NEET 2020

Chemistry

1. Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as :
   a. Cross Cannizzaro's reaction
   b. Cross Aldol condensation
   c. Aldol condensation
   d. Cannizzaro's reaction

   Ans: B

   Solution: Benzaldehyde have no alpha hydrogen, acetophenone has alpha hydrogen. So it can undergo cross Aldol condensation reaction

$$C_6H_5CHO + CH_3COC_6H_5 \xrightarrow[-H_2O]{NaOH}$$

$$C_6H_5 - CH = CH - \overset{\overset{O}{\|}}{C} - C_6H_5$$

Benzyl acetophenone

2. Measuring Zeta potential is useful in determining which property of colloidal solution
   a. Stability of the colloidal particles
   b. Size of the colloidal particles
   c. Viscosity
   d. Solubility

   Ans : A

   Solution:

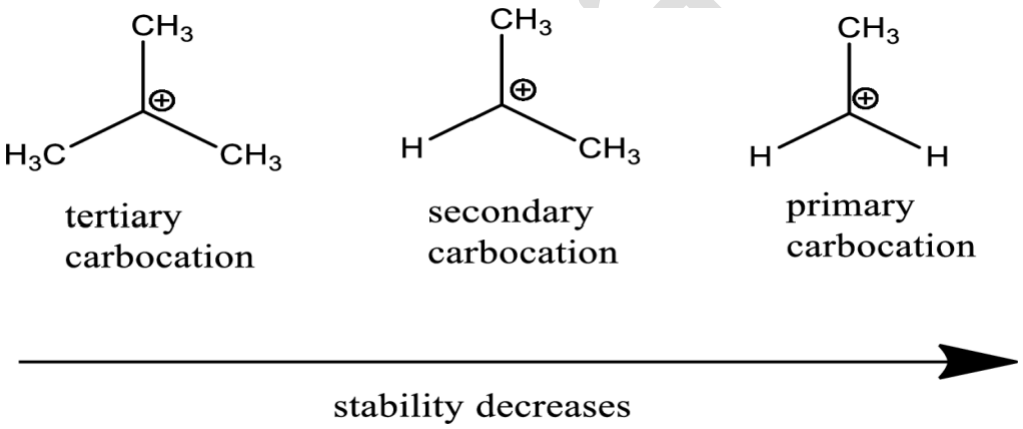
   Stability of colloidal particles. The colloids with high zeta potential are electrically stable and with low tends to coagulate

3. A tertiary butyl carbocation is more stable than the secondary butyl carbocation because of which one of the following

a. -R effect of -CH_3 group
b. Hyperconjugation
c. -I effect of -CH_3 groups
d. +R effect of -CH_3 groups

Ans : B

Solution : Tertiary carbocations are stable due to +I effect & hyper conjugation



4. The correct option for free expansion of an ideal gas under adiabatic condition is

a) $q < 0$, $\triangle T = 0$ and $w = 0$
b) $q > 0$, $\triangle T > 0$ and $w > 0$
c) $q = 0$, $\triangle T = 0$ and $w = 0$
d) $q = 0$, $\triangle T < 0$ and $w > 0$

Answer : C

Solution :
Free expansion, W =0
Adiabatic process, q = 0

$\Delta U = q + w = 0$

Therefore $\Delta T = 0$

5. Match the following.

Oxide	Nature
(a) CO	(i) Basic
(b) BaO	(ii) Neutral
(c) Al2O3	(iii) Acidic
(d) Cl2O7	(iv) Amphoteric

Which one of the following is correct?

a. (a) (iii); (b) (iv); c (i); d (ii)
b. (a) (iv); (b) (iii); c (ii); d (i)
c. (a) (i); (b) (ii); c (iii); d (iv)
d. (a) (ii); (b) (i); c (iv); d (iii)

Answer: (d)

Solution:

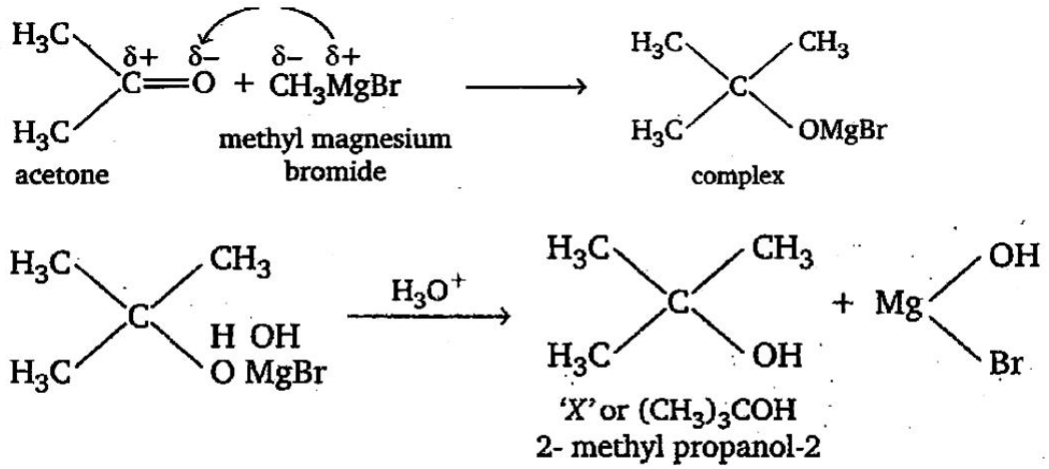
Oxide	Nature
(a) CO	(i) Neutral
(b) BaO	(ii) Basic
(c) Al_2O_3	(iii) Amphoteric
(d) Cl_2O_7	(iv) Acidic

6. Reaction between acetone and methyl magnesium chloride followed by hydrolysis will give

a) Tert. butyl alcohol
b) Isobutyl alcohol
c) Isopropyl alcohol
d) Sec. butyl alcohol

Ans: A

Solution:



3° butyl alcohol

7. The following metal ion activates many enzymes participates in the oxidation of glucose to produce ATP and with Na, is responsible for the transmission of nerve signals
   a) Calcium
   b) Potassium
   c) Iron
   d) Copper

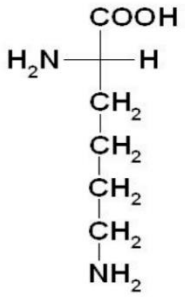
   Ans : b

   Solution:
   The Potassium ions that are abundant within the cell fluids can activate many enzymes. They participate in the oxidation of glucose to produce
   ATP and along with Sodium ions , they are responsible for the transmission of nerve signals

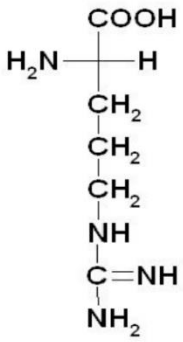
8. Which of the following is a basic amino acid?
   a) Tyrosine
   b) Lysine
   c) Serine
   d) Alanine

   Ans : B

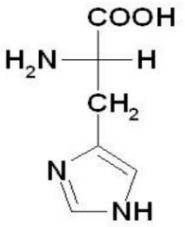
Solution: Basic amino acids are



Lysine*
Lys

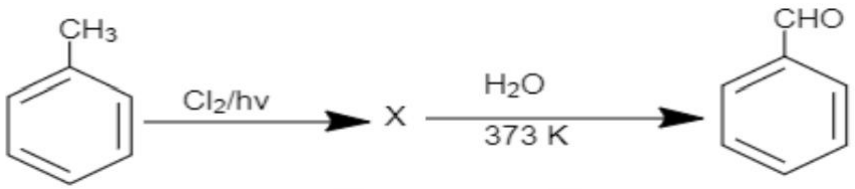


Arginine*
Arg

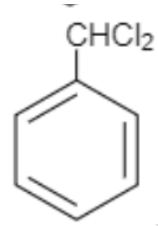


Histidine*
His

9. Identify compound X in the following aqueous of reaction:



a)



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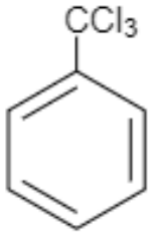
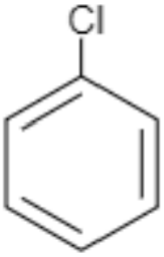
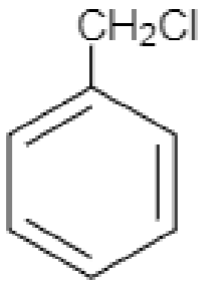


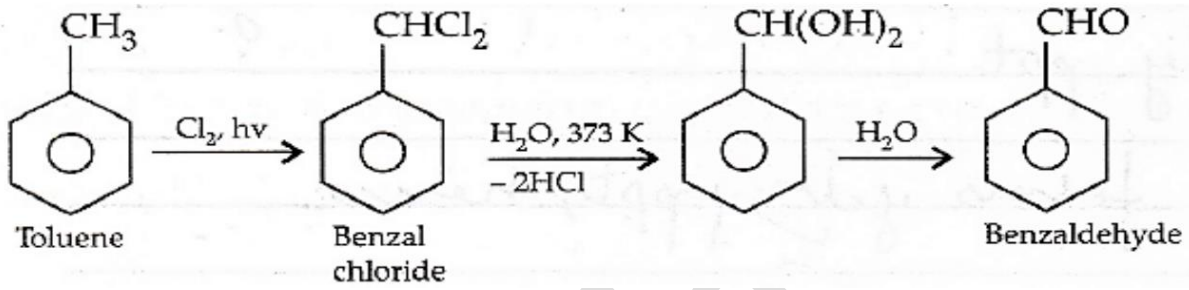
c)



d) 

Ans : A

Solution:



10. Which of the following is the correct order of increasing field strength of ligand to form coordination compound?

a) $F^- < SCN^- < C2O4^{2-} < CN-$

b) $CN- < C2O42- < SCN- < F-$

c) $SCN- < F- < C2O42- < CN-$

d) $SCN- < F- < CN-< C2O42-$

Answer : C

Solution:

Weak Field

$$I^- < Br < S^2 < SCN^- < CI^- <$$

$$NO_3^- < F^- < C_2O_4^{2-} < H_2O < NCS^- <$$

$$CH_3CN < NH_3 < en < bipy < phen <$$

$$NO_2^- < PPh_3 < CN^-CO$$ Strong Field

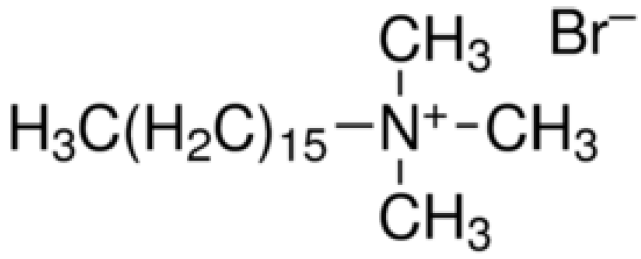
So the answer is option C - $SCN^- < F^- < C_2O_4^{2-} < CN^-$

11. Which of the following is cationic detergent?
a) Cetyl trimethyl ammonium bromide
b) Sodium dodecylbenzene sulphonate
c) Sodium lauryl sulphate
d) Sodium stearate

Ans: A

Solution:

Cationic detergents are those that give electrically positive ions in solution. The quaternary salts of ammonium of amines with acetate, chlorides or bromides as anions are cationic detergents.



12. Which one of the followings has maximum number of atoms

A. 1g of O2(g) [Atomic mass of O = 16]
B. 1g of Li(s) [Atomic mass of Li = 7]
C. 1g of Ag(s) [Atomic mass of Ag = 108]
D. 1g of Mg(s) [Atomic mass of Mg = 24]

Answer :B

Solution:

In the given options, all those are having same number of grams.

Number of Atoms = no. of moles x avogadro number x atomicity

Lower is atomic mass, more is number of atoms

So Li has lower atomic mass and more number of atoms

13. Match the following.

Name	IUPAC Official name
(a) Unnilunium	(i) Mendelevium
(b) Unniltrium	(ii) Lawrencium
(c) Unnilhexium	(iii) Seaborgium
(d) Ununnnium	(iv) Darmstadtium

Which one of the following is incorrect?

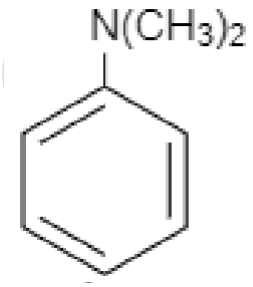
a) (c) (iii)
b) (d) (iv)
c) (a) (i)
d) (b) (ii)

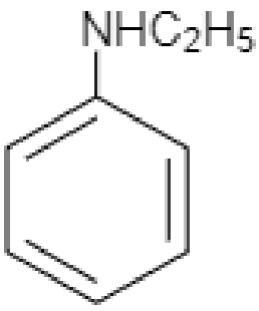
Ans: b

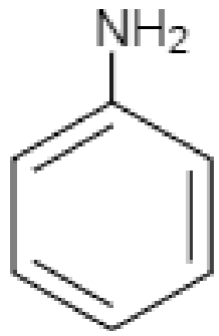
Solution:

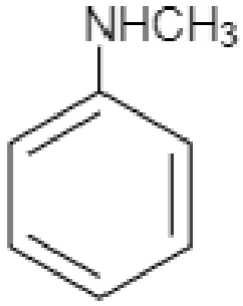
(a) Unnilunium ⇒ 101 ⇒ Md
(b) Unniltrium ⇒ 103 ⇒