

## GGSIPIU chemistry 2009

1. Increasing order lowest first for the values of  $e/m$  for electron  $e$ , proton  $p$ , neutron  $n$  and  $\alpha$ -particles is

a  $e, p, n, \alpha$       b  $n, \alpha, p, e$

c  $n, p, e, \alpha$       d  $n, p, \alpha, e$

2. A particle moving with a velocity  $10^6$  m/s will have de-Broglie wavelength nearly

[Given,  $m = 6.62 \times 10^{-27}$  kg,  $h = 6.62 \times 10^{-34}$  J-s]

a  $10^{-9}$

b  $10^{-13}$

c  $10^{-19}$

d  $1 \text{ \AA}$

3. Bohr's radius of 2<sup>nd</sup> orbit of  $\text{Be}^{3+}$  is equal to that of

a 4<sup>th</sup> orbit of hydrogen

b 2<sup>nd</sup> orbit of  $\text{He}^+$

c 3<sup>rd</sup> orbit of  $\text{Li}^{2+}$

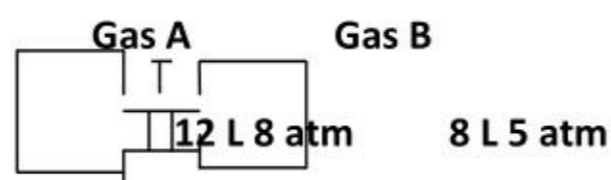
d first orbit of hydrogen

4. Half-life period of a radioactive element is 100 yr. How long will it take for its 93.75% decay ?

a 400 yr      b 300 yr

c 200 yr      d 193 yr

5. Two vessels containing gases A and B are interconnected as shown in the figure. The stopper is opened, the gases are allowed to mix homogeneously. The partial pressures of A and B in the mixture will be, respectively



a 8 and 5 atm

b 9.6 and 4 atm

c 4.8 and 2 atm

d 6.4 and 4 atm

6. The temperature, at which a gas shows maximum ideal behavior, is known as

- a Boyle's temperature
- b inversion temperature
- c critical temperature
- d absolute temperature

7. The unit of rate constant of a second order reaction is

- a mol/L -s
- b L/mol -s
- c L<sup>2</sup>/mol<sup>2</sup>-s
- d per second

8.  $2\text{N}_2\text{O}_5 \rightleftharpoons 4\text{NO}_2 + \text{O}_2$

For the above reaction which of the following is not correct about rates of reaction ?

- a  $\frac{-d[\text{N}_2\text{O}_5]}{dt} = 2 \frac{d[\text{O}_2]}{dt}$
- b  $\frac{-2d[\text{N}_2\text{O}_5]}{dt} = \frac{d[\text{NO}_2]}{dt}$
- c  $\frac{d[\text{N}_2\text{O}_5]}{dt} = 4 \frac{d[\text{O}_2]}{dt}$
- d  $\frac{-2d[\text{N}_2\text{O}_5]}{dt} = 4 \frac{d[\text{NO}_2]}{dt} = \frac{d[\text{O}_2]}{dt}$

9.  $\text{A} + \text{B} \rightarrow \text{Product}$

If concentration of A is doubled, rate increases 4 times. If concentrations of A and B both are doubled, rate increases 4 times. If concentrations of A and B both are doubled, rate increases 8 times. The differential rate equation of the reaction will be

- a  $\frac{dC}{dt} = kC_A \times C_B$     b  $\frac{dC}{dt} = kC_A^2 \times C_B^3$
- c  $\frac{dC}{dt} = kC_A^2 \times C_B$     d  $\frac{dC}{dt} = kC_A^2 \times C_B^2$

