electrons						
	(3) of its amphoteric na	ture	(4) its is a transition metal						
9.	In which of the following	g elements, + 3 oxidatior	state is more stable tha	n + 5 ?					
	(1) P	(2) As	(3) N	(4) Bi					
10.æ	Which of the following i	s correct order of stabilit	y :						
	(1) Tl ³⁺ > Bi ³⁺	(2) $PbO_2 > PbO$	(3) BiI ₅ < BiF ₅	(4) Sn ²⁺ = Ge ²⁺					

Exercise-2

$\mathbf{\hat{z}}$ Marked Questions may have for Revision Questions.

1.	 (1) The properties of elements are periodic function of their atomic numbers. (2) Non-metallic elements are less in number than metallic elements. (3) For transition elements, the 3d-orbitals are filled with electrons after 3p-orbitals and before 4s-orbitals. (4) The first ionisation enthalpies of elements generally increase with increase in atomic number as we go along a period. 							
2.	Which of the following	is true about the elemen	t "As according to Mode	rn periodic table :				
	(1) It is a 5 th period eler	ment.	(2) It is a p-block eleme	ent.				
	(3) It belongs to 16 th gr	oup.	(4) It is one among typical elements.					
3.2	Which of the following	of only s-block						
	(1) 55,12,18,53	(2) 13,33,54,83	(3) 3, 20,55,87	(4) 22,33,55,66				
4.2	Screening effect is not	observed in :						
	(1) He⁺	(2) Li ²⁺	(3) Be ³⁺	(4) In all cases				
5.2	When the following five	e anions are arranged in	order of decreasing ionic	radius, the correct sequence is				
	(1) Se ²⁻ , I ⁻ , Br ⁻ , O ²⁻ , F ⁻		(2) I⁻ , Se²⁻, Br⁻ , F⁻, O²	-				
	(3) Se ²⁻ , I ⁻ , Br ⁻ , F ⁻ , O ²⁻		(4) I ⁻ , Se ²⁻ , Br ⁻ , O ²⁻ , F ⁻					
6.	The correct order of size	ze of ions Li+, Mg²+, K+, A	\ ³⁺ :					
	(1) Al ³⁺ < Mg ²⁺ < Li ⁺ < K	(+	(2) $Mg^{2+} < AI^{3+} < Li^{+} < h$	〈 +				
	(3) Al ³⁺ < Mg ²⁺ < K ⁺ < Li	+	(4) $AI^{3+} < Li^+ < Mg^{2+} < F$	〈 +				
7.	Ionic radii of :							
	(1) Ti ⁴⁺ < Mn ⁷⁺	(2) ³⁵ Cl [−] < ³⁷ Cl [−]	(3) K⁺ > C⊢	(4) P ³⁺ > P ⁵⁺				

- 8. The correct order of radii is :
 (1) N < Be < B
 (2) F⁻ < O²⁻ < N³⁻
 (3) Na < Li < K
 (4) Fe³⁺ < Fe²⁺ < Fe⁺⁴
- 9.2Which of the following is the correct order of ionisation enthalpy ?(1) $Be^+ > Be$ (2) $Be > Be^+$ (3) C > Be(4) B > Be(1) 2, 3(2) 3, 4(3) 1, 3(4) 1, 4
- **10.** \searrow Considering the elements B, Al, Mg, and K, the correct order of their metallic character is :(1) B > Al > Mg > K(2) Al > Mg > B > K(3) Mg > Al > K > B(4) K > Mg > Al > B
- **11.** The incorrect statement among the following is :
 - (1) the first ionization energy of AI is less than first ionization energy of Mg.
 - (2) the second ionization energy of Mg is greater than second ionization energy of Na.
 - (3) the first ionization energy of Na is less than first ionization energy of Mg.
 - (4) the third ionization energy of Mg is greater than third ionization energy of Al.
- **12.** Fluorine has the highest electronegativity among the ns² np⁵ group on the Pauling scale, but the electron affinity of fluorine is less than that of chlorine because :
 - (1) the atomic number of fluorine is less than that of chlorine.
 - (2) fluorine being the first member of the family behaves in an unusual manner.
 - (3) chlorine can accommodate an electron better than fluorine by utilising its vacant 3d-orbital.
 - (4) small size, high electron density and an increased electron repulsion makes addition of an electron to fluorine less favourable than that in the case of chlorine in isolated stage.
- **13.** Which of the following statement is incorrect ?
 - (1) The tendency to attract bonded pair of electron in case of hybrid orbitals follow the order : $sp > sp^2 > sp^3$
 - (2) Alkali metals generally have negative value of electron gain enthalpy.
 - (3) Cs⁺(g) releases more energy upon gain of an electron than Cl(g).

