

## GGSIU chemistry 2013

1. The hybridization state of C-atom in butendioic acid is

- a  $sp^2$     b  $sp^3$   
c Both a and b    d  $sp$

2. The oxidation number of C-atom in  $CH_2Cl_2$  and  $CCL_4$  are respectively

- a -2 and -4    b 0 and -4  
c 0 and 4    d 2 and 4

3. Phenolphthalein of pH range 8 -10 is used in which of the following type of titration as a suitable indicator?

- a  $NH_4OH$  and  $HCl$     b  $NH_4OH$  and  $HCOOH$   
c  $NH_4OH$  and  $C_2H_4O_2$     d  $NaOH$  and  $C_2H_4O_2$

4. Which of the following species has a highest bond energy?

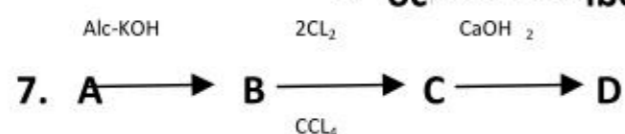
- a  $O_2^{2-}$     b  $O_2^+$     c  $O_2^-$     d  $O_2$

5. Which of the following is a weak acid ?

- a  $C_6H_6$     b  $CH_3-C \equiv CH$   
c  $CH_2=CH_2$     d  $CH_3-C \equiv C-CH_3$

6. A mixture containing 60% centane and 40% iso-octane will have

- a centane number 60    b centane number 40  
c octane number 40    d None of these



Here the compound C will be

- a Lewisite  
b Westron  
c Acetylene tetrachloride  
d Both b and c

8. Which of the following is least hydrolysed?

a  $\text{BeCl}_2$    b  $\text{MgCl}_2$    c  $\text{CaCl}_2$    d  $\text{BaCl}_2$

9. The volume concentration of a 3% solution of hydrogen peroxide would be

a 9880   b 9.88   c 22.4   d 3

10. The energy produced related to mass defect of 0.02 amu is

a 28.2 MeV   b 931.5 MeV  
c 18.62 MeV   d None of these

11. A solution contains  $\text{Cl}^-$ ,  $\text{I}^-$  and  $\text{SO}_4^{2-}$  ions in it. Which of the following ion is capable to precipitate all of above when added in this solution?

a  $\text{Pb}^{2+}$    b  $\text{Ba}^{2+}$    c  $\text{Hg}^{2+}$    d  $\text{Cu}^{2+}$

12. The minimum number of carbon atoms in ketones which will show chain isomerism

a seven   b four   c six   d five

13. In Victor Mayer's method 0.2g of an organic substance displaced 56 mL of air at STP, the molecular weight of the compound is

a 56   b 112   c 80   d 28

14.  $^{14}\text{C}_6$  is a beta-active nucleus. A sample of  $^{14}\text{CH}_4$  gas kept in a closed vessel shows increase in pressure with time. This is due to the

a formation of  $^{14}\text{NH}_3$  and  $\text{H}_2$   
b formation of  $^{14}\text{BH}_3$  and  $\text{H}_2$   
c formation of  $^{14}\text{C}_2$  and  $\text{H}_2$   
d formation of  $^{14}\text{CH}_3$ ,  $^{14}\text{NH}_2$  and  $\text{H}_2$

15. The bond angle around the central atom is highest in

a  $\text{SO}_2$    b  $\text{BBr}_3$   
c  $\text{CS}_2$    d  $\text{SF}_4$

16. For a d electron, the orbital angular momentum is

a  $\sqrt{6} \frac{h}{2\pi}$    b  $\sqrt{2} \frac{h}{2\pi}$   
c  $\sqrt{6} \frac{h}{2\pi}$    d  $\frac{h}{2\pi}$

17. A gaseous mixture of O<sub>2</sub> and X containing 20 mole% of X, diffuses through a small hole in 234s while pure O<sub>2</sub> take 224s to diffuse through the same hole. The molecular mass of mixture is

- a 34.9      b 46.6  
c 32         d 44

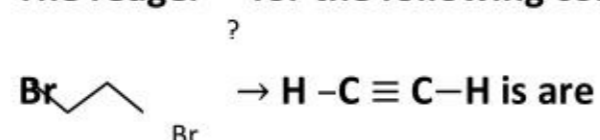
18. The electronegativity of C,H,O,N and S are 2,5,2,1,3,5,3,0 and 2.5 respectively. Which of following bond is most polar?

