Exercise – I (JEE-Main Pattern)

SECTION–A

- This section contains **TWENTY** questions.
- Each question has **FOUR** options (1), (2), (3) and (4). **ONLY ONE** of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories:

Full Marks : +4, if only the bubble corresponding to the correct option is darkened.
Zero Marks : 0, if none of the bubbles is darkened.
Negative Marks : –1 in all other cases

1. Which of the following is not a Dobereiner triad :
(1) H, F, Cl (2) N, O, F (3) P, As, Sb (4) S, Se, Te

CPT001

2. Which of the following does not reflect the periodicity of element
(1) Bonding behaviour (2) Electronegativity
(3) Ionisation potential (4) Neutron/ Proton ratio

CPT002

3. The number of paired electrons in oxygen atom is:
(1) 6 (2) 16 (3) 8 (4) 32

CPT003

4. Atomic number is the base of :–
(a) Lothar Meyer curve (b) Newland octave rule
(c) Modern periodic table (d) Dobereiner triad rule
(e) Long form of periodic table
(1) a, b, d (2) c, e (3) a, d (4) a, c, e

CPT004

5. For an element, the quantum numbers of the last electron are as following :
$\ell = 3$, m = – 2 and s = + 1/2. The element belongs to :
(1) s-Block (2) p-Block (3) d-Block (4) f-Block

CPT005

6. Which of the following has the lowest anion to cation size ratio ?
(1) LiF (2) NaF (3) CsI (4) CsF

CPT006

7. The correct order of decreasing first ionization energy is :
(1) Si > Al > Mg > Na (2) Si > Mg > Al > Na
(3) Al > Si > Mg > Na (4) Mg > Na > Al > Si

CPT007

8. The ionization energy and electron affinity of an element are 17.42 and 3.42 eV respectively. Then the electronegativity of the element on Pauling scale is :
(1) 10.435 (2) 3.726 (3) 0.166 (4) 2.88

CPT008

9. IP_1 and IP_2 of Mg are 178 and 348 kcal mol^{-1}. The enthalpy required for the reaction $Mg \rightarrow Mg^{2\oplus} + 2e^{\ominus}$ is :-

(1) + 170 kcal mol^{-1} (2) + 526 kcal mol^{-1}

(3) – 170 kcal mol^{-1} (4) – 526 kcal mol^{-1}

CPT009

10. If the ionic radii of $K^{\oplus}$ and $F^{\ominus}$ are nearly the same (i.e. 1.34 Å), then the atomic radii of K and F are respectively :

(1) 1.34 Å, 1.34 Å (2) 0.72 Å, 1.96 Å (3) 1.96 Å, 0.72 Å (4) 1.96 Å, 1.34 Å

CPT010

11. Which of the following oxide is neutral ?

(1) CO (2) SnO_2 (3) ZnO (4) SiO_2

CPT011

12. IUPAC name of the element placed just after actinide series :-

(1) Unniltrium (2) Unnilpentium (3) Unnilquadium (4) Ununbium

CPT012

13. The amount of energy released for the process $X_{(g)} + e^{\ominus} \rightarrow X^{\ominus}_{(g)}$ is minimum and maximum respectively for :–

(a) F (b) Cl (c) N (d) B

Correct answer is :–

(1) c & a (2) d & b (3) a & b (4) c & b

CPT013

14. Choose the s-block element from the following:

(1) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^5, 4s^1$ (2) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^1$

(3) $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$ (4) all of the above

CPT014

15. Which of the following order is incorrect against the property indicated :

(1) Mg < Ar < Na (2nd I.E.) (2) Be < F < Cl ($|\Delta H_{eg}|$)

(3) Rb < Na < K > Ca (atomic radius) (4) P < S < N (electronegativity)

CPT015

16. EN of the element (A) is E_1 and IP is E_2. Hence EA will be according to mulliken

(1) $2E_1 - E_2$ (2) $E_1 - E_2$ (3) $E_1 - 2E_2$ (4) $(E_1 + E_2)/2$

CPT016

17. Moving from right to left in a periodic table, the atomic size is:

(1) Increased (2) Decreased (3) Remains constant (4) None of these

CPT017

18. One element has atomic weight 39. Its electronic configuration is $1s^2, 2s^2\ 2p^6, 3s^2\ 3p^6\ 4s^1$. The true statement for that element is:

(1) High value of IE (2) Transition element (3) Isotone with $_{18}Ar^{38}$ (4) None

CPT018

19. The decreasing size of $K^{\oplus}$, $Ca^{2\oplus}$, $Cl^{\ominus}$ & $S^{2\ominus}$ follows the order:

(1) $K^{\oplus} > Ca^{2\oplus} > S^{2\ominus} > Cl^{\ominus}$ (2) $K^{\oplus} > Ca^{2\oplus} > Cl^{\ominus} > S^{2\ominus}$

(3) $Ca^{2\oplus} > K^{\oplus} > Cl^{\ominus} > S^{2\ominus}$ (4) $S^{2\ominus} > Cl^{\ominus} > K^{\oplus} > Ca^{2\oplus}$

CPT019

20. The process requires absorption of energy is

(1) $F \rightarrow F^{\ominus}$ (2) $Cl \rightarrow Cl^{\ominus}$ (3) $O^{\ominus} \rightarrow O^{2\ominus}$ (4) $H \rightarrow H^{\ominus}$

CPT020

SECTION-B

- This section will have **TEN questions**. Candidate can choose to attempt any 5 questions out of these 10 questions. In case if candidate attempts more than 5 questions, first 5 attempted questions will be considered for marking.
- The answer to each question is a **NUMERICAL VALUE.**
- For each question, enter the correct numerical value (Answer should be rounded off to the nearest integer).
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +4, if only correct answer is given.

Zero Marks : 0, if no answer is given.

Negative Marks :-1 for incorrect answer

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1. Find out the atomic number of element whose IUPAC name is Unnilpentium.

Fill your answer as sum of digits (excluding decimal places) till you get the single digit answer.

CPT021

2. Find the number of transition metals among the following.

Pb, Gd, Mo, Rh, Fe, Zn, Al

CPT022

3. Upto argon find the number of elements which have lower IE_1 as compared to He mark your answer as sum of digits

CPT023

4. Find the number of elements of p-block having atleast three valence electrons.

Na, Ca, Cl, Se, Mn, B

CPT024

5. Find the number of oxide(s) which are more acidic than SO_3.

SO_2, Cl_2O_7, P_2O_5, CaO, Al_2O_3

CPT025

6. How many of the following radius orders are incorrect ?

(i) $N^{3\ominus} > P^{3\ominus}$ (ii) $O^{2\ominus} > F^{\ominus}$

(iii) $Ca^{2\oplus} > Sr^{2\oplus}$ (iv) $S^{1\ominus} > S^{2\ominus}$

(v) $S^{2\ominus} > O^{\ominus}$ (vi) $Na^{\oplus} > F^{\ominus}$

CPT026

7. The number of oxygen atoms in the most acidic oxide among Cl_2O, Cl_2O_3, ClO_2, Cl_2O_5, Cl_2O_6, Cl_2O_7 is.

CPT027

8. How many of the following oxides are amphoteric
$BeO, Al_2O_3, SnO_2, N_2O, NO, CO_2, PbO_2, Sb_2O_3$

CPT028

9. Size of $H^{\ominus}$ is smaller than how many elements among these ?

H, Li, Be, B, C, N, O, F, $F^{\ominus}$

CPT029

10. _____ is higher for fluorine as compared to chlorine.

Find the number of properties given below to fill the blank space to make a correct statement.

Atomic mass, Covalent radius, Ionic radius ($X^{\ominus}$), Ionization energy, Electron affinity, Electronegativity,

CPT030

Exercise – II (JEE-Main PYQs)

1. The correct order of the atomic radii of C, Cs, Al and S is : **[JEE (Main) 2019]**

(1) S < C < Al < Cs (2) S < C < Cs < Al

(3) C < S < Cs < Al (4) C < S < Al < Cs

CPT031

2. The correct option with respect to the Pauling electronegativity values of the elements is :- **[JEE (Main) 2019]**

(1) Ga < Ge (2) Si < Al (3) P > S (4) Te > Se

CPT032

3. The IUPAC symbol for the element with atomic number 119 would be : **[JEE (Main) 2019]**

(1) Unh (2) Uun (3) Une (4) Uue

CPT033

4. The isoelectronic set of ions is : **[JEE (Main) 2019]**

(1) $N^{3\ominus}, Li^{\oplus}, Mg^{2\oplus}$ and $O^{2\ominus}$ (2) $Li^{\oplus}, Na^{\oplus}, O^{2\ominus}$ and $F^{\ominus}$