10. Which of the following is a wrong statement about equilibrium state ?

- a Rate of forward reaction = Rate of backward reaction
- b Equilibrium is dynamic

c Catalysis increase value of equilibrium constant

d Free energy change is zero

11.  $A+B \rightleftharpoons C+D$  Initially moles of A and B are equal. At equilibrium, moles of C are three times that of A. The equilibrium constant of the reaction will be

a 1   b 3   c 4   d 9

12. If for  $N_2+3H_2 \rightleftharpoons 2NH_3$ ,  $K_{eq}$  for the reaction  $NH_3 \rightleftharpoons \frac{1}{2}N_2 + \frac{3}{2}H_2$  will be

a 6.25   b 25   c 250   d 500

13. A weak acid HX has dissociation constant  $10^{-5}$ . The pH of 0.1 M solution of this acid will be

a 2   b 3   c 4   d 5

14. Which of the following is not a buffer solution ?

a 100 mL 0.1 M  $CH_3COOH$  + 50 mL 0.1 M  $CH_3COONa$

b 100 mL 0.1 M  $CH_3COOH$  + 50 mL 0.1 M NaOH

c 50 mL 0.1 M  $CH_3COOH$  + 100 mL 0.1 M NaOH

d 100 mL: 0.1 M  $NH_4OH$  + 50 mL 0.1 M HCL

15. If  $K_{sp}$  of  $Ag_2S$  is  $10^{-17}$ , the solubility of  $Ag_2S$  in 0.1 M solution of  $Na_2S$  will be

a  $10^{-8}$    b  $5 \times 10^{-9}$

c  $10^{-15}$    d  $10^{-16}$

16. Which of the following has the highest solubility product ?

a CuS   b  $Bi_2S_3$

c CdS   d ZnS

17. The pH values of 0.1 solution of HCL,  $CH_3COOH$ ,  $NH_4CL$  and  $CH_3COONa$  will have the order

a  $HCL < CH_3COOH < NH_4CL < CH_3COONa$

b  $CH_3COONa < NH_4CL < CH_3COOH < HCL$

c  $NH_4CL < CH_3COONa < CH_3COOH < HCL$

d All will have same pH value

18. For the titration of solution of oxalic acid and sodium hydroxide, the suitable indicator is



- a phenolphthalein
- b methyl orange
- c any of these
- d None of these

19. If 'F' is faraday and 'N' is Avogadro number, then charge of the 4 electron can be expressed as

- a  $F \times N$     b  $\frac{F}{N}$
- c  $\frac{N}{F}$         d  $F^2 N$

20. By passing 9.65 A current for 16 min 40 s, the volume of O<sub>2</sub> liberated at STP will be

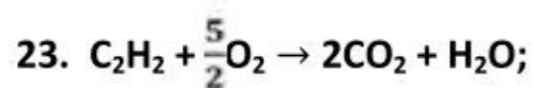
- a 280 mL    b 560 mL
- c 1120 mL   d 2240 mL

21. By diluting a weak electrolyte, specific conductivity  $K_c$  and equivalent conductivity  $\lambda_c$  change as

- a both increase
- b  $K_c$  increases,  $\lambda_c$  decreases
- c  $K_c$  decreases,  $\lambda_c$  increases
- d both decrease

22. In daniel cell, anode and cathode are respectively

- a Zn | Zn<sup>2+</sup> and Cu<sup>2+</sup> | Cu
- b Cu | Cu<sup>2+</sup> and Zn<sup>2+</sup> | Zn
- c Fe | Fe<sup>2+</sup> and Cu<sup>2+</sup> | Cu
- d Cu | Cu<sup>2+</sup> and Fe<sup>2+</sup> | Fe



$\Delta H = -310 \text{ kcal}$



On the basis of the above equations,  $\Delta H_f$  enthalpy of formation of  $C_2H_2$  will be

- a -148 kcal    b +54 kcal  
c -54 kcal    d +80 kcal

24.  $I_2(s) \rightleftharpoons I_2(g)$ ;  $\Delta H = +40 \text{ kcal}$ ,  $\Delta S = 80 \text{ cal}$ . The sublimation point of  $I_2(s)$  will be

- a  $100^\circ\text{C}$     b  $127^\circ\text{C}$   
c  $227^\circ\text{C}$     d  $500^\circ\text{C}$

25. If 0.1 M solutions of each electrolyte are taken and if all electrolytes are completely dissociated, then whose boiling point will be highest?