- a O -H      b S -H  
c N -H      d C -H

19. ZnS can be existing in the .....structure other than zing blende structure.

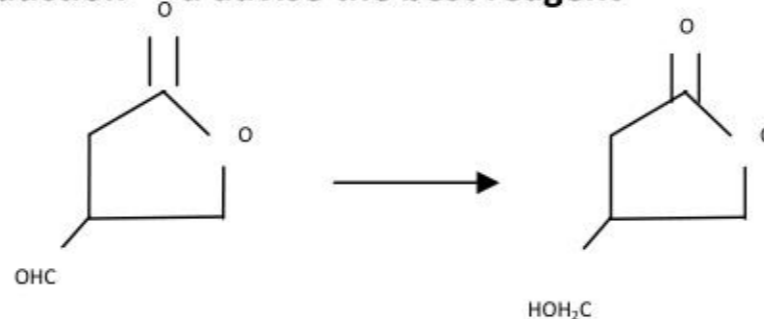
- a bcc        b wurtzite  
c simple cubic    d rock salt

20. The reagents for the following conversion,



- a Alcoholic KOH  
b Alcoholic KOH followed by NaNH<sub>2</sub>  
c Aqueous KOH followed by NaNH<sub>2</sub>  
d Zn/CH<sub>3</sub>OH

21. Consider the following reduction and advise the best reagent

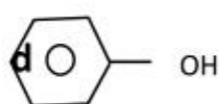
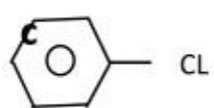


