DPP SHEET

ONLY ONE OPTION CORRECT TYPE

1. First ionization enthalpy of Al is lower than that of Mg. This is because

(a) the size of Al is bigger than Mg

(b) ionization enthalpy decrease in a period from left to right

(c) it is easier to remove electron from unpaired $3p^1$ than from paired $3s^2$

(d) aluminium is a passive metal while magnesium is active metal.

2. Group 13 elements show $+1$ and $+3$ oxidation states. Relative stability of $+3$ oxidation state may be given as

(a) $Tl^{3+} > In^{3+} > Ga^{3+} > Al^{3+} > B^{3+}$

(b) $B^{3+} > Al^{3+} > Ga^{3+} > In^{3+} > Tl^{3+}$

(c) $Al^{3+} > Ga^{3+} > Tl^{3+} > In^{3+} > B^{3+}$

(d) $Al^{3+} > B^{3+} > Ga^{3+} > Tl^{3+} > In^{3+}$

3. Electropositive character for the elements of group 13 follows the order

(a) $B > Al > Ga > In > Tl$

(b) $B < Al < Ga < In < Tl$

(c) $B < Al > Ga < In > Tl$

(d) $B < Al > Ga > In > Tl$

4. Boron is unable to form BF_6^{3-} ions due to

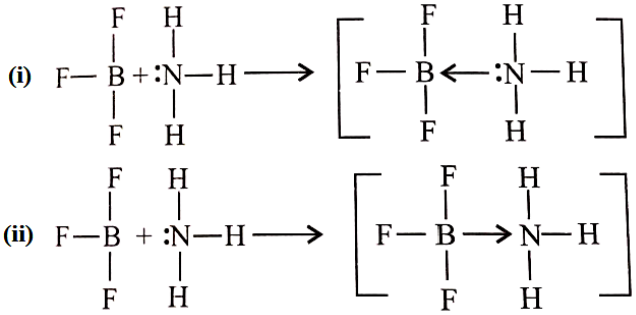
(a) non-availability of d-orbitals

(b) small size of boron atom

(c) non-metallic nature

(d) less reactivity towards halogens

5. Which of the following is correct representation of the reaction when BF_3 reacts with ammonia?



(a) (i) is incorrect and (ii) is correct.

(b) (i) is correct and (ii) is incorrect.

(c) Both (i) and (ii) are correct.

(d) Both (i) and (ii) are incorrect.

6. Which of the following compounds is formed in borax bead test?

(a) Metaborate (b) Tetraborate (c) Triborate (d) Orthoborate

7. What happens when a mixture of cobalt oxide and borax is heated in a flame on a loop of platinum wire?

(a) A transparent white bead is formed.

(b) A bright pink coloured $NaBO_2$ bead is formed.

(c) A blue coloured $Co(BO_2)_2$ bead is formed.

(d) A red coloured $Co(BO_2)_2$ bead is formed.

8. Which of the following compounds are formed when BCl_3 is treated with water?

(a) H_3BO_3 (b) B_2H_6 (c) B_2O_3 (d) HBO_2

9. An aqueous solution of boric acid is found to be weakly acidic in nature becuase

(a) It is a protic acid which donates protons in aqueous solution.

(b) It is Lewis acid which abstracts OH^- from water and leaves H^+ to make the solution acidic.

(c) It gives metaboric acid when dissolved in water.

(d) It is prepared by reaction of borax with sulphuric acid hence it behaves as an acid.

10. The type of hybridization of boron in diborane is

(a) sp – hybridisation (b) sp^2 – hybridisation (c) sp^3 – hybridisation (d) sp^3d^2 – hybridization

11. In diborane,

(a) four bridged hydrogen atoms and two terminal hydrogen atoms are present

(b) two bridged hydrogen atoms and four terminal hydrogen atoms are present

(c) three bridged hydrogen atoms and three terminal hydrogen atoms are present

(d) there are no bridged hydrogen atoms in diborane, only hydrogen bonds are present.

12. Match the column I with column II and mark the appropriate choice.

	Column I		**Column II**
(A)	Borax	(i)	Na_3AlF_6
(B)	Inorganic benzene	(ii)	$Na_2B_4O_7 \cdot 10H_2O$
(C)	Cryolite	(iii)	$Al_2O_3 \cdot 2H_2O$
(D)	Bauxite	(iv)	$B_3N_3H_6$

(a) $(A) \rightarrow (ii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (iii)$

(b) $(A) \rightarrow (i), (B) \rightarrow (ii), (C) \rightarrow (iii), (D) \rightarrow (iv)$

(c) $(A) \rightarrow (ii), (B) \rightarrow (iii), (C) \rightarrow (i), (D) \rightarrow (iv)$

(d) $(A) \rightarrow (iii), (B) \rightarrow (i), (C) \rightarrow (ii), (D) \rightarrow (iv)$

13. All members of group 14 when heated in oxygen form oxides. Which of the following is the correct trend of oxides?

(a) CO_2 and SiO_2 are acidic.

(b) CO, GeO, SnO and PbO are amphoteric.

(c) Monoxides react with haemoglobin to form toxic compounds.

(d) All oxides burn with blue flame.