(3) $F^{\ominus}, Li^{\oplus}, Na^{\oplus}$ and $Mg^{2\oplus}$ (4) $N^{3\ominus}, O^{2\ominus}, F^{\ominus}$ and $Na^{\oplus}$

CPT034

5. The electronegativity of aluminium is similar to : **[JEE (Main) 2019]**

(1) Boron (2) Carbon (3) Lithium (4) Beryllium

CPT036

6. The first ionization energy (in kJ/mol) of Na, Mg, Al and Si respectively, are : **[JEE (Main) 2020]**

(1) 496, 737, 577, 786 (2) 786, 737, 577, 496

(3) 496, 577, 737, 786 (4) 496, 577, 786, 737

CPT037

7. The acidic, basic and amphoteric oxides, respectively, are : **[JEE (Main) 2020]**

(1) MgO, Cl_2O, Al_2O_3 (2) Cl_2O, CaO, P_4O_{10}

(3) Na_2O, SO_3, Al_2O_3 (4) N_2O_3, Li_2O, Al_2O_3

CPT038

8. The electronic configurations of bivalent europium and trivalent cerium are :
(atomic number : Xe = 54, Ce = 58, Eu = 63) **[JEE (Main)-2020]**

(1) [Xe] $4f^4$ and [Xe] $4f^9$ (2) [Xe] $4f^7$ and [Xe] $4f^1$

(3) [Xe] $4f^7\ 6s^2$ and [Xe] $4f^2\ 6s^2$ (4) [Xe] $4f^2$ and [Xe] $4f^7$

CPT039

9. The electron gain enthalpy (in kJ/mol) of fluorine, chlorine, bromine and iodine, respectively are : **[JEE (Main) 2020]**

(1) – 333, – 349, – 325 and – 296 (2) –296, – 325, – 333 and – 349

(3) – 333, – 325, – 349 and – 296 (4) –349, – 333, – 325 and – 296

CPT040

10. Within each pair of elements of F & Cl , S & Se, and Li & Na, respectively, the elements that release more energy upon an electron gain are- **[JEE (Main) 2020]**

(1) F, Se and Na (2) F, S and Li (3) Cl, S and Li (4) Cl, Se and Na

CPT041

11. In general, the property (magnitudes only) that shows an opposite trend in comparison to other properties across a period is **[JEE (Main) 2020]**

(1) Electronegativity (2) Electron gain enthalpy
(3) Ionization enthalpy (4) Atomic radius

CPT042

12. Three elements X, Y and Z are in the 3^{rd} period of the periodic table. The oxides of X, Y and Z, respectively, are basic, amphoteric and acidic. The correct order of the atomic numbers of X, Y and Z is : **[JEE (Main)-2020]**

(1) Z < Y < X (2) X < Z < Y (3) X < Y < Z (4) Y < X < Z

CPT043

13. Among the statements (I – IV), the correct ones are :
(I) Be has smaller atomic radius compared to Mg.
(II) Be has higher ionization enthalpy than Al.
(III) Charge/radius ratio of Be is greater than that of Al.
(IV) Both Be and Al form mainly covalent compounds. **[JEE (Main)-2020]**

(1) (I), (II) and (IV) (2) (II), (III) and (IV)
(3) (I), (II) and (III) (4) (I), (III) and (IV)

CPT044

14. The increasing order of the atomic radii of the following elements is :

(a) C (b) O (c) F
(d) Cl (e) Br **[JEE(Main) 2020]**

(1) (b) < (c) < (d) < (a) < (e) (2) (a) < (b) < (c) < (d) < (e)
(3) (d) < (c) < (b) < (a) < (e) (4) (c) < (b) < (a) < (d) < (e)

CPT047

15. The correct order of electron gain enthalpy is **[JEE (Main) 2021]**

(1) S > Se > Te > O (2) Te > Se > S > O (3) O > S > Se > Te (4) S > O > Se > Te

CPT048

16. The metal that has very low melting point and its periodic position is closer to a metalloid is : **[JEE (Main) 2022]**