- a HI/Red      b LiA/H<sub>4</sub>  
c NaBH<sub>4</sub>      d Zn -Hg/HCL

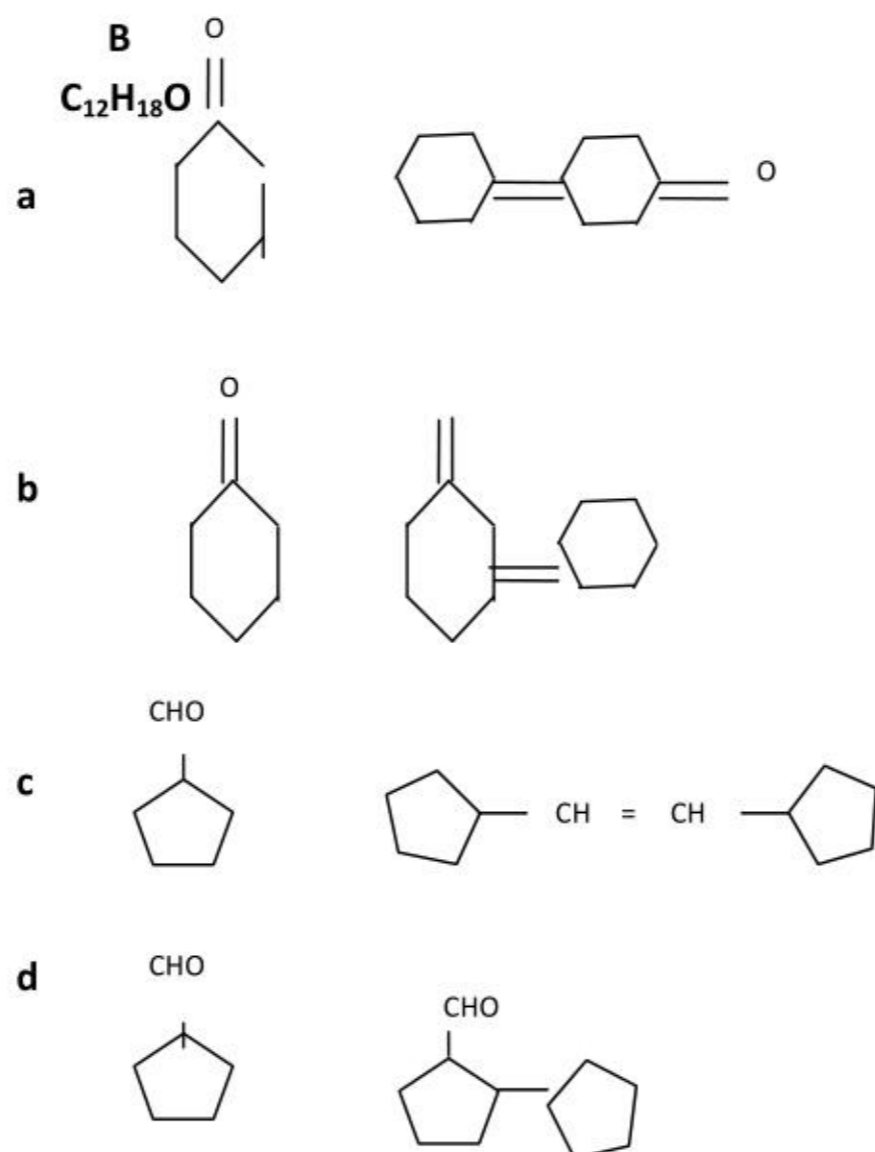
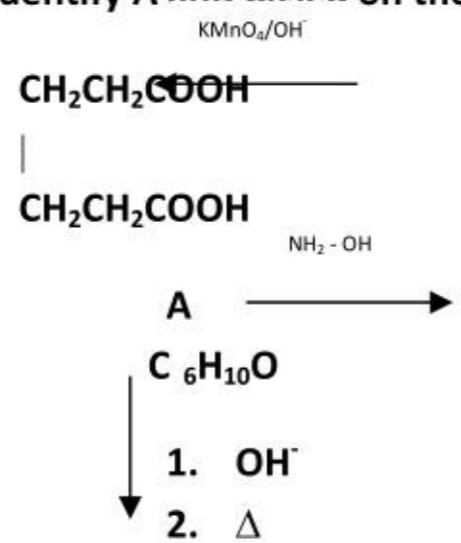
22. of the reagents is not used in the preparation of anisole via Williamson's synthesis?

a Na

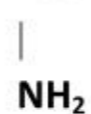
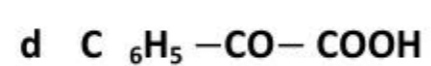
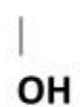
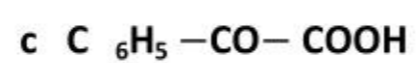
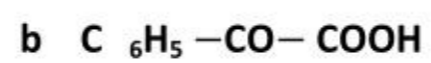
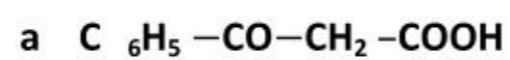
b CH<sub>3</sub>-Cl



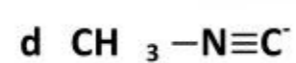
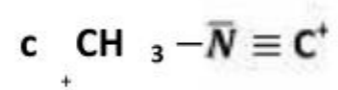
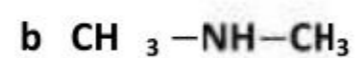
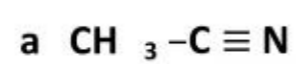
23. Identify A and B based on the following reaction scheme.



