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## NEET CHEMISTRY 2018-19 - Chennai

Periodic Test : 04

Test ID : 016

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Name: \_\_\_\_\_

Time: 3HRS

ID No: \_\_\_\_\_

**Negative Marks : 4 marks for correct attempt & 1 mark deducted for every wrong attempt.**

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- When 22.4 litres of  $\text{H}_2(\text{g})$  is mixed with 11.2 litres of  $\text{Cl}_2(\text{g})$ , each at S.T.P, the moles of  $\text{HCl}(\text{g})$  formed is equal to
  - 1 mol of  $\text{HCl}(\text{g})$
  - 2 mol of  $\text{HCl}(\text{g})$
  - 0.5 mol of  $\text{HCl}(\text{g})$
  - 1.5 mol of  $\text{HCl}(\text{g})$
- 1.0 g of magnesium is burnt with 0.56 g  $\text{O}_2$  in a closed vessel. Which reactant is left in excess and how much? (At wt.  $\text{Mg} = 24$ ,  $\text{O} = 16$ )
  - $\text{Mg}$ , 0.16 g
  - $\text{O}_2$ , 0.16 g
  - $\text{Mg}$ , 0.44 g
  - $\text{O}_2$ , 0.28 g
- $6.02 \times 10^{20}$  molecules of urea are present in 100 mL of its solution. The concentration of solution is
  - 0.001 M
  - 0.1 M
  - 0.02 M
  - 0.01 M
- In an experiment it showed that 10 mL of 0.05 M solution of chloride required 10 mL of 0.1 M solution of  $\text{AgNO}_3$ , which of the following will be the formula of the chloride (X stands for the symbol of the element other than chlorine ).
  - $\text{X}_2\text{Cl}_2$
  - $\text{XCl}_2$
  - $\text{XCl}_4$
  - $\text{X}_2\text{Cl}$
- Which has the maximum number of molecules among the following?
  - 44 g  $\text{CO}_2$
  - 48 g  $\text{O}_3$
  - 8 g  $\text{H}_2$
  - 64 g  $\text{SO}_2$
- The angular momentum of electron in 'd' orbital is equal to
  - $2\sqrt{3}h$
  - 0 h
  - $\sqrt{6}h$
  - $\sqrt{2}h$
- What is the maximum number of orbitals that can be identified with the following quantum numbers?  $n=3$ ,  $l=1$ ,  $m_l=0$ 
  - 1
  - 2
  - 3
  - 4
- Calculate the energy in joule corresponding to light of wavelength 45 nm. (Planck's constant,  $h = 6.63 \times 10^{-34}$  J s, speed of light,  $c = 3 \times 10^8$   $\text{ms}^{-1}$ )
  - $6.67 \times 10^{15}$