(1) Al (2) Ga (3) Se (4) In

CPT049

17. The correct decreasing order for metallic character is **[JEE (Main) 2022]**

(1) Na > Mg > Be > Si > P (2) P > Si > Be > Mg > Na
(3) Si > P > Be > Na > Mg (4) Be > Na > Mg > Si > P

CPT050

18. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R.**
Assertion A: The energy required to form Mg^{2+} from Mg is much higher than that required to produce Mg^{+}.
Reason R: Mg^{2+} is small ion and carry more charge than Mg^{+}.
In the light of the above statements, choose the **correct** answer from the options given below: **[JEE (Main) 2023]**

(1) Both A and R are true but R is NOT the correct explanation of A.
(2) A is true but R is false.
(3) A is false but R is true.
(4) Both A and R are true and R is the correct explanation of A. **CPT176**

19. Inert gases have positive electron gain enthalpy. Its correct order is **[JEE (Main) 2023]**

(1) Xe < Kr < Ne < He (2) He < Ne < Kr < Xe

(3) He < Xe < Kr < Ne (4) He < Kr < Xe < Ne

CPT177

20. The correct increasing order of the ionic radii is **[JEE (Main)-2023]**

(1) $Cl^- < Ca^{2+} < K^+ < S^{2-}$ (2) $K^+ < S^{2-} < Ca^{2+} < Cl^-$

(3) $S^{2-} < Cl^- < Ca^{2+} < K^+$ (4) $Ca^{2+} < K^+ < Cl^- < S^{2-}$

CPT178

Exercise - III (JEE Advanced Pattern)

SECTION–I

- This section contains **FOURTH** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories:

Full Marks	: +3	If only the bubble corresponding to the correct option is darkened.
Zero Marks	: 0	If none of the bubbles is darkened.
Negative Marks	: –1	In all other cases

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1. Consider the following changes :

(1) $M(s) \longrightarrow M(g)$

(2) $M(s) \longrightarrow M^{2\oplus}(g) + 2e^{\ominus}$

(3) $M(g) \longrightarrow M^{\oplus}(g) + e^{\ominus}$

(4) $M^{\oplus}(g) \longrightarrow M^{2\oplus}(g) + e^{\ominus}$

(5) $M(g) \longrightarrow M^{2\oplus}(g) + 2e^{\ominus}$

The second ionization energy of M could be calculated from the energy values associated with :

(A) 1 + 3 + 4 (B) 2 – 1 + 3

(C) 1 + 5 (D) 5 – 3

CPT051

2. Out of $Na^{\oplus}$, $Mg^{2\oplus}$, $O^{2\ominus}$ and $N^{3\ominus}$, the pair of species showing minimum and maximum IP would be.

(A) $Na^{\oplus}, Mg^{2\oplus}$ (B) $Mg^{2\oplus}, N^{3\ominus}$

(C) $N^{3\ominus}, Mg^{2\oplus}$ (D) $O^{2\ominus}, N^{3\ominus}$

CPT052

3. The correct order of stability of $Al^{\oplus}$, $Al^{2\oplus}$, $Al^{3\oplus}$ is :-

(A) $Al^{3\oplus} > Al^{2\oplus} > Al^{\oplus}$

(B) $Al^{2\oplus} > Al^{3\oplus} > Al^{\oplus}$

(C) $Al^{2\oplus} < Al^{\oplus} > Al^{3\oplus}$

(D) $Al^{3\oplus} > Al^{\oplus} > Al^{2\oplus}$

CPT053

4. Which order is wrong :-

(A) Electronegativity – P < N < O < F

(B) I^{st} ionisation potential – B < Be < O < N

(C) Basic property – MgO > CaO > FeO > Fe_2O_3

(D) Reactivity – Be < Li < K < Cs

CPT054

SECTION-II

- This section contains **THREE** questions.
- Each question has **FOUR** options for correct answer(s). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct option(s).
- For each question, choose the correct option(s) to answer the question.
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks	: +4	If only (all) the correct option(s) is (are) chosen.
Partial Marks	: +3	If all the four options are correct but ONLY three options are chosen.
Partial Marks	: +2	If three or more options are correct but ONLY two options are chosen, both of which are correct options.
Partial Marks	: +1	If two or more options are correct but ONLY one option is chosen and it is a correct option.
Zero Marks	: 0	If none of the options is chosen (i.e. the question is unanswered).
Negative Marks	: –2	In all other cases.

