CHAPTER 5

ANSWERS

Multiple Choice Questions

1.	(b)	**2.**	(c)	**3.**	(a)	**4.**	(b)
5.	(c)	**6.**	(b)	**7.**	(c)	**8.**	(c)
9.	(b)	**10.**	(b)	**11.**	(d)	**12.**	(d)
13.	(c)	**14.**	(c)	**15.**	(b)	**16.**	(d)
17.	(b)	**18.**	(b)	**19.**	(c)	**20.**	(c)
21.	(a)	**22.**	(b)	**23.**	(b)	**24.**	(c)
25.	(b)	**26.**	(a)				

Short Answer Questions

27. The arrangement of these elements is known as Döbereiner triad. Example, Lithium, Sodium and Potassium

28. (a) (i) F and Cl (ii) Na and K.

(b) Newland's law of octaves

29. (a) No, because all these elements do not have similar properties although the atomic mass of silicon is average of atomic masses of sodium (Na) and chlorine (Cl).

(b) Yes, because they have similar properties and the mass of magnesium (Mg) is roughly the average of the atomic mass of Be and Ca.

30. **Hint—** Elements with similar properties can be grouped together.

31. **Hint—** Hydrogen resembles alkali metals as well as halogens

32. $GeCl_4$, $GaCl_3$

33.

Element	Group No.	Valency
A	Group-13	3
B	Group-14	4
C	Group-2	2

34. XCl_4; Covalent bonding

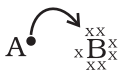
35. **Hint—** Radii of Y is less than X because Y is cation of X

36. (a) F < N < Be < Li

(b) Cl < Br < I < At

37. (a), (b) and (d)

(a) Magnesium (b) Sodium (d) Lithium

38. **Hint—** A B 

Ionic bond.
A = K (Potassium) B = Cl (Chlorine)

39. Ge < Ga < Mg < Ca < K

40. (a) Na or K (b) Ca (c) Hg

Hg < Ca < Na < K

41. (a) Sodium (Na) Group 1 and Period 3 or Potassium (K) Group 1 and Period 4

(b) Phosphorus (P) Group 15 and Period 3

(c) Carbon (C) Group 14 and Period 2

(d) Helium (He) Group 18 and Period 1

(e) Aluminium (Al) Group 13 and Period 3

Long Answer Questions

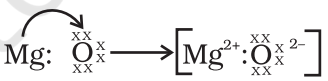
42. (a) Magnesium (Mg)

(b) K, L, M

2, 8, 2

(c) $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$

(d) $MgO(s) + H_2O(l) \rightarrow Mg(OH)_2(aq)$

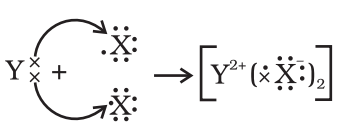
(e) 

43. (a) X belongs to Group 17 and 3rd period

Y belongs to Group 2 and 4th period

(b) X — Non-metal and Y — Metal

(c) Basic oxide; Ionic bonding

(d) 

44. (a) Elements— Neon (Ne), Calcium (Ca), Nitrogen (N), Silicon (Si)

(b) Group— 18, 2, 15, 14

(c) Period— 2, 4 , 2, 3

(d) Electron configuration— (2, 8); (2, 8, 8, 2); (2, 5); (2, 8, 4)

(e) Valency— 0, 2, 3, 4

45.

	1 M	7 A	G	N	E	2 S	I	U	M		
		S				O					
		3 T	8 I	N		D	9 B		5 L		
		A	R			4 I	O	D	I	6 N	E
		T	O			U	R		T	E	
		I	N			M	O		H	O	
		N					N		I	N	
		E							U		
									M		

46. (a) H, He, Li, Be, B, C, N, O, F, Ne, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca

(b) Group 1 — H, Li, Na, K
Group 2 — Be, Mg, Ca
Group 13 — B, Al
Group 14 — C, Si
Group 15 — N, P
Group 16 — O, S
Group 17 — F, Cl
Group 18 — He, Ne, Ar

47. (a) Germanium (Ge) and Gallium (Ga)

(b) Group 14; Period 4 and Group 13; Period 4

(c) Ge — Metalloid; Ga — Metal

(d) Ga — 3 Ge —4

48. (a) Lithium

(b) Fluorine

(c) Fluorine

(d) Boron

(e) Carbon

49. (a) Element X is sulphur (atomic no. 16)

(b) K, L, M
2, 8, 6

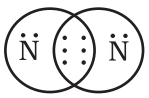
(c) $2FeSO_4$ (s) $\xrightarrow{\text{Heat}}$ Fe_2O_3 (s) + SO_2 (g) + SO_3 (g)

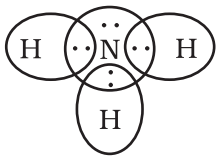
(d) Acidic

(e) 3rd period, group 16

50. (a) Nitrogen (atomic no. 7)

2,5; it has 5 valence electrons

(b)  triple covalent bonds

(c)  3 single covalent bonds

51. Noble gases

According to Mendeleev's classification, the properties of elements are the periodic function of their atomic masses and there is a periodic recurrence of elements with similar physical and chemical properties. Noble gas being inert, could be placed in a separate group without disturbing the original order.

52. (**Hint—** 63 elements were known.)

- Compounds of these elements with oxygen and hydrogen were studied (formation of oxides and hydrides)
- Elements with similar properties were arranged in a group
- Mendeléev observed that elements were automatically arranged in the order of increasing atomic masses.