14. An element of group 14 forms two oxides one of which is highly Poisonous and neutral. Other oxide can be easily liquefied and compressed to give a solid which is used as a refrigerant under the name of drikold. The element and the oxides are

(a) Si, SiO, SiO_2 (b) Pb, PbO, PbO_2 (c) C, CO, CO_2 (d) Sn, SnO, SnO_2

15. Which of the following is not true about structure of diamond and graphite?

(a) In diamond, each carbon is sp^3 hybridised while in graphite each carbon is sp^2 hybridised.

(b) In diamond, carbon atoms are closely packed in crystal lattice while graphite has layer structure.

(c) Diamond is a hard substance while graphite is a soft substance.

(d) Graphite is thermodynamically very less stable as compared to diamond and is amorphous form of carbon.

16. Which of the following acids cannot be stored in glass?

(a) HF (b) HCl (c) H_2SO_4 (d) HI

17. In SiO_4^{4-}, the tetrahedral molecule, two oxygen atoms are shared in

(a) sheet silicates

(b) double-chain silicates

(c) chain silicates

(d) three-dimensional silicates

18. The element which exists in liquid state for a wide range of temperature and can be used for measuring high temperature is

(a) B (b) Al (c) Ga (d) In

19. Silicon has a strong tendency to form polymers like silicones. The chain length of silicon polymer can be controlled by adding

(a) $MeSiCl_3$

(b) Me_2SiCl_2

(c) Me_3SiCl

(d) Me_4Si

20. Ionisation enthalpy $\left(\Delta_i H_1 kJ\ mol^{-1}\right)$ for the elements of Group 13 follows the order

(a) $B > Al > Ga > In > Tl$

(b) $B < Al < Ga < In < Tl$

(c) $B < Al > Ga < In > Tl$

(d) $B > Al < Ga > In < Tl$

21. In the structure of diborane

(a) all hydrogen atoms lie in one plane and boron atoms lie in a plane perpendicular to this plane

(b) 2 boron atoms and 4 terminal hydrogen atoms lie in the same plane and 2 bridging hydrogen atoms lie in the perpendicular plane

(c) 4 bridging hydrogen atoms and boron atoms lie in one plane and two terminal hydrogen atoms lie in a plane perpendicular to this plane

(d) all the atoms are in the same plane.

22. A compound X, of boron reacts with NH_3 on heating to give another compound Y which is called inorganic benzene. The compound X can be prepared by treating BF_3 with lithium aluminium hydride. The compounds X and Y are represented by the formulas

(a) $B_2H_6, B_3N_3H_6$ (b) $B_2O_3, B_3N_3H_6$ (c) $BF_3, B_3N_3H_6$ (d) $B_3N_3H_6, B_2H_6$

23. The most commonly used reducing agent is

(a) $AlCl_3$ (b) $PbCl_2$ (c) $SnCl_4$ (d) $SnCl_2$

24. Cement, the important building material is a mixture of oxides of several elements. Besides calcium, iron and sulphur, oxides of elements of which of the group(s) are present in the mixture?

(a) Group 2 (b) Groups 2, 13 and 14 (c) Groups 2 and 13 (d) Groups 2 and 14

25. In the following reactions sequence,

$(A) + N_2 \xrightarrow{\Delta} (B) \xrightarrow{+H_2O} (C) + (D)$ white ppt. (C) is formed and gas (D) is evolved. white ppt. (C) dissolves in NaOH solution, while gas (D) gives white fumes in HCl. Thus, (A) is

(a) B (b) Al (c) Ga (d) C

26. Under hydrolytic conditions, the compounds used for preparation of linear polymer and for chain termination, respectively, are

(a) CH_3SiCl_3 and $Si(CH_3)_4$

(b) $(CH_3)_2SiCl_2$ and $(CH_3)_3SiCl$

(c) $(CH_3)_2SiCl_2$ and CH_3SiCl_3

(d) $SiCl_4$ and $(CH_3)_3SiCl$

27. The geometry of a complex species can be understood from the knowledge of type of hybridization of orbitals of central atom. The hybridization of orbitals of central atom in $\left[B(OH)_4\right]^-$ and the geometry of the complex are respectively

(a) sp^3, tetrahedral (b) sp^3, square planar (c) sp^3d^2, octahedral (d) dsp^2, square planar

28. Which of the following oxides is acidic in nature?

(a) B_2O_3 (b) Al_2O_3 (c) Ga_2O_3 (d) In_2O_3

29. The exhibition of highest co-ordination number depends on the availability of vacant orbitals in the central atom. Which of the following elements is not likely to act as central atom in MF_6^{3-} ?

(a) B (b) Al (c) Ga (d) In

30. $Na_2B_4O_7 \cdot 10H_2O \xrightarrow{\Delta} X \xrightarrow{\Delta} Y + Z$ X, Y and Z in the reaction are

(a) $X = Na_2B_4O_7, Y = NaBO_2, Z = B_2O_3$

(b) $X = Na_2B_4O_7, Y = B_2O_3, Z = H_3BO_3$

(c) $X = B_2O_3, Y = NaBO_2, Z = B(OH)_3$

(d) $X = NaBO_2, Y = B_2O_3, Z = B(OH)_3$

Answer Key

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
C	B	D	A	B	A	C	A	B	C
11.	**12.**	**13.**	**14.**	**15.**	**16.**	**17.**	**18.**	**19.**	**20.**
B	A	A	C	D	A	C	C	C	D
21.	**22.**	**23.**	**24.**	**25.**	**26.**	**27.**	**28.**	**29.**	**30.**
B	A	D	B	B	C	A	A	A	A