For Example : If first, third and fourth are the **ONLY** three correct options for a question with second option being an incorrect option; selecting only all the three correct options will result in +4 marks. Selecting only two of the three correct options (e.g. the first and fourth options), without selecting any incorrect option (second option in this case), will result in +2 marks. Selecting only one of the three correct options (either first or third or fourth option), without selecting any incorrect option (second option in this case), will result in +1 marks. Selecting any incorrect option(s) (second option in this case), with or without selection of any correct option(s) will result in –2 marks.

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5. Select the correct statement(s).

(A) The value of electron gain enthalpy of an element can be -ve or +ve.

(B) In the periodic table, metallic character of the elements increases down the group and decreases across the period

(C) The $Cl^{\ominus}$ & $S^{2\ominus}$ are isoelectronic species but first one is not smaller in size than the second

(D) Ionization enthalpy of an atom is equal to electron gain enthalpy of cation

CPT055

6. In halogens, which of the following properties increase from iodine to fluorine

(A) Ionisation energy (B) Electronegativity

(C) Bond length (D) Electron affinity

CPT056

7. Which are correct match ?

(A) O < C < S < Se — Atomic size

(B) Na < Al < Mg < Si — I^{st} I.P

(C) MgO < SrO < Cs_2O < K_2O — Basic character

(D) P_4O_{10} > SO_3 > Cl_2O_7 - Acidic character

CPT057

SECTION–III

- This section contains **SEVEN** questions.
- **Each question has matching lists.** The codes for the lists have choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**
- For each question, marks will be awarded in one of the following categories :

Full Marks	: +3	If only the bubble corresponding to the correct option is darkened.
Zero Marks	: 0	If none of the bubbles is darkened.
Negative Marks	: –1	In all other cases

Match the column :

8. Match the column :

Column I	**Column II**
(A) Highest density	(P) Lithium
(B) Metallic character	(Q) Osmium
(C) Lightest Metal	(R) Mercury
(D) Liquid at room temperature	(S) Bromine

(A) ((A) Q ;(B) P, Q, R ;(C) P ;(D) R, S) (B) ((A) P ;(B) P, Q, R ;(C) Q ;(D) R, S)
(C) ((A) P, Q, R;(B) Q;(C) P ;(D) R, S) (D) ((A) R, S ;(B) P, Q, R ;(C) P ;(D) Q)

CPT058

9. If electrons are filled in the sub shells of an atom in the following order 1s, 2s, 2p, 3s, 3p, 3d, 4s, 4p, 4d, 4f..... then match the following element in List I with block in List II.

List-I	**List-II**
(A) K(19)	(P) s-Block
(B) Fe(26)	(Q) p-Block
(C) Ga(31)	(R) d-Block
(D) Sn(50)	(S) f-block

CPT059

(A) (A)P ; (B)Q ; (C)R ; (D)S (B) (A)R ; (B)R ; (C)Q ; (D)S
(C) (A)S ; (B)R ; (C)Q ; (D)P (D) (A)Q ; (B)R ; (C)R ; (D)S

10. Match List I (Element) with List II (Electronegativity on Pauling Scale) and select the correct answer using the codes given below :

List I (Element)	**List II (Electronegativity on Pauling scale)**
A. Carbon	1. 0.8
B. Nitrogen	2. 1.6
C. Aluminium	3. 2.5
D. Cesium	4. 3.0
	5. 4.0

Code :	**A**	**B**	**C**	**D**		**A**	**B**	**C**	**D**
(A)	2	4	5	1	(B)	3	1	2	4
(C)	2	1	5	4	(D)	3	4	2	1

CPT060

11. Match List I (Atomic Number of Element) with List II (Block to which the Element Belongs) and select the correct answer using the codes given below :

List I (Atomic Number of Element)	**List II** (Block to which the element belongs)
A. 24	1. p
B. 38	2. f
C. 49	3. s
D. 59	4. d

Code :

	A	**B**	**C**	**D**
(A)	2	1	3	4
(B)	4	3	1	2
(C)	2	3	1	4
(D)	4	1	3	2

CPT061

12. Match the correct atomic radius with the element.

Element	**Atomic radius (pm)**
(A) Be	(p) 74
(B) C	(q) 88
(C) O	(r) 111
(D) B	(s) 77
(E) N	(t) 66