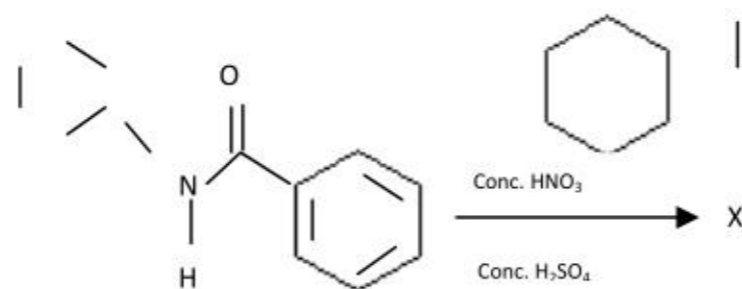
24. Which of the following carboxylic acid undergoes decarboxylation easily?



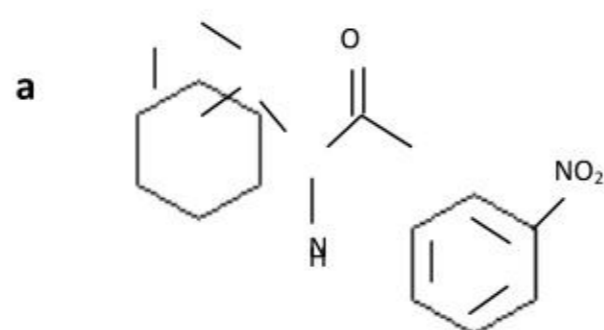
25.  $\text{CH}_3\text{NH}_2 + \text{CHCl}_3 + \text{KOH} \rightarrow$  Nitrogen containing compound is