(4) The electronegativity values for 2p-series elements is less than that for 3p-series elements on account of small size and high inter electronic repulsions.

14.	Identify the least stable	ion amongst the following	ng :					
	(1) Li⁻	(2) Be⁻	(3) B⁻	(4) C-				
15.	Among the following, th	e number of elements sh	owing only one non-zero	o oxidation state is :				
	O, CI, F, (1) 2	N, P, Sn, (2) 3	TI, Na, T i (3) 4	(4) 5				
16.	The oxidation number the (1) 0	hat iron does not exhibit i (2) +1	n its common compound (3) +2	ls or in its elemental state is : (4) +3				
17.	Which of the following c	an show +7 oxidation sta	ate?					
	(1) Mn	(2) F	(3) In	(4) N				
18.2	Which of following does not exist :							
	(1) TII ₃	(2) PbF ₄	(3) Both (1) and (2)	(4) None of these				
19.	Elements of which period	od show maximum inert p	air effect :					
	(1) 3	(2) 4	(3) 5	(4) 6				

	Exercise -	3			
	PART - I :	NEET / AIPMT QUE	ESTION (PREVIOUS	YEARS)	
1.	Which one of the follow negative sign) of the giv 2005] (1) Cl < F < S < O	ving arrangements repre ven atomic species ? (2) O < S < F < Cl	esents the correct order (3) S < O < Cl < F	of electron gain entha [AIF (4) F < Cl < O < S	Ipy (with MT-
2.	Four successive mem numbers. Which one of (1) Vanadium (Z = 23)	listed below with thei tion enthalpy ? [AIPM (4) Manganese (Z = 2	r atomic T-2005] 25)		
3.	The correct order regard (1) $sp < sp^2 > sp^3$	ding the electronegativity (2) sp < sp ² < sp ³	of hybrid orbitals of carb (3) sp > sp² < sp³	bon is : [AIPM] (4) sp > sp ² > sp ³	T-2006]
4.	Identify the correct order (1) $Ca^{2+} < K^+ < Ar < S^{2-}$ (3) $Ar < Ca^{2+} < K^+ < Cl^-$	r of the size of the follow < Cl⁻ < S²⁻	wing [AIPMT-2 (2) Ca ²⁺ < K ⁺ < Ar < Cl ⁻ < S ²⁻ (4) Ca ²⁺ < Ar < K ⁺ < Cl ⁻ < S ²⁻		
5.	With which of the follow (1) $1s^2$, $2s^2 2p^5$	ing electronic configurati (2) 1s ² , 2s ² 2p ³	on an atom has the lowe (3) 1s ² , 2s ² 2p ⁵ 3s ¹	est ionisation enthalpy ([AIPN (4) 1s², 2s² 2p ⁶	? 1T-2007]
6.	The correct order of dec (1) Cr. Mp. $\lambda = \lambda$	creasing second ionisatio	on enthalpy of Ti(22), V(2	3), Cr(24) and Mn(25) [AIPM]	is : T-2008]
7.	Amongst the elements ionisation energy ? 2009] (1) [Nel 3s ² 3p ³	(2) $\sqrt{3}$ with following electron (2) [Ne] $3s^2 3p^2$	(3) MIT $>$ CT $>$ TT $>$ V nic configurations, whic (3) [Ar] 3d ¹⁰ 4s ² 4p ³	h one may have the [AIF (4) [Ne] 3s ² 3n ¹	highest P MT-
8.	Among the elements Ca 2010] (1) Mg < Ca < Cl < P	a, Mg, P and Cl, the orde (2) Cl < P < Mg < Ca	r of increasing atomic ra (3) P < Cl < Ca < Mg	dii is : [AIF (4) Ca < Mg < P < Cl	PMT-
9.	Among the following wh (1) CsI	ich one has the highest (2) CsF	cation to anion size ratio (3) LiF	? [AIPM (4) NaF	T-2010]
10.	Which of the following in (1) La ³⁺ (Z = 57)	ons will exhibit colour in a (2) Ti³+ (Z = 22)	aqueous solutions ? (3) Lu³+ (Z = 71)	[AIPM (4) Sc ³⁺ (Z = 21)	T-2010]
11.	Which of the following id (1) Ni ³⁺	ons has electronic config (2) Mn³+	uration [Ar]3d ⁶ ? (3) Fe ³⁺	[AIPM (4) Co³+	T-2010]
12.	Which of the following p (1) Fe ²⁺ , Ni ²⁺	oairs has the same size ? (2) Zr ⁴⁺ , Ti ⁴⁺	(3) Zr ⁴⁺ , H <i>f</i> ⁴⁺	[AIPM] (4) Zn ⁴⁺ , H <i>f</i> ⁴⁺	Г-2010]