- b)  $6.67 \times 10^{11}$   
 c)  $4.42 \times 10^{-15}$   
 d)  $4.42 \times 10^{-18}$
9.  $\text{Be}^{2+}$  is isoelectronic with which of the following ions?  
 a)  $\text{H}^+$   
 b)  $\text{Li}^+$   
 c)  $\text{Na}^+$   
 d)  $\text{Mg}^{2+}$
10. What is the maximum numbers of electrons that can be associated with following set of quantum numbers?  $n = 3, l = 1$  and  $m = -1$   
 a) 4  
 b) 2  
 c) 10  
 d) 6
11. What is the value of electron gain enthalpy of  $\text{Na}^+$  if  $\text{IE}_1$  of  $\text{Na} = 5.1 \text{ eV}$ ?  
 a)  $-5.1 \text{ eV}$   
 b)  $-10.2 \text{ eV}$   
 c)  $+2.55 \text{ eV}$   
 d)  $+10.2 \text{ eV}$
12. The correct order of the decreasing ionic radii among the following isoelectronic species is
- (a)  $\text{Ca}^{2+} > \text{K}^+ > \text{S}^{2-} > \text{Cl}^-$   
 (b)  $\text{Cl}^- > \text{S}^{2-} > \text{Ca}^{2+} > \text{K}^+$   
 (c)  $\text{S}^{2-} > \text{Cl}^- > \text{K}^+ > \text{Ca}^{2+}$   
 (d)  $\text{K}^+ > \text{Ca}^{2+} > \text{Cl}^- > \text{S}^{2-}$
13. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl?  
 a)  $\text{Cl} < \text{F} < \text{O} < \text{S}$   
 b)  $\text{O} < \text{S} < \text{F} < \text{Cl}$   
 c)  $\text{F} < \text{S} < \text{O} < \text{Cl}$   
 d)  $\text{S} < \text{O} < \text{Cl} < \text{F}$
14. Among the elements Ca, Mg, P and Cl, the order of increasing atomic radii is  
 a)  $\text{Mg} < \text{Ca} < \text{Cl} < \text{P}$   
 b)  $\text{Cl} < \text{P} < \text{Mg} < \text{Ca}$   
 c)  $\text{P} < \text{Cl} < \text{Ca} < \text{Mg}$   
 d)  $\text{Ca} < \text{Mg} < \text{P} < \text{Cl}$
15. Among the following which one has the highest cation to anion size ratio?  
 a)  $\text{CsI}$   
 b)  $\text{CsF}$   
 c)  $\text{LiF}$   
 d)  $\text{NaF}$
16. The correct geometry and hybridization for  $\text{XeF}_4$  are  
 a) octahedral,  $\text{sp}^3\text{d}^2$   
 b) trigonal bipyramidal,  $\text{sp}^3\text{d}$   
 c) planar triangle,  $\text{sp}^3\text{d}^3$   
 d) square planar  $\text{sp}^3\text{d}^2$
17. Among the following, which one is a wrong statement?  
 a)  $\text{PH}_5$  and  $\text{BiCl}_5$  do not exist.  
 b)  $\rho\pi - \delta\pi$  bonds are present in  $\text{SO}_2$ .  
 c)  $\text{SeF}_4$  and  $\text{CH}_4$  have same shape.  
 d)  $\text{I}_3^+$  has bent geometry
18. Consider the molecules  $\text{CH}_4$ ,  $\text{NH}_3$  and  $\text{H}_2\text{O}$ . Which of the given statements is false?  
 a) The H-O-H bond angle in  $\text{H}_2\text{O}$  is smaller than the H-N-H bond angle in  $\text{NH}_3$ .  
 b) The H-C-H bond angle in  $\text{CH}_4$  is larger than the H-N-H bond angle in  $\text{NH}_3$ .  
 c) The H-C-H bond angle in  $\text{CH}_4$ , the H-N-H bond angle in  $\text{NH}_3$ , and the H-O-H bond angle in  $\text{H}_2\text{O}$  are all greater than  $90^\circ$ .

- d) The H-O-H bond angle in H<sub>2</sub>O is larger than the H-C-H bond angle in CH<sub>4</sub>.
19. Predict the correct order among the following:
- bond pair- bond pair > lone pair – bond pair > lone pair – lone pair.
  - lone pair - bond pair > bond pair – bond pair > lone pair – lone pair.
  - lone pair – lone pair > lone pair – bond pair > bond pair – bond pair.
  - lone pair – lone pair > bond pair – bond pair > lone pair – bond pair.
20. In which of the following pairs, both the species are not isostructural?
- Diamond, Silicon carbide
  - NH<sub>3</sub>, PH<sub>3</sub>
  - XeF<sub>4</sub>, XeO<sub>4</sub>
  - SiCl<sub>4</sub>, PCl<sub>4</sub>
21. For real gases van der Waals equation is written as  $\left(p + \frac{an^2}{V^2}\right)(V - nb) = nRT$  where a and b are van der Waals constants Two sets of gases are
- (I)** O<sub>2</sub>, CO<sub>2</sub>, H<sub>2</sub> and He
- (II)** CH<sub>4</sub>, O<sub>2</sub> and H<sub>2</sub>
- The gases given in set-I in increasing order of b and gases given in set-II in decreasing order of a, are arranged below. Select the correct order from the following
- (I) He < H<sub>2</sub> < CO<sub>2</sub> < O<sub>2</sub>  
(II) CH<sub>4</sub> > H<sub>2</sub> > O<sub>2</sub>
  - (I) O<sub>2</sub> < He < H<sub>2</sub> < CO<sub>2</sub>  
(II) H<sub>2</sub> > O<sub>2</sub> > CH<sub>4</sub>
  - (I) H<sub>2</sub> < He < O<sub>2</sub> < CO<sub>2</sub>  
(II) CH<sub>4</sub> > O<sub>2</sub> > H<sub>2</sub>
  - (I) H<sub>2</sub> < O<sub>2</sub> < He < CO<sub>2</sub>  
(II) O<sub>2</sub> > CH<sub>4</sub> > H<sub>2</sub>
22. Equal volumes of two monatomic gases, A and B at same temperature and pressure are mixed. The ratio of specific heats (C<sub>p</sub>/C<sub>v</sub>) of the mixture will be
- 0.83
  - 1.50
  - 3.3
  - 1.67
23. By what factor does the average velocity of a gaseous molecule increase when the temperature ( in Kelvin ) is doubled?
- 2.0
  - 2.8
  - 4.0
  - 1.4
24. Two gases A and B having the same volume diffuse through a porous partition in 20 and 10 seconds respectively. The molecular mass of A is 49 u. Molecular mass of B will be
- 50.00 u
  - 12.25 u
  - 6.50 u
  - 25.00 u
25. A gaseous mixture was prepared by taking equal mole of CO and N<sub>2</sub>. If the total pressure of the mixture was found I atmosphere, the partial pressure of the nitrogen (N<sub>2</sub>) in the mixture is
- 0.5 atm
  - 0.8 atm
  - 0.9 atm
  - 1 atm
26. Which of the following statements is correct for the spontaneous adsorption of a gas?