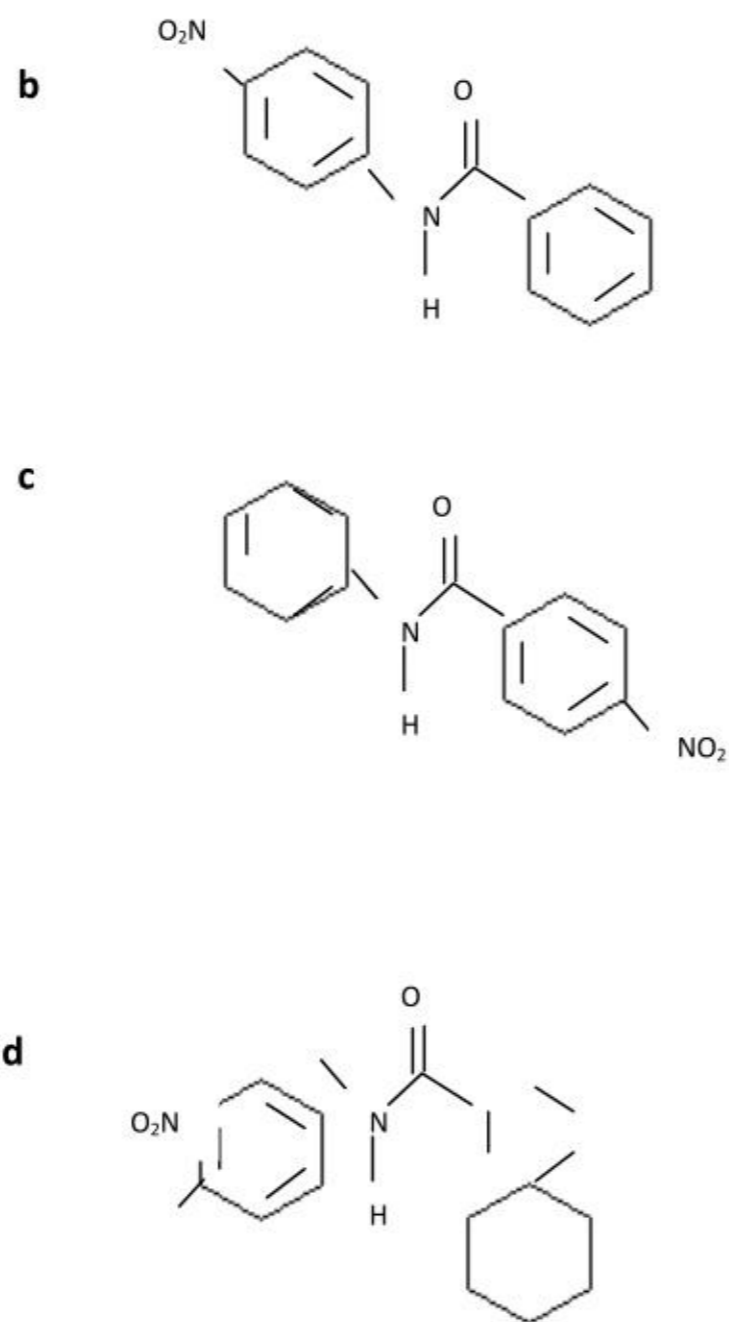


26. In the following reaction

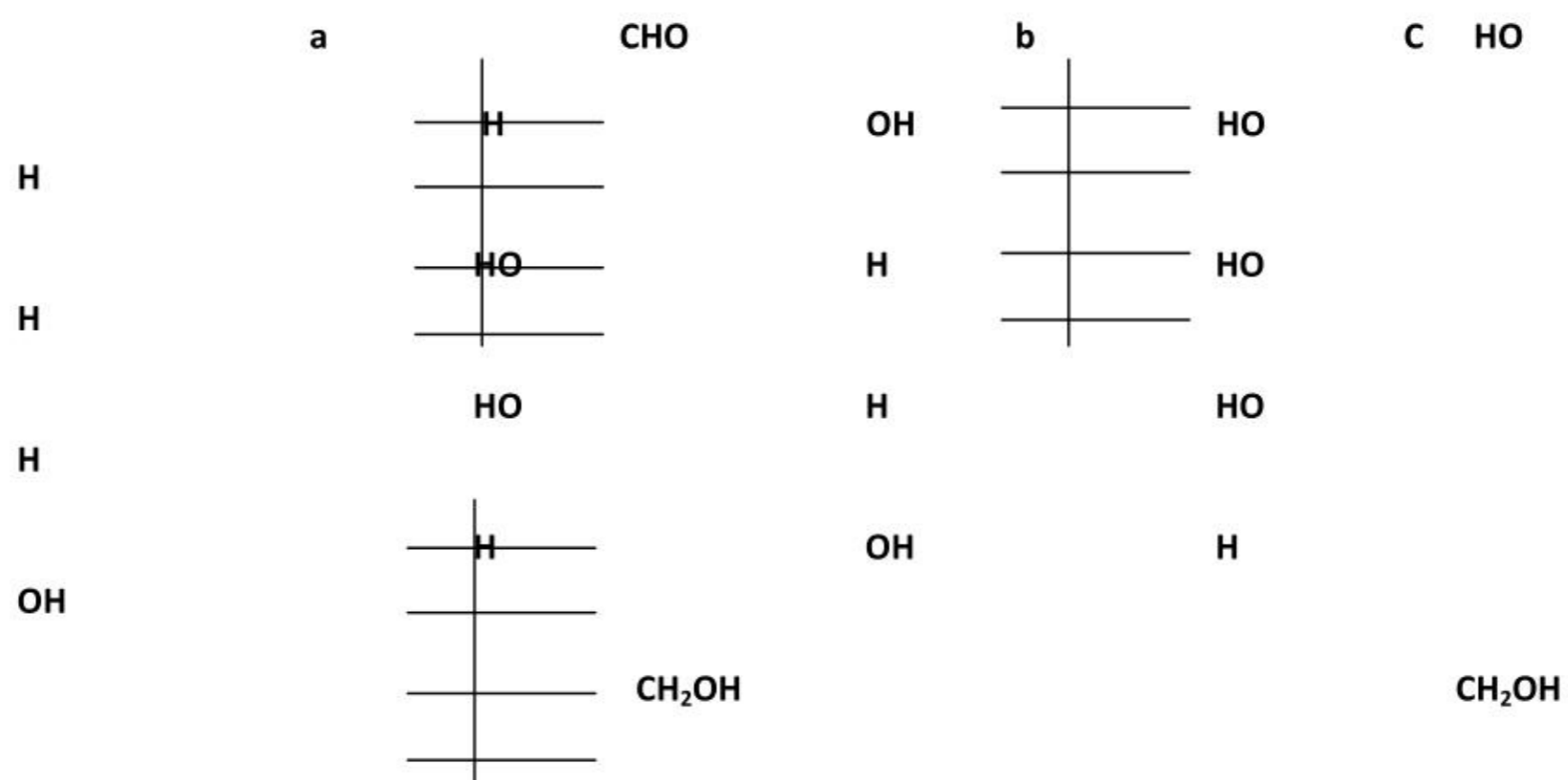


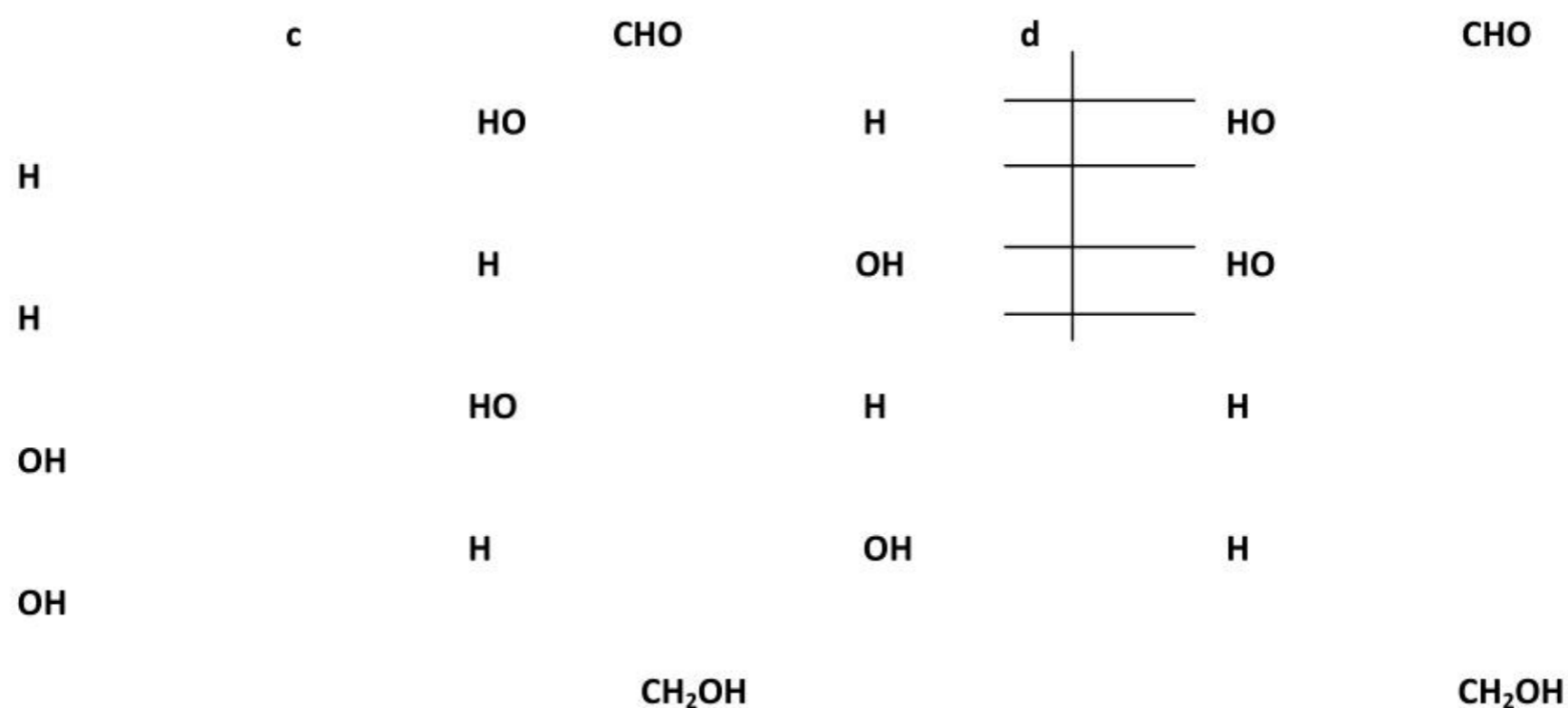
The structure of the major product X is





27. Which of the following monosaccharides yield an optically inactive alditol on  $\text{NaBH}_4$  reduction?





28. The monomer melamine has a chemical name

- a 2,4,6 - trimino - 1,3,5- trizine
- b 1,3,5 - trimino - 2,4,6- trizine
- c 2,4 -dimino - 1,3,5- triazine
- d 2 - amino - 1,3,5- triazine

29. For the reaction,  $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ ; the relation connecting the degree of dissociation  $\alpha$  of  $N_2O_4$  with the equilibrium constant  $K_p$  is

- a  $\alpha = \frac{\frac{K_p}{p}}{4 + \frac{K_p}{p}}$
- b  $\alpha = \frac{K_p}{4 + K_p}$
- c  $\alpha = \left( \frac{\frac{K_p}{p}}{4 + \frac{K_p}{p}} \right)^{1/2}$
- d  $\alpha = \left( \frac{K_p}{4 + K_p} \right)^{1/2}$

30. If the solubility of calcium phosphate mol. Wt = M in water at 25 °C is  $w$  g/100 mL, its solubility product at 25°C is