- a Glucose    b KCl  
c  $BaCl_2$     d  $K_4[Fe(CN)_6]$

26. A solid metal has ccp or fcc structure. The relation of side of cube  $a$  and radius of atom  $r$  will be

- a  $a=2r$     b  $a=2\sqrt{2}r$   
c  $a=\frac{4}{\sqrt{3}}r$     d  $a=\sqrt{\frac{3}{2}}r$

27. Hydrogen is prepared on large scale for industrial use

- a by  $Zn+H_2SO_4$     b by  $Al+NaOH$   
c by  $Na+C_2H_5OH$     d from water gas

28. Which of the following properties of lithium does not show diagonal relationship with magnesium?

- a Formation of  $Li^+$  ion  
b Formation of  $Li_3N$   
c Solubility of  $LiHCO_3$   
d Thermal decomposition of  $Li_2CO_3$

29. Which of the following carbonates decomposes at lowest temperature?

- a  $MgCO_3$     b  $CaCO_3$   
c  $SrCO_3$     d  $BaCO_3$

30. In which of the following pairs both molecules do not possess same type of hybridization?

a  $\text{CH}_4$  and  $\text{H}_2\text{O}$    b  $\text{PCl}_5$  and  $\text{SF}_4$

c  $\text{SF}_6$  and  $\text{XeF}_4$    d  $\text{BCl}_3$  and  $\text{NCl}_3$

31. If H—X bond length is 2.00 Å and H—X bond has dipole moment  $5.12 \times 10^{-30}$  C-m, the percentage of ionic character in the molecule will be

a 10%   b 16%   c 18%   d 20%

32. i H—C—H angle in  $\text{CH}_4$

ii Cl—B—Cl angle in  $\text{BCl}_3$

iii F—I—F angle in  $\text{IF}_7$  in a plane

iv I—I—I angle in  $\text{I}_3^-$

Increasing order of above bond angles is

a i < ii < iii < iv

b ii < i < iii < iv

c iii < i < ii < iv

d iv < ii < i < iii

33. According to molecular orbital theory, bond order in increasing order will be

a  $\text{O}_2^{2+} < \text{O}_2 < \text{O}_2^- < \text{O}_2^{2-}$

b  $\text{O}_2^{2-} < \text{O}_2^- < \text{O}_2 < \text{O}_2^{2+}$

c  $\text{O}_2 < \text{O}_2^{2-} < \text{O}_2^- < \text{O}_2^{2+}$

d  $\text{O}_2 < \text{O}_2^{2+} < \text{O}_2^- < \text{O}_2^{2-}$

34. Correct order electron affinities of halogens is

a  $\text{F} > \text{Cl} > \text{Br} > \text{I}$    b  $\text{I} > \text{Br} > \text{Cl} > \text{F}$

c  $\text{Cl} > \text{F} > \text{I} > \text{Br}$    d  $\text{Cl} > \text{F} > \text{Br} > \text{I}$

35. Atomic radii of Ti, Zr and Hf vary

a  $\text{Ti} > \text{Zr} > \text{Hf}$    b  $\text{Ti} < \text{Zr} < \text{Hf}$

c  $\text{Ti} < \text{Hf} < \text{Zr}$    d  $\text{Ti} < \text{Zr} = \text{Hf}$

36. If  $\text{NO}_2$  is dissolved in  $\text{NaOH}$ , we get solution of

a  $\text{NaNO}_2$

- b  $\text{NaNO}_3$
- c mixture of  $\text{NaNO}_2$  and  $\text{NaNO}_3$
- d  $\text{NaNO}_4$

37. A gas that relights glowing splinter, is

- a  $\text{H}_2$     b  $\text{O}_2$
- c  $\text{N}_2$     d  $\text{NO}_2$

38. A white-coloured inorganic compound, on heating, gives a gas which turns lime water milky and residue is left which is yellow when hot and turns white on cooling. The compound is

