NEET ANSWER KEY & SOLUTIONS

SUBJECT :- CHEMISTRY

CLASS :- 11th **PAPER CODE :- CWT-3**

CHAPTER :- PREODIC TABLE

ANSWER KEY

1.	(C)	**2.**	(B)	**3.**	(A)	**4.**	(A)	**5.**	(D)	**6.**	(B)	**7.**	(D)
8.	(A)	**9.**	(C)	**10.**	(B)	**11.**	(B)	**12.**	(B)	**13.**	(A)	**14.**	(A)
15.	(C)	**16.**	(B)	**17.**	(D)	**18.**	(A)	**19.**	(B)	**20.**	(A)	**21.**	(B)
22.	(B)	**23.**	(A)	**24.**	(D)	**25.**	(C)	**26.**	(D)	**27.**	(B)	**28.**	(D)
29.	(C)	**30.**	(A)	**31.**	(C)	**32.**	(A)	**33.**	(C)	**34.**	(D)	**35.**	(C)
36.	(C)	**37.**	(B)	**38.**	(D)	**39.**	(C)	**40.**	(C)	**41.**	(B)	**42.**	(D)
43.	(B)	**44.**	(D)	**45.**	(B)	**46.**	(C)	**47.**	(C)	**48.**	(C)	**49.**	(C)
50.	(D)												

SOLUTIONS

SECTION-A

1. (C)

2. (B)
Sol. The d-block has 10 columns, because a maximum of 10 electrons can occupy all the orbitals (5) in a d-subshell.

3. (A)

4. (A)
Sol. Noble gases have fully filled valence shell electronic configuration. Therefore it represents ns^2np^6.

5. (D)
Sol. For d-block elements group number = number of electrons in (n – 1)d sub-shell + number of electrons in valence shell.
So, group number = $(n-1)d^{10} + ns^1$

6. (B)
Sol. All belongs to d-block as differentiating electrons enter in d-subshell.

7. (D)
Sol. For isoelectronic species, as Z increases, Z_{eff} increases (and vice versa).

8. (A)
Sol. For isoelectronic species, as Z increases, Z_{eff} increases (and vice versa).

9. (C)
Sol. Ne is bigger than oxygen due to interelectronic repulsion on account of completely filled 2p subshell.

10. (B)
Sol. Across the period size decreases and down the group size increases. So, Cs is largest ionic radius.

11. (B)
Sol. All are isoelectronic species and thus Na^+ has smallest ionic radius because of high effective nuclear charge (i.e., 11 No. of protons as compared to 9, 8 and 7 in F, O and N respectively).

12. (B)
Sol. O^+ is smaller than parent atom while anion is bigger than parent atom. O^{2-} and N^{3-} are isoelectronic species. So ionic size $\propto \frac{1}{\text{nuclear charge}}$. Hence the correct order is $O^+ < O^{2-} < N^{3-}$.

13. (A)

14. (A)
Sol. Atomic radii of zero group elements are expressed as their vander Waal's radii.
$r_{\text{van der Waal's}} > r_{\text{covalent}}$.

15. (C)
Sol. On moving left to right in a period, atomic radii decreases due to increase in Z_{eff} and addition of electrons to the same outermost shell.

16. (B)
Sol. Atomic radius increases on moving top to bottom in a group due to increasing number of shells. However, it decreasing on moving left to right in a period due to increasing Z_{eff} and addition of electrons to the same shell.
Nb (4d) ≈ Ta (5d) (due to poor shielding of nuclear charge by 4f electrons).
For isoelectronic species, ionic radius $\propto \frac{1}{\text{nuclear charge}}$. So correct order is $Y^{3+} < Sr^{2+} < Rb^+$.

17. (D)
Sol. Orbitals bearing lower value of n will be more closer to the nucleus and thus electrons will experience greater attraction from nucleus and so its removal will be difficult, not easier.

18. (A)
Sol. Due to stable half filled electronic configuration of outer most shell of N, it has higher ionisation energy than O which has partially filled electron configuration of outer most shell.

19. (B)
Sol. The IP decreases in a group on moving downward because atomic radius increases hence the correct order is : Be > Mg > Ca

20. (A)
Sol. Across the period (i.e. 3^{rd} period) the size of atom decreases and nuclear charge increases. So generally the ionisation energy increases. However the ionisation energy of Mg is greater than Al because of more penetration power of 2s sub-shell electrons of Mg as compared to that of the 2p sub-shell electron of Al. Also, Mg has fully filled configuration.

21. (B)
Sol. Completely filled electron configurations and half filled electron configurations are expected to have higher ionisation energies. $ns^2\ np^5$ will have higher first ionisation energy than $ns^2\ np^4$ on account of smaller size of atom and higher nuclear charge.

22. (B)
Sol. The ionisation energy of Tin (Sn) is less than that of lead (Pb) It is due to the poor sheilding of d- and f- electron in Pb, due to which it feels greater attraction from nucleus.

