**Q1 - 25 January - Shift 1**

Inert gases have positive electron gain enthalpy. Its correct order is

(1) Xe < Kr < Ne < He

(2) He < Ne < Kr < Xe

(3) He < Xe < Kr < Ne

(4) He < Kr < Xe < Ne

*Space for your notes:*

**Q2 - 25 January - Shift 2**

Which of the following represents the correct order of metallic character of the given elements ?

(1) Si < Be < Mg < K (2) Be < Si < Mg < K

(3) K < Mg < Be < Si (4) Be < Si < K < Mg

*Space for your notes:*

**Q3 - 29 January - Shift 1**

The bond dissociation energy is highest for

(1) $Cl_2$

(2) $I_2$

(3) $Br_2$

(4) $F_2$

*Space for your notes:*

**Q4 - 30 January - Shift 1**

Match List – I with List – II

| LIST–I (Atomic number) | | LIST–II (Block of periodic table) | |
|---|---|---|---|
| (A) | 37 | I. | p–block |
| (B) | 78 | II. | d–block |
| (C) | 52 | III. | f–block |
| (D) | 65 | IV. | s–block |

Choose the **correct** answer from the options given below:

(1) A – II, B – IV, C – I, D – III

(2) A – I, B – III, C – IV, D – II

(3) A – IV, B – III, C – II, D – I

(4) A – IV, B – II, C – I, D – III

*Space for your notes:*

**Q5 - 31 January - Shift 1**

The correct increasing order of the ionic radii is

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

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

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

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

*Space for your notes:*

**Q6 - 31 January - Shift 1**

$Nd^{2+} =$ _____

(1) $4f^2 6s^2$

(2) $4f^4$

(3) $4f^3$

(4) $4f^4 6s^2$

*Space for your notes:*

Q7 - 31 January - Shift 2

Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**

**Assertion (A) :** The first ionization enthalpy of 3d series elements is more than that of group 2 metals

**Reason (R) :** In 3d series of elements successive filling of d-orbitals takes place.

In the light of the above statements, choose the **correct** answer from the options given below :

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**

(2) Both **(A)** and **(R)** are true but **(R)** is **not** the correct explanation of (A)

(3) **(A)** is false but **(R)** is true

(4) **(A)** is true but **(R)** is false

*Space for your notes:*

Q8 - 31 January - Shift 2

Which of the following elements have half-filled f-orbitals in their ground state ?
(Given : atomic number
Sm = 62; Eu = 63; Tb = 65; Gd = 64, Pm = 61 )

A. Sm
B. Eu
C. Tb
D. Gd
E. Pm

Choose the **correct** answer from the options given below:

(1) B and D only (2) A and E only
(3) A and B only (4) C and D only

*Space for your notes:*

Q9 - 01 February - Shift 2

For electron gain enthalpies of the elements denoted as $\Delta_{eg}H$, the incorrect option is :

(1) $\Delta_{eg}H$ (Cl) < $\Delta_{eg}H$ (F)

(2) $\Delta_{eg}H$ (Se) < $\Delta_{eg}H$ (S)

(3) $\Delta_{eg}H$ (I) < $\Delta_{eg}H$ (At)

(4) $\Delta_{eg}H$ (Te) < $\Delta_{eg}H$ (Po)

*Space for your notes:*

# Answer Key

**(As per Official NTA Key released on 2 Feb)**

| | | | |
|---|---|---|---|
| **Q1** (3) | **Q2** (1) | **Q3** (1) | **Q4** (4) |
| **Q5** (4) | **Q6** (2) | **Q7** (1) | **Q8** (1) |
| **Q9** (2) | | | |

Q1 (3)

| Element | ΔegH[KJ/mol] |
|---|---|
| He | +48 |
| Ne | +116 |
| Kr | +96 |
| Xe | +77 |

From NCERT

So, order is Ne > Kr >Xe> He

Q2 (1)

Metallic character increases down the group and decreases along the period.

Q3 (1)

Bond energy of $F_2$ less than $Cl_2$ due to lone pair lone pair repulsions.

Bond energy order $Cl_2 > Br_2 > F_2 > I_2$

Q4 (4)

| Atomic number | Block |
|---|---|
| 37 (K) | s-block |
| 78 (Pt) | d-block |
| 52 (Te) | p-block |
| 65 (Tb) | f-block |

Q5 (4)

In isoelectronic species size $\propto \frac{1}{Z}$

$$Ca^{2+} < K^{+} < Cl^{-} < S^{2-} : \text{Size}$$

**Q6 (2)**

$$Nd(60) = [Xe]\ 4f^4\ 5d^0\ 6s^2$$

$$Nd^{2+} = [Xe]\ 4f^4\ 5d^0\ 5s^0$$

**Q7 (1)**

From Sc to Mn ionization energy is less than that of Mg.

**For 3d series :**

| | Sc | Ti | V | Cr | Mn |
|---|---|---|---|---|---|
| IE (KJ/mol) | 631 | 656 | 650 | 653 | 717 |
| | Fe | Co | Ni | Cu | Zn |
| IE (KJ/mol) | 762 | 758 | 736 | 745 | 906 |

**For 2nd Group**

| | Be | Mg | Ca | Sr | Ba | Ra |
|---|---|---|---|---|---|---|
| IE (KJ/mol) | 631 | 656 | 650 | 653 | 717 | 762 |

**Q8 (1)**

1. $_{62}Sm : 4f^6 6s^2$
2. $_{64}Gd : 4f^7 5d^1 6s^2$
3. $_{63}Eu : 4f^7 6s^2$
4. $_{65}Tb: 4f^9 6s^2$
5. $_{61}Pm: 4f^5 6s^2$

Q9 (2)

(1) $\Delta_{eg}H$ (Cl) < $\Delta_{eg}H$ (F)
(–345) (– 328) Correct

(2) $\Delta_{eg}H$ (Se) < $\Delta_{eg}H$ (S)
(–195) (– 200) Incorrect

(3) $\Delta_{eg}H$ (I) < $\Delta_{eg}H$ (At)
(–295) (– 270) Correct

(4) $\Delta_{eg}H$ (Te) < $\Delta_{eg}H$ (Po)
(–190) (– 183) Correct