(A) (A) → (t), (B) → (q), (C) → (r), (D) → (s), (E) → (p)
(B) (A) → (p), (B) → (s), (C) → (t), (D) → (q), (E) → (r)
(C) (A) → (r), (B) → (s), (C) → (t), (D) → (q), (E) → (p)
(D) (A) → (s), (B) → (r), (C) → (t), (D) → (q), (E) → (p)

CPT062

13. Match the correct ionisation enthalpies and electron gain enthalpies of the following elements.

Elements	ΔH_1	ΔH_2	ΔH_{eg}
(i) Most reactive non metal	A. 419	3051	– 48
(ii) Most reactive metal	B. 1681	3374	– 328
(iii) Least reactive element	C. 738	1451	– 40
(iv) Metal forming binary halide	D. 2372	5251	+ 48

(A) (i)–B, (ii)–A, (iii)–D, (iv)–C
(B) (i)–A, (ii)–B, (iii)–C, (iv)–D
(C) (i)–D, (ii)–C, (iii)–B, (iv)–A
(D) (i)–D, (ii)–A, (iii)–B, (iv)–C

CPT063

14. Match the characteristics mentioned in List II with the process in List I.

List I	**List II**
(A) $O(g) + e^{\ominus} \rightarrow O^{\ominus}(g)$	(P) Positive electron gain enthalpy
(B) $O^{\ominus}(g) + e^{\ominus} \rightarrow O^{2\ominus}(g)$	(Q) Negative electron gain enthalpy
(C) $Na^{\ominus}(g) \rightarrow Na(g) + e^{\ominus}$	(R) Exothermic
(D) $Mg^{\oplus}(g) + e^{\ominus} \rightarrow Mg(g)$	(S) Endothermic

(A) (A) P,S; (B) Q,R ; (C) S ; (D) Q,R
(B) (A) Q,R ; (B) P,S ; (C) S ; (D) Q,R
(C) (A) S ; (B) P,S ; (C) Q,R ; (D) Q,R
(D) (A) Q,R ; (B) S; (C) P,S ; (D) Q,R

CPT064

SECTION–IV

- contains **ONE** paragraph.
- Based on each paragraph, there are **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D) **ONLY ONE** of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories:

Full Marks : +3 if only the bubble corresponding to the correct answer is darkened.

Zero Marks : 0 in all other cases.

Paragraph for Questions No. 15 & 16

First electron gain enthalpy (in $\frac{kJ}{mol}$) of few elements are given below :

Elements	ΔH_{eg}
I	–60
II	–45
III	–328
IV	–295
V	+48

Answer the following questions on the basis of above data:

15. Which element may be an inert gas

(A) I (B) III (C) IV (D) V

CPT065

16. Which element is most non-metallic among all the elements -

(A) I (B) II (C) III (D) IV

CPT066

SECTION–V

- This section contains **FOUR** questions.
- The answer to each question is a **NUMERICAL VALUE.**
- For each question, enter the correct numerical value (in decimal notation, truncated/rounded-off to the second decimal place; e.g. 6.25, 7.00, –0.33, –.30, 30.27, –127.30, if answer is 11.36777..... then both 11.36 and 11.37 will be correct).
- Answer to each question will be evaluated according to the following marking scheme:

Full Marks : +3, if ONLY the correct numerical value is entered as answer.

Zero Marks : 0, in all other cases.

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17. For an element the successive ionisation energy values (in eV/atom), are given below.
14.534, 29.601, 47.448, 77.472, 97.888, 552.057, 667.029
Find the number of valence shell electrons in that element.

CPT067

18. How many of the following properties are higher for Aluminium as compared to Gallium.
Atomic mass, Covalent radius, Ionization energy, Electron affinity, Electronegativity, Effective Nuclear charge. **CPT068**

19. How many orders are CORRECT

(a) Acidic strength $\Rightarrow$ ClOH < BrOH < IOH

(b) Basic strength $\Rightarrow$ BeO < MgO < CaO < SrO

(c) Electronegativity $\Rightarrow$ I < Br < N < O < F

(d) Electron affinity $\Rightarrow$ Mg < Na < Si < S < Cl

(e) % Ionic character $\Rightarrow$ F–H < O–H < N–H

CPT069

20. Write the number of pairs in which size of first element or ion is higher as compared to II^{nd} out of following eight pairs.