- a  $10^9 \left( \frac{w}{M} \right)^5$
- b  $10^7 \left( \frac{w}{M} \right)^5$
- c  $10^5 \left( \frac{w}{M} \right)^5$
- d  $10^3 \left( \frac{w}{M} \right)^5$

31. Mass of one atom of an element is  $6.64 \times 10^{-23}$  g. This is equal to

- a  $6.64 \times 10^{-23}$  u
- b 40.0 u

- c  $\frac{1}{40}$  u                      d 6.64 u

32. Sulphide ores of metals are usually concentrated by froth floatation process. Which one of the following sulphide ores offers an exception and is concentrated by chemical leaching?

- a Argentite                      b Galena  
c Copper pyrite                d Sphalerite

33. Soldiers of Napoleon army which at Alps during freezing winter suffered a serious problem as regards to the tin buttons of their uniforms. White metallic tin buttons got covered by grey powder. This transformation is related to

- a an interaction with nitrogen of the air at very low temperatures  
b a change in the partial pressure of oxygen in the air  
c a change in the crystalline structure of tin  
d an interaction with water vapour contained in the humid air

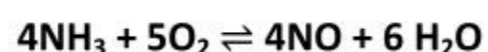
34. Which of the following is a mixed oxide?

- a  $\text{Fe}_2\text{O}_3$                       b  $\text{PbO}_2$   
c  $\text{BaO}_2$                         d  $\text{Pb}_3\text{O}_4$

35. If the quantum numbers for the 5<sup>th</sup> electron in carbon atom are 2,1,1, + $\frac{1}{2}$ , then for the 6<sup>th</sup> electron, these values would be

- a 1,1,0,  $\frac{1}{2}$                       b 2,0,1, + $\frac{1}{2}$   
c 2,1,1,  $-\frac{1}{2}$                       d 2,1, -1, + $\frac{1}{2}$

36. For the homogenous reaction.



The equilibrium constant  $K_c$  has the units

- a  $\text{Conc.}^{+10}$   
b  $\text{Conc.}^{+1}$   
c  $\text{Conc.}^{-1}$   
d It is dimensionless

37. Which of the following behavior binary liquid solution?



- a Plot of  $1/\rho_{\text{total}}$  vs  $1/Y_A$  mole fraction of A in vapour phase is linear
- b plot of  $1/\rho_{\text{total}}$  vs  $1/y_B$  is linear
- c plot of  $1/\rho_{\text{total}}$  vs  $1/y_A y_B$  is linear
- d plot of  $1/\rho_{\text{total}}$  vs  $y_A$  is linear