13. The correct order of the decreasing ionic radii among the following is electronic species are :

					[AIPMT-2010]
	(1) $Ca^{2+} > K^+ > S^{2-} > Cl^-$		(2) $CI^- > S^{2-} > Ca^{2+} > K^+$		
14	$(3) 3^2 > 01 > K^2 > 0a^2$ Which of the following	represents the correct ((4) $(7) = 30$ (4) $(7) = 30$ (4) $(7) = 30$	on gain enthal	Inv with negative
14.	sign for the elements O	. S. F and Cl ?		on gain china	[AIPMT-2010]
	(1) Cl < F < O < S	(2) O < S < F < Cl	(3) F < S < O < Cl	(4) S < O < C	l < F
15.	What is the value of ele	ctron gain enthalpy of N	a ⁺ if IE ₁ of Na = 5.1 eV ?		[AIPMT-2011]
	(1) –5.1 eV	(2) –10.2 eV	(3) +2.55 eV	(4) +10.2 eV	
16.	Identify the wrong state (1) Amongst isoelectron (2) Amongst isoelectron (3) Atomic radius of the (4) Atomic radius of the the periodic table.	[AIPMT-2012] the ionic radius. he ionic radius. eriodic table. the 2 nd period of			
17.	Which of the following o (1) $H^- > H^+ > H$	orders of ionic radii is con (2) Na+ > F ⁻ > O ²⁻	rrectly represented? (3) F ⁻ > O ²⁻ > Na ⁺	(4) Al ³⁺ > Mg ²	[AIPMT-2014] ²⁺ > N ³⁻
18.	Reason of lanthanoid co	ontraction is :			[AIPMT-2014]
	(1) Negligible screening(3) Decreasing nuclear	effect of 'f' orbitals charge	(2) Increasing nuclear of(4) Decreasing screening	charge ng effect	
19.	The species Ar, K⁺ an	d Ca2+ contain the sar	me number of electrons	. In which ord	ler do their radii
	increase				[AIPMT-2015]
	(1) Ca²⁺ < Ar < K⁺	(2) Ca²⁺ < K⁺ < Ar	(3) K ⁺ < Ar < Ca ²⁺	(4) Ar < K⁺<(Ca ²⁺
20.	Because of lanthanoid	contraction, which of th	e following pairs of elem	nents have nea	arly same atomic
	radii ? (Numbers in the (1) Zr (40) and Nb (41)	parenthesis are atomic i	numbers). (2) Zr (40) and Hf (72)		[AIPMT-2015]
	(3) Zr (40) and Ta (73)		(4) Ti (22) and Zr (40)		
21.	In which of the following	g options the order of ar	rangement does not agr	ee with the var	iation of property
	(1) Li $<$ Na $<$ K $<$ Rb (inc	creasing metallic radius))		
	(2) Al ³⁺ < Mg ²⁺ < Na ⁺ < F	- (increasing ionic size)			
	(3) $B < C < N < O$ (incre	easing first ionization ent	(halpy)		
		asing electron gain enti-	aipy)		
22.	Which one of the followi	ing orders is correct for t	the bond dissociation ent	halpy of haloge	en molecules? [NEET-2016]
	(1) $F_2 > Cl_2 > Br_2 > l_2$	(2) $I_2 > Br_2 > CI_2 > F_2$	(3) $Cl_2 > Br_2 > F_2 > I_2$	(4) $Br_2 > l_2 > F$	$F_2 > CI_2$
23.	The electronic configura	ations of Eu (Atomic No.	63) Gd (Atomic No. 64) a	and Tb (Atomic	No. 65) are : [NEET-2016]
	(1) [Xe]4f ⁷ 6s ² , [Xe]4f ⁷ 5d	¹ 6s ² and [Xe]4f ⁹ 6s ²			
	(2) [Xe]4f ⁷ 6S ² , [Xe]4f ⁶ 5d ¹ 6s ² [Xe]4f ⁶	² and [Xe]4f° 50'65 ² 75d16s ² and [Xe]4f95d16	SS ²		
	(4) [Xe]4f ⁶ 5d ¹ 6s ² , [Xe]4f	$f^7 5d^16s^2$ and [Xe]4f ⁸ 5d ¹ 6	S ²		
24.	The element $Z = 114$ has	as beeen discovered rec	ently. It will belong to wh	ich of the follov	ving familv/
•	aroup and electronic co	nfiguration ?			[NEET-2017]