23. (A)
Sol. As elements are ionized of the proton to electron ratio increases, so the attraction between valence shell electron and nucleus increases and as a result the size decreases. Therefore, the removal of electron from smaller cation requires higher energy. Hence the second ionisation energy is higher than its first ionisation energy.

24. (D)
Sol. Second ionisation energy of potassium is greater than that of Ca. In case of potassium ion (i.e. K^+) the electron removal from the stable inert gas configuration ($1s^2\ 2s^2\ 2p^6 3s^2 3p^6$) requires much higher energy.

25. (C)
Sol. Electron affinity is the measure of the ease with which an atom receives the additional electron in its valence shell in gaseous phase.
Generally down the group, the electron affinity decreases due to increase in atomic size.

26. (D)
Sol. In chlorine, the addition of additional electron to larger 3p-subshell experiences less electron-electron repulsion than smaller 2p-subshell of fluorine. Phosphorus has very low electron affinity because there is high electron repulsion when the incoming electron enters an orbital that is already half filled.

27. (B)

28. (D)
Sol. In chlorine, the addition of additional electron to larger 3p-subshell experiences less electron-electron repulsion than smaller 2p-subshell of fluorine. Phosphorus has very low electron affinity because there is high electron repulsion when the incoming electron enters an orbital that is already half filled.

29. (C)
Sol. According to Mulliken's, the electronegativity

$$= \frac{\text{Ionisation energy} + \text{Electron affinity}}{2}$$

30. (A)
Sol. As size of atom decreases across the period, the attraction between the nucleus and shared pair of electrons increases. So electronegativity increases across the period.

31. (C)
Sol. Eelctronegativity values are as given below N = 3.0; C = 2.5; Si = 1.8; P = 2.1

32. (A)

Sol. Halogens have valence shell electron configuration ns^2np^5. They have highest electronegative values in their respective period.

33. (C)

Sol. The addition of extra electron is difficult to the atom having stable configuration and so electron gain enthalpy will be positive. Similarly the removal of electron is quite difficult from stable configuration and so ionisation enthalpy is higher. However EN remains unaffected because it neither involves gain nor loss of electron.

34. (D)

Sol. Electronegativity of elements generally increases across the period (less increase) and decreases down the group (more decrease).
Si = 1.8, P = 2.1, C = 2.5, N = 3.0. So, the correct increasing order is Si < P < C < N.

35. (C)

Sol. Non metals are more electronegative than metals.

SECTION-B

36. (C)

37. (B)

38. (D)

39. (C)

Sol. BiI_5 does not exists because of I^- being very strong reducing agent. So it reduces Bi^{5+} to Bi^{3+} and forms BiI_3.

40. (C)

Sol. For transition elements, the 3d-orbitals are filled with electrons after 4s-orbitals and before 4p-orbitals.

41. (B)

Sol. Zr and Hf has nearly same radius due to lanthanide contraction.

42. (D)

Sol. TlI_3 exists as Tl^+ and I_3^- while PbF_4 exists because of F^- being very weak reducing agent.

43. (B)

Sol. ${}_4Be^-$ - $1s^2\ 2s^2\ 2p^1$ Addition of electron to a completely filled stable configuration, so least stable.

44. (D)

Sol. The tendency to attract bonded pair of electron in case of hybrid orbitals increases with increase in % s-character and so the order : $sp > sp^2 > sp^3$
The electron affinity values for 2p-series elements is less than that for 3p-series elements on account of small size and high inter electronic repulsions. Statements (B) and (C) are facts. Every cation releases more energy than neutral atom upon gain of an electrons.

45. (B)

Sol. IE_2 of Na > Mg as in Na, second electron is to be removed from stable inert gas configuration i.e.,$1s^22s^22p^6$.

46. (C)

Sol. Among isoelectronic species, size decreases with increases in nuclear charge.

Mg^{2+}	Na^+	Ne	O^{2-}
Number of elecron			
10	10	10	10
Number of charge			
+12	+11	+10	+8

47. (C)

Sol. Chlorine has high electron affinity than fluorine. The less negative electron gain enthalpy of fluorine as compared to chlorine is due to very small size of the fluorine atom.

48. (C)

Sol. He contains fully filled $1s^2$ orbital which has more penetrating effect and is very close to the nucleus and hence has higher value of inosiation energy.

49. (C)

Sol. Calcium has a higher nuclear charge than sodium.

50. (D)

Sol. First ionisation energy for nitrogen is greater than oxygen.

N	O
eV	14.5
13.6	

This is due to stable configuration of nitrogen (half-filled 2p-orbital).
Due to screening effect, the valence electrons experience less attraction towards the nucleus. Due to this, the valence shell electrons do not fell the full charge of the nucleus. The actual nuclear charge felt by the valence shell electrons is termed effective nuclear charge and its magnitude increases in a period when we move from left right.