- a)  $\Delta S$  is negative and, therefore  $\Delta H$  should be highly positive.
- b)  $\Delta S$  is negative and, therefore  $\Delta H$  should be highly negative.
- c)  $\Delta S$  is positive and, therefore  $\Delta H$  should be highly negative.
- d)  $\Delta S$  is positive and, therefore  $\Delta H$  should be highly positive.

27. For the reaction,  $X_2O_{4(l)} \longrightarrow 2XO_{2(g)}$   
 $\Delta U = 2.1 \text{ kcal}$ ,  $\Delta S = 20 \text{ cal K}^{-1}$  at 300 K,

Hence,  $\Delta G$  is

- a) 2.7 kcal
- b) -2.7 kcal
- c) 9.3 kcal
- d) -9.3 kcal

28. A reaction having equal energies of activation for forward and reverse reactions has

- a)  $\Delta H = 0$
- b)  $\Delta H = \Delta G = \Delta S = 0$
- c)  $\Delta S = 0$
- d)  $\Delta G = 0$

29. When 5 litres of a gas mixture of methane and propane is perfectly combusted at  $0^\circ\text{C}$  and 1 atmosphere, 16 litres of oxygen at the same temperature and pressure is consumed. The amount of heat released from this combustion ( $\Delta H_{\text{comb}}(\text{CH}_4) = 890 \text{ kJ mol}^{-1}$ ,  $\Delta H_{\text{comb}}(\text{C}_3\text{H}_8) = 2220 \text{ kJ mol}^{-1}$ ) is

- a) 38
- b) 317
- c) 477
- d) 32

30. Three thermochemical equations are given

- (i)  $C_{(\text{graphite})} + O_{2(g)} \rightarrow CO_{2(g)}$ ;  $\Delta_r H^\circ = x \text{ kJ mol}^{-1}$
- (ii)  $C_{(\text{graphite})} + \frac{1}{2}O_{2(g)} \rightarrow CO_{(g)}$ ;  $\Delta_r H^\circ = y \text{ kJ mol}^{-1}$
- (iii)  $CO_{(g)} + \frac{1}{2}O_{2(g)} \rightarrow CO_{2(g)}$ ;  $\Delta_r H^\circ = z \text{ kJ mol}^{-1}$

Based on the above equations, find out which of the relationship given below is correct.

- a)  $z = x + y$
- b)  $x = y + z$
- c)  $y = 2z - x$
- d)  $x = y - z$

31. MY and  $NY_3$ , two nearly insoluble salts, have the same  $K_{sp}$  values of  $6.2 \times 10^{-13}$  at room temperature. Which statement would be true in regard to MY and  $NY_3$ ?

- a) The salts MY and  $NY_3$  are more soluble in 0.5 M KY than in pure water.
- b) The addition of the salt of KY to solution of MY and  $NY_3$  will have no effect on their solubilities.
- c) The molar solubilities of MY and  $NY_3$  in water are identical.
- d) The molar solubilities of MY in water is less than that of  $NY_3$ .

32. If the equilibrium constant for  $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$

is K, the equilibrium constant for  $\frac{1}{2}N_{2(g)} + \frac{1}{2}O_{2(g)} \rightleftharpoons NO_{(g)}$  will be