- (1) Halogen family, [Rn] $5f^{14}6d^{10}7s^27p^5$ (3) Oxygen family, [Rn] $5f^{14}6d^{10}7s^27p^4$
- (2) Carbon family, [Rn] 5f¹⁴6d¹⁰7s²7p²
 (4) Nitrogen family, [Rn] 5f¹⁴6d¹⁰7s²7p⁶

25. Magnesium reacts with an element (X) to form an ionic compound. If the ground state electronic configuration of (X) is 1s² 2s² 2p³, the simplest formula for this compound is : [NEET-2018] (4) MgX₂ (1) Mg_2X_3 (2) Mg_3X_2 (3) Mg₂X PART - II : AIIMS QUESTION (PREVIOUS YEARS) [AIIMS 2004] 1. For electron affinity of halogens which of the following is correct ? (1) Br > F (2) F > CI (3) Br > Cl (4) F > I 2. Assertion : First ionisation energy for nitrogen is lower than oxygen. Reason : Across a period effective nuclear charge decreases. [AIIMS 2005] (1) If both assertion and reason are true and reason is the correct explanation of assertion. (2) If both assertion and reason are true but reason is not the correct explanation of assertion. (3) If Assertion is true but reason is false. (4) If both assertion and reason are false. 3. Consider the following statements : I. The radius of an anion is larger than that of the parent atom. **II.** The ionization energy generally increases with increasing atomic number in a period. **III.** The electronegativity of an element is the tendency of an isolated atom no attract an electron. Which of the above statements is/are correct? [AIIMS 2012] (3) I and II (4) II and III (1) I alone (2) II alone 4. Among the following groupings which represents the collection of isoelectronic species? [AIIMS 2013] (3) CO, NO⁺, CN⁻, C₂²⁻ (4) NO, CN⁻, N₂, O₂⁻ (1) $NO^+, C_2^{2-}, O_2^-, CO$ (2) N_2, C_2^{2-}, CO, NO 5. Which of the order for ionization energy is correct? [AIIMS 2013] (1) Be < B < C < N < O (2) B < Be < C < O < N(3) Be > B > C > N > O(4) B < Be < N < C < O 6. Assertion: Best diagonal relationship is shown between Be and Al. [AIIMS 2013] Reason: Ionization energy of Be is almost the same as that of AI. (1) If both assertion and reason are true and reason is the correct explanation of assertion. (2) If both assertion and reason are true but reason is not the correct explanation of assertion. (3) If Assertion is true but reason is false. (4) If both assertion and reason are false. 7. Following table shows the successive molar ionisation energy (KI mol⁻¹) of five elements A to E. Ionisation energy (kJ/mol⁻¹) [AIIMS 2015] Element 1st 2nd 3rd 4th А 4000 6100 2080 9400 В 500 4600 6900 9500 С 740 1500 7700 10500 D 2700 580 1800 11600

