

12. The electronic configuration of a cation  $M^{5+}$  is  $1s^2 2s^2 2p^6 3s^2 3p^6$ . What would be the electronic configuration for M?

A.  $1s^2 2s^2 2p^6 3s^2 3p^1$   
 B.  $1s^2 2s^2 2p^6 3s^2 3p^5$   
 C.  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5$   
 D.  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^2$

13. The molecule  $BF_3$  is an example of a molecule that

A. Obeys the octet rule  
 B. has an expanded octet  
 C. Has an incomplete octet  
 D. has odd number of electrons

14. What is the type of hybridisation for the central atom of  $SO_3^{2-}$ ?

A.  $sp$  C.  $sp^3$   
 B.  $sp^2$  D.  $sp^3d$

15. Based on VSEPR theory, predict the shape of  $IBr_4^+$  ion.

A. Distorted tetrahedral  
 B. Tetrahedral  
 C. Trigonal pyramidal  
 D. Square planar

16. The forces of attraction between hydrogen molecules are

A. Covalent bond  
 B. hydrogen bonds  
 C. London forces  
 D. dipole-dipole forces

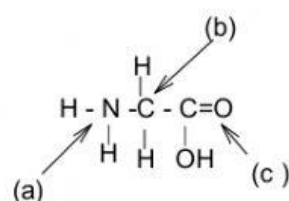
17. Which of the following compound has the highest boiling point.

A.  $CCl_4$  C.  $CH_4$   
 B.  $CBr_4$  D.  $CF_4$

18. Which of the following species has the shortest nitrogen to nitrogen bond?

A.  $N_2$  C.  $N_2O$   
 B.  $N_2O_4$  D.  $N_2H_4$

19. What are the types of hybridization for a, b and c in the given molecule below?



A.  $sp^2, sp^2, sp^3$  C.  $sp, sp^2, sp^3$   
 B.  $sp, sp^3, sp^3d$  D.  $sp^3, sp^3, sp^2$

20. A 3.0 L vessel is filled with 12.85 g of a gas mixture at  $30^\circ\text{C}$ . The gas mixture consisted of 80% w/w of argon and 20% w/w of nitrogen gas.

Calculate the total pressure of gasses

A. 3.35 atm C. 2.10 atm  
 B. 2.89 atm D. 3.89 atm

21. Calculate the total pressure exerted by a mixture of 16g of  $N_2$  and 12 g of  $O_2$  in a 3.0 L vessel at  $25^\circ\text{C}$ .

A. 8.2 atm C. 7.70 atm  
 B. 6.70 atm D. 7.25 atm

22. A 2 dm<sup>3</sup> glass vessel at  $T^\circ\text{C}$  contains Helium gas at  $1/4P$  while a 3 dm<sup>3</sup> glass vessel at the same temperature contains oxygen at  $1/2P$ . When both vessels are joined and the gases are completely mixed, what is the partial pressure of the oxygen gas?

A.  $3/10P$  C.  $3/20P$   
 B.  $4/5P$  D.  $5/4P$