- a)  $\frac{1}{2}K$
- b) K
- c)  $K^2$
- d)  $K^{1/2}$

33. What is the pH of the resulting solution when equal volumes of 0.1 M NaOH and 0.01 M HCl are mixed?

- a) 2.0

- b) 7.0  
c) 1.04  
d) 12.65
34. Aqueous solution of which of the following compounds is the best conductor of electric current?  
a) Hydrochloric acid, HCl  
b) Ammonia, NH<sub>3</sub>  
c) Fructose, C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>  
d) Acetic acid, C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>
35. Which one of the following pairs of solution is not an acidic buffer?  
a) CH<sub>3</sub>COOH and CH<sub>3</sub>COONa  
b) H<sub>2</sub>CO<sub>3</sub> and Na<sub>2</sub>CO<sub>3</sub>  
c) H<sub>2</sub>PO<sub>4</sub> and Na<sub>3</sub>PO<sub>4</sub>  
d) HClO<sub>4</sub> and NaClO<sub>4</sub>
36. Oxidation numbers of P in PO<sub>4</sub><sup>3-</sup>, of S in SO<sub>4</sub><sup>2-</sup> and that of Cr in Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> are respectively  
a) +3, +6 and +5  
b) +5, +3 and +6  
c) -3, +6 and +6  
d) +5, +6 and +6
37. Number of moles of MnO<sub>4</sub><sup>-</sup> required to oxidize one mole of ferrous oxalate completely in acidic medium will be  
a) 7.5 moles  
b) 0.2 moles  
c) 0.6 moles  
d) 0.4 moles
38. Which is the best description of the behaviour of bromine in the reaction given below?  
H<sub>2</sub>O + Br<sub>2</sub> → HOBr + HBr  
a) Proton acceptor only  
b) Both oxidised and reduced  
c) Oxidised only  
d) Reduced only
39. The oxidation states of sulphur in the anions SO<sub>3</sub><sup>2-</sup>, S<sub>2</sub>O<sub>4</sub><sup>2-</sup> and S<sub>2</sub>O<sub>6</sub><sup>2-</sup> follow the order  
a) S<sub>2</sub>O<sub>4</sub><sup>2-</sup> < SO<sub>3</sub><sup>2-</sup> < S<sub>2</sub>O<sub>6</sub><sup>2-</sup>  
b) SO<sub>3</sub><sup>2-</sup> < S<sub>2</sub>O<sub>4</sub><sup>2-</sup> < S<sub>2</sub>O<sub>6</sub><sup>2-</sup>  
c) S<sub>2</sub>O<sub>4</sub><sup>2-</sup> < S<sub>2</sub>O<sub>6</sub><sup>2-</sup> < SO<sub>3</sub><sup>2-</sup>  
d) S<sub>2</sub>O<sub>6</sub><sup>2-</sup> < S<sub>2</sub>O<sub>4</sub><sup>2-</sup> < SO<sub>3</sub><sup>2-</sup>
40. Oxidation state of Fe in Fe<sub>3</sub>O<sub>4</sub> is  
a)  $\frac{5}{4}$   
b)  $\frac{4}{5}$   
c)  $\frac{3}{2}$   
d)  $\frac{8}{3}$
41. Which of the following groups of ions makes the water hard?  
a) Sodium and bicarbonate  
b) Magnesium and chloride  
c) Potassium and sulphate  
d) Ammonium and chloride
42. One would expect proton to have very large  
a) Charge  
b) ionization potential  
c) hydration energy  
d) radius
43. At its melting point ice is lighter than water because  
a) H<sub>2</sub>O molecules are more closely packed in solid state.  
b) Ice crystals have hollow hexagonal arrangement of H<sub>2</sub>O molecules.  
c) On melting of ice the H<sub>2</sub>O molecules shrinks in size.  
d) Ice forms mostly heavy water on first melting.
44. Hydrogen peroxide molecules are  
a) monoatomic and form X<sub>2</sub><sup>2-</sup> ions  
b) diatomic and form X<sup>-</sup> ions  
c) diatomic and form X<sub>2</sub><sup>-</sup> ions

- d) monoatomic and form  $X^-$  ions
45. The ionization of hydrogen atom would give rise to
- Hydride ion
  - Hydronium ion
  - Proton
  - Hydroxyl ion
46. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage purity of magnesium carbonate in the sample?  
(At. wt. of Mg = 24)
- 96
  - 60
  - 84
  - 75
47. The function of “ Sodium pump “ is a biological process operating in each and every cell of all animals. Which of the following biologically important ions is also a constituent of this pump?
- $K^+$
  - $Fe^{2+}$
  - $Ca^{2+}$
  - $Mg^{2+}$
48. Solubility of the alkaline earth metal sulphates in water decreases in the sequence
- $Sr > Ca > Mg > Ba$
  - $Ba > Mg > Sr > Ca$
  - $Mg > Ca > Sr > Ba$
  - $Ca > Sr > Ba > Mg$
49. In Castner-Kellner cell for production of sodium hydroxide
- brine is electrolyzed using graphite electrodes
  - molten sodium chloride is electrolysed
  - sodium amalgam is formed at mercury cathode
  - brine is electrolyzed with Pt electrodes
50. Which one of the alkali metals, forms only, the normal oxide,  $M_2O$  on heating in air?
- Rb
  - K
  - Li
  - Na