	Е	420	3100	4400	5900						
	Which two ele	emetns are	e most li	kely to b	be in the	e same group	o of the perio	dic table?	?		
	(1) C and D		(2) D a	nd E		(3) B and I	D	(4) B ar	nd E		
8.	Arrange the e	lements S	Se, Cl an	nd S in th	ne incre	asing order o	of ionisation e	energy :		[AIIMS	2016]
	(1) Se > S > 0	CI	(2) Se	< S < C	I	(3) Se < S	> CI	(4) Non	e of the	above	
9.	Which of the f	following c	does not	represe	ent the c	correct order	of the prope	rties indic	ated?	[AIIMS	2016]
	(1) O ⁻² > Ne >	∙ Mg²+ > Al	³⁺ (size)			(2) N³- < O	²- < F- < Na⁺	(Nuclear	charge)		
	(3) Li > Be > E	B > C (Ele	ctron ga	ain entha	alpy)	(4) Li > Na > K > Cs (iE) ₁					
10.	H⁺ ion always	; get asso	ciated w	ith other	r atoms	or molecules	. This is bec	ause		[AIIMS	2017]
	(1) Ionisation	enthalpy of	of hydro	gen rese	embles	that of alkali	metals.				
	(2) Its reactivi	ity is simila	ar to hale	ogens.							
	(3) It resemble	es both all	kali meta	als and	halogen	S.					
	(4) Loss of an	n electron	from hyd	drogen a	atom res	sults in a nuc	leus of very	small siz	e as cor	npared to	o other
	atoms or ions	;									
			/	INI\ / A						<u>, </u>	
	PARI	- III : JE		AIN) / P		PRUBLEN	15 (PREV	1005 1	EARS)	
1.	Which one of	the follow	ing ions	has the	highes	t value of ion	ic radius ?		[AIEEE	5-2004, 3	/225]
	(1) Li⁺		(2) B ³⁺			(3) O ²⁻		(4) F⁻			
2.	The formation of the oxide ion $O^{2-}_{(g)}$ requires first an exothermic and then an endothermic step as										
	shown below :										
	O _(g) +	e ⁻ = O ⁻ _(g)	; ∆H° = -	– 142 k.	Jmol⁻¹						
	O- (g) -	+ e ⁻ = O ²⁻	_(g) ; ∆H° :	= 844 k	Jmol ⁻¹				[AIEEE	5-2004, 3	/225]
	This is becaus	se :									
	(1) oxygen is	more elec	tronega	tive.							
	(2) oxygen ha	as high ele	ctron af	finity.							
	(3) O⁻ ion will	tend to re	sist the	addition	of anot	her electron.					
	(4) O⁻ ion has	s compara	tively lar	rger size	e than o	xygen atom.					
3.	In which of the	e followinç	g arrang	ements	the orde	er is NOT ac	cording to the	e propert	y indicat	ed agair	ist it ?
									[AIEE	E-2005, 3	3/225]
	(1) Al ³⁺ < Mg ²⁺	⁺ < Na⁺ < F	=- – inci	reasing	ionic siz	e					
	(2) B < C < N	< 0 – incr	reasing	first ioni	sation e	nthalpy					
	(3) I < Br < F	< Cl – incr	reasing	electron	gain er	thalpy (with	negative sigr	ר)			
	(4) Li < Na < I	K < Rb – i	ncreasir	ng metal	llic radiu	IS					
4.	Which of the f	following f	actors n	nay be r	egardec	l as the main	cause of lar	nthanide	contract	ion ?	
	(1) Greater sh	nielding of	5d elec	trons by	4f elect	trons.		[.	AIEEE 2	2005, 4½	/ 225]
	(2) Poorer shi	ielding of {	5d electi	ron by 4	f electro	ons.					
										Pag	e 32
										-	

- (3) Effective shielding of one of 4f electrons by another in the sub-shell.
- (4) Poor shielding of one of 4f electron by another in the sub-shell.