38. A 0.004 M solution of  $\text{Na}_2\text{SO}_4$  is isotonic with a 0.010 M solution of glucose at the  $25^\circ\text{C}$ . The apparent degree of dissociation of  $\text{Na}_2\text{SO}_4$  is

- a 25%    b 50%    c 75%    d 85%

39. Cow milk an example of neutral emulsion is stabilised by

- a fat      b water
- c casein    d  $\text{Mg}^{2+}$  ions

40. The initial concentration of sugar solution is 0.12 M. On doing fermentation the concentration of sugar decreases to 0.06 M in 10 h and to 0.045 M to 15 h. The order of the reaction is

- a 0.5    b 1.0    c 1.5    d 2.0

41. An athlete is given 100 g of glucose  $\text{C}_6\text{H}_{12}\text{O}_6$  of energy equivalent to 1560 kJ. He utilizes 50% of this gained energy in a n event. In order to avoid storage of energy in the body what is the weight of water he would need to perspire ? The enthalpy of evaporation of water is 44 kJ/mol.

- a 319 g    b 638 g    c 14040 g    d 35.45 g

42. Which of the following relationship is incorrect ?

- a  $\frac{\Delta H - \Delta E}{\Delta n RT} = \text{constant}$     b  $\Delta G = -T\Delta S_{\text{Total}}$
- c  $q = \Delta U + W$     d  $K = e^{-\Delta G^0/RT}$

43. A mixture of gases having different molecular weights is separated by which method ?

- a Atmolysis    b Metathesis
- c Ostwald and Walker method
- d Reverse osomosis

44. Boric acid is polymeric due to

- a its acidic nature
- b the presence of hydrogen bonds

c its monobasic nature

d its geometry

45. The metal ion which does not form coloured compound is

a chromonium    b iron

c zinc                    d manganese

46. The type of isomerism present in pentaamine nitro cobalt III chloride is

a optical            b linkage

c ionization        d polymerization

47. Which of the following is known as invert soap?

a Pentaerythritol monostearate

b Sodium stearyl sulphate

c Trimethylstearyl ammonium bromide

d Ethoxylated nonylphenol

48. The cell constant is the

a resistance x conductance

b resistance x specific conductance

c conductance x specific resistance

d resistance x specific resistance

49. It has been found experimentally that if standard reduction potential of oxidant – standard reduction potential of reductant is more than 1.7V then their combination lead to explosion though it may be prevented by kinetic factors.

Now go through the following data and answer the questions.

$$E^0_{\text{Ag}^+/\text{Ag}} = 0.80 \text{ V}$$

$$E^0_{\text{ClO}_4^-/\text{ClO}_3^-} = 1.23 \text{ V}$$

$$E^0_{\text{Fe}^{3+}/\text{Fe}^{2+}} = 0.77 \text{ V}$$

$$E^0_{\text{MnO}_4^-/\text{Mn}^{3+}} = 1.54 \text{ V}$$

$$E^0_{N_2/N_3^-} = -3.09 \text{ V}$$

$$E^0_{Na^+/Na} = -2.17 \text{ V}$$

$$E^0_{O_2/H_2O} = -1.03 \text{ V}$$

Which of the following ionic combinations may lead to the formation of explosive substance?

- a Sodium ion and azide ion
- b Silver ion and perchlorate ion
- c Silver ion and azide ion
- d All the above

50. For the reaction  $2A + B \rightarrow \text{product}$ ; doubling the initial concentrations of both reactants increase the rate by a factor of 8 and doubling the concentration of B alone doubles the rate. The rate law for the reaction is

- a  $r = k[A][B]^2$
- b  $r = k[A][B]$
- c  $r = k[A]^2[B]^2$
- d  $r = k[A]^2[B]$