(O,S) , (He, Ne), (Kr, Ne), (Na, $Na^{\oplus}$), (Cl, $Cl^{\ominus}$), ($I^{\ominus}$, $Cl^{\ominus}$), (Li, Na), ($Li^{\oplus}$, $Na^{\oplus}$)

CPT070

Exercise - IV (JEE Advanced PYQs)

1. **Statement-1 :** F atom has a less negative electron gain enthalpy than Cl atom.
Statement-2 : Additional electron is repelled more efficiently by 3p electron in Cl atom than by 2p electron in F atom. **[JEE (Advanced) 2000]**

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.
(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement-2 is false.
(D) Statement-1 is false, statement-2 is true.

CPT071

2. The correct order of radii is : **[JEE (Advanced) 2000]**

(A) N < Be < B
(B) $F^{\ominus} < O^{2\ominus} < N^{3\ominus}$
(C) Na < Li < K
(D) $Fe^{3\oplus} < Fe^{2\oplus} < Fe^{4\oplus}$

CPT072

3. The IE_1 of Be is greater than that of B. [T/F] **[JEE (Advanced) 2001]**

CPT073

4. The set representing correct order of IP_1 is **[JEE (Advanced) 2001]**

(A) K > Na > Li
(B) Be > Mg > Ca
(C) B > C > N
(D) Fe > Si > C

CPT074

5. Identify the least stable ion amongst the following : **[JEE (Advanced) 2002]**

(A) $Li^{\ominus}$
(B) $Be^{\ominus}$
(C) $B^{\ominus}$
(D) $C^{\ominus}$

CPT075

6. The increasing order of atomic radii of the following group 13 elements is **[JEE (Advanced) 2016]**

(A) Al < Ga < In < Tl
(B) Ga < Al < In < Tl
(C) Al < In < Ga < Tl
(D) Al < Ga < Tl < In

CPT076

7. The option(s) with only amphoteric oxides is (are): **[JEE (Advanced) 2017]**

(A) Cr_2O_3, CrO, SnO, PbO
(B) NO, B_2O_3, PbO, SnO_2
(C) Cr_2O_3, BeO, SnO, SnO_2
(D) ZnO, Al_2O_3, PbO, PbO_2

CPT077

8. The 1st , 2nd and the 3rd ionization enthalpies I_1, I_2 and I_3, of four atoms with atomic numbers n, n+1, n+2 and n+3 , where n < 10, are tabulated below. What is the value of n?

[JEE (Advanced) 2020]

CPT078

Atomic number	Ionization Enthalpy (kJ/mol)		
	I_1	I_2	I_3
n	1681	3374	6050
n+1	2081	3952	6122
n+2	496	4562	6910
n+3	738	1451	7733

Answer Key

Exercise - I (JEE-Main Pattern)

Section-A	Q.	1	2	3	4	5	6	7	8	9	10
	A.	2	4	1	2	4	4	2	2	2	3
	Q.	11	12	13	14	15	16	17	18	19	20
	A.	1	3	4	3	3	1	1	3	4	3
Section-B	Q.	1	2	3	4	5	6	7	8	9	10
	A.	6	3	8	3	1	4	7	5	0	2

Exercise - II (JEE-Main PYQs)

Question	1	2	3	4	5	6	7	8	9	10
Answer	4	1	4	4	4	1	4	2	1	3
Question	11	12	13	14	15	16	17	18	19	20
Answer	4	3	1	4	1	2	1	4	3	4

Exercise - III (JEE-Advanced Pattern)

Section-I	Q.	1	2	3	4				
	A.	D	C	D	C				
Section-II	Q.	5	6	7					
	A.	A,B,D	A,B	A,B					
Section-III	Q.	8	9	10	11	12	13	14	
	A.	A	B	D	B	C	A	B	
Section-IV	Q.	15	16						
	A.	D	C						
Section-V	Q.	17	18	19	20				
	A.	5	3	3	3				

Exercise - IV (JEE Advanced PYQs)

Question	1	2	3	4	5	6	7	8
Answer	C	B	T	B	B	B	C,D	9

Important Notes