5.	The lanthanide contract	[AIEEE-2005, 3/225]							
	(1) Zr and Y have abou	t the same radius	(2) Zr and Nb have sir	nilar oxidation state					
	(3) Zr and Hf have abou	ut the same radius	(4) Zr and Zn have sa	and Zn have same oxidation state.					
6.	The increasing order of	, P, S and F (lowest first) is :							
	(1) F < S < P < B	(2) P < S < B < F	(3) B < P < S < F	(4) B < S < P < F					
7.	Lanthanoid contraction	is caused due to :		[AIEEE-2006, 4/220]					
	(1) the appreciable shielding on outer electrons by $4f$ electrons from the nuclear charge								
	(2) the appreciable shielding on outer electrons by $5f$ electrons from the nuclear charge								
	(3) the same effective nuclear charge from Ce to Lu								
	(4) the imperfect shielding on outer electrons by 4f electrons from the nuclear charge								
8.	The stability of dihalides of Si, Ge, Sn and Pb increases steadily in the sequence. [AIEEE-2007, 3/1								
	(1) SiX ₂ << GeX ₂ << Sn	X ₂ << PbX ₂	(2) PbX ₂ << SnX ₂ << GeX ₂ << SiX ₂						
	(3) GeX ₂ << SiX ₂ << Sn	X ₂ << PbX ₂	(4) SiX ₂ << GeX ₂ << P	bX ₂ << SnX ₂					
9.	The set representing the correct order of ionic radius is : [AIEEE-2009,								
	(1) Na ⁺ > Li ⁺ > Mg ²⁺ > B	e ²⁺	(2) $Li^+ > Na^+ > Mg^{2+} > Be^{2+}$						
	(3) $Mg^{2+} > Be^{2+} > Li^+ > N$	Na⁺	(4) Li* > Be ²⁺ > Na* > Mg ²⁺						
10.	The correct sequence v	which shows decreasing	order of the ionic radii of the elements is : [AIEEE-2010, 4/144]						
	(1) Al ³⁺ > Mg ²⁺ > Na ⁺ > I	> O²-	(2) Na ⁺ > Mg ²⁺ > Al ³⁺ > O ²⁻ > F ⁻ (4) O ²⁻ > F ⁻ > Na ⁺ > Mg ²⁺ > Al ³⁺						
	(3) Na ⁺ > F^- > Mg ²⁺ > O	^{2–} > Al ³⁺							
11.	The outer electron conf	iguration of Gd (Atomic N	No : 64) is : [/	AIEEE 2011 (Cancelled), 4/120]					
	(1) 4f³ 5d⁵ 6s²	(2) 4f ⁸ 5d ⁰ 6s ²	(3) 4f ⁴ 5d ⁴ 6s ²	(4) 4f ⁷ 5d ¹ 6s ²					
12.	The correct order of electron gain enthalpy with negative sign of F, Cl, Br and I, having atomic number 9, 17, 35 and 53 respectively, is:								
	(1) F > Cl > Br > l	(2) Cl > F > Br > l	(3) Br > Cl > l > F	(4) I > Br > CI > F					
13.	The increasing order of	the ionic radii of the give	en isoelectronic species	is : [AIEEE-2012, 4/144]					
	(1) Cl⁻, Ca²+ , K+, S²-	(2) S²-, Cl⁻, Ca²+, K+	(3) Ca²+, K+ , Cl⁻ , S²-	(4) K⁺, S²⁻, Ca²⁺ , Cl⁻					
14.	Which of the following represents the correct order of increasing first ionization enthalpy for Ca, B								
	Se and Ar? (1) $C_{2} < S < B_{2} < S_{2}$	Δr	[JEE Mains-2013, 4/120]						
	(3) Ba < Ca < Se < S <	Ar	(4) Ca < Ba < S < Se < Ar						

15.	The first ionisation pote	nthalpy of Na⁺ will be : [JEE Mains-2013,						
	4/120] (1) –2.55 eV	(2) –5.1 eV	(3) –10.2 eV	(4) +2.55 eV				
16.	The ionic radii (in Å) of (1) 1.36, 1.40 and 1.71 (3) 1.71, 1.40 and 1.36	N³-, O²- and F- are respe	ectively : (2) 1.36, 1.71 and 1.40 (4) 1.71, 1.36 and 1.40	[JEE Mains-2015, 4/120]				
17.	Which of the following a (1) Na	atoms has the highest firs (2) K	st ionization energy ? (3) Sc	[JEE Mains-2016] (4) Rb				
18.	The group having isoel (1) O⁻, F⁻, Na, Mg⁺	ectronic species is : (2) O²-, F⁻, Na, Mg²+	(3) O⁻, F⁻, Na⁺, Mg²+	[JEE Mains-2017] (4) O ^{2–} , F [–] , Na ⁺ , Mg ²⁺				
19.	When the first electron is : (1) almost the same as (3) a more negative val	gain enthalpy (Δ_{eg} H) of d that of the first ue than the first	oxygen is –141 kJ/mol, its second electron gain enth [JEE Mains-2019 (2) negative, but less negative than the first (4) a positive value					
20.	Aluminium is usually for states. This is due to : (1) inert pair effect (3) diagonal relationship	ound in +3 oxidation sta	tate. In contrast, thalium exists in +1 and +3 oxidation [JEE Mains-2019] (2) lanthanoid contraction (4) lattice effect					
21.	In general, the properti are : (1) atomic radius and e	es that decrease and in lectronegativity	crease down a group in the periodic table, respectively, [JEE Mains-2019] (2) electronegativity and atomic radius					
22.	 (3) election gain entrain The effect of lanthanoid (1) increase in atomic r (2) decrease in both ato (3) increase in both ato (4) decrease in atomic 	d contraction in the lantha adii and decrease in ionio omic and ionic radii mic and ionic radii radii and increase in ionio	(4) electronegativity and anoid series of elements c radii	eries of elements by an and large means : [JEE Mains-2019]				
23.	The electronegativity of (1) Lithium	aluminium is similar to : (2) Carbon	(3) Boron	[JEE Mains-2019] (4) Beryllium				
24.	The correct option with	The correct option with respect to the Pauling, electronegativity values of the elements is : [JEE Mains-201						
25.	 (1) I e > Se The correct order of the (1) C < S < AI <cs< li=""> </cs<>	(2) Ga < Ge e atomic radii of C, Cs, A (2) S < C < AI < Cs	(3) SI < AI I, and S is: (3) S < C < Cs < AI	(4) P > S [JEE Mains-2019] (4) C < S < Cs < Al				