- a  $\text{Pb(NO}_3)_2$     b  $\text{PbCO}_3$
- c  $\text{BaCO}_3$     d  $\text{ZnCO}_3$

39. Buckminsterfullerene is a variety of

- a boron    b carbon
- c ammonia    d fluorine

40. What will be the compound if two valencies of carbonyl group are satisfied by two alkyl groups?

- a Aldehyde    b Ketone
- c Acid    d Acidic anhydride

41. 2-chloro-3-methylbutane is treated with sodium in etheral solution, then it will give

- a 2,4 -dimethylhexane
- b 3,5 - dimethylhexane
- c 2,3,4,5 -tetramethylhexane
- d 2,6 -dimethyloctane

42.  $\text{C}_2\text{H}_5\text{Cl} + \text{aq NaOH} \rightarrow \text{C}_2\text{H}_5\text{OH} + \text{NaCl}$ ; this reaction is

- a electrophilic substitution of I order
- b electrophilic substitution of II order
- c nucleophilic substitution of I order
- d nucleophilic substitution of II order



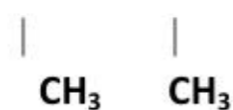
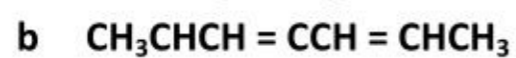
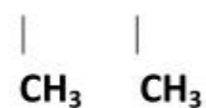
43. Which of the following does not contain chiral carbon atom?

- a Lactic acid    b 2-chlorobutanoic acid  
c Tartaric acid    d Succinic acid

44. An organic on reuctive ozonolysis produces

- i acetaldehyde  
ii acetone  
iii 2-methylprpane-1.3-dial

The formula of alkadiene will be



45. Which of the following acids will have lowest value of  $\text{pK}_a$  ?

- a  $\text{CH}_3\text{CH}_2\text{COOH}$     b  $\text{CH}_3\text{CHCOOH}$



- c  $\text{CH}_3\text{CHCOOH}$     d  $\text{FCH}_2\text{CH}_2\text{COOH}$



46. Which of the following will not respond to iodoform test ?

- a Ethyl alcohol    b propanol -2



c Propanol -1      d Ethanal

47. The strongest ortho/para directing group is

a  $-\text{NH}_2$       b  $-\text{CH}_3$   
c  $-\text{Cl}$       d  $-\text{C}_2\text{H}_5$

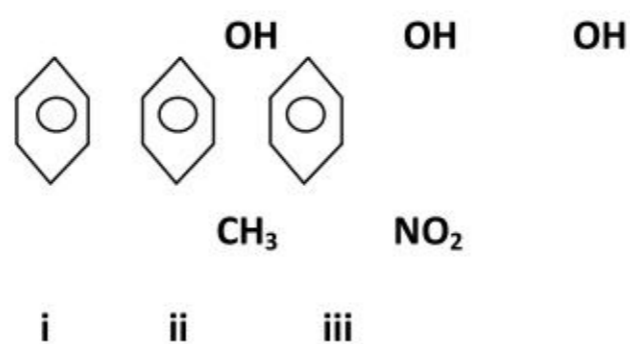
48. Which of the following reaction can be used to change benzaldehyde to cinnamic acid?

a perkin r eaction    b Knoevenagle reaction  
c Reformatsky reaction    d Benzoin condensation

49. Which of the following is strongest base ?

a  $\text{C}_6\text{H}_5\text{NH}_2$       b p -  $\text{NO}_2 - \text{C}_6\text{H}_4\text{NH}_2$   
c m -  $\text{NO}_2 - \text{C}_6\text{H}_4\text{NH}_2$     d  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$

50. Correct acidic order of the following compounds is



a I>ii>iii  
b Iii>i>ii  
c Ii>iii>i  
d 1>iii>ii