Answers

	~							_ 1					
SEC	TION (A)						UJE	- 1					
1.	(3)	2.	(3)	3.	(2)	4.	(3)	5.	(1)	6.	(1)	7.	(4)
8.	(2)	9.	(3)	10.	(1)	11.	(3)	12.	(4)	13.	(4)		()
SEC	TION (B)		()		()		()		()		()		
1.	(1)	2.	(4)	3.	(1)								
SEC	TION (C)												
1.	(3)	2.	(3)	3.	(2)	4.	(4)	5.	(2)	6.	(4)	7.	(2)
8.	(2)	9.	(1)	10.	(1)	11.	(3)	12.	(3)	13.	(2)		
SEC	TION (D)												
1.	(4)	2.	(1)	3.	(2)	4.	(1)	5.	(2)	6.	(2)	7.	(2)
8.	(2)	9.	(2)	10.	(1)	11.	(3)	12.	(3)	13.	(4)	14.	(1)
SEC	TION (E)												
1.	(3)	2.	(4)	3.	(2)	4.	(3)	5.	(3)	6.	(4)	7.	(2)
8.	(3)	9.	(4)	10.	(2)	11.	(1)	12.	(4)				
SEC	TION (F)												
1.	(3)	2.	(1)	3.	(3)	4.	(3)	5.	(1)	6.	(1)	7.	(3)
8.	(2)	9.	(4)	10.	(2)	11.	(3)						
SEC	TION (G)												
1.	(2)	2.	(3)	3.	(4)	4.	(2)	5.	(1)	6.	(4)	7.	(1)
8	(2)	9	(4)	10	(3)								
<u> </u>	(2)	0.	(-)	10.	(0)	EYED		- 2					
1.	(3)	2.	(2)	3.	(3)		(4)	<u>- ∠</u> 5.	(4)	6.	(1)	7.	(4)
8.	(2)	9.	(3)	10.	(3)	11.	(2)	12.	(4)	13.	(4)	14.	(2)
15.	(1)	16.	(2)	17.	(1)	18.	(4)	19.	(4)		(')		(-)
	. ,		. ,		. ,	EXER	CISE	- 3	. ,				
						<u></u> P/	ART-I	•					
1.	(2)	2.	(4)	3.	(4)	4.	(2)	5.	(3)	6.	(1)	7.	(1)
8.	(2)	9.	(2)	10.	(2)	11.	(4)	12.	(3)	13.	(3)	14.	(2)
15.	(1)	16.	(1)	17.	(BON	US) 18.	(1)	19.	(2)	20.	(2)	21.	(3,4)
22.	(3)	23.	(1)	24.	(2)	25.	(2)						
						PA	RT-II						
1.	(4)	2.	(4)	3.	(3)	4.	(3)	5.	(2)	6.	(1)	7.	(4)
8.	(2)	9.	(3)	10.	(4)								
						PA	RT-III						
1.	(3)	2.	(3)	3.	(2)	4.	(4)	5.	(3)	6.	(4)	7.	(4)
8.	(1)	9.	(1)	10.	(4)	11.	(4)	12.	(2)	13.	(3)	14.	(3)
15.	(2)	16.	(3)	17.	(3)	18.	(4)	19.	(4)	20.	(1)	21.	(2)
22.	(2)	23.	(4)	24.	(2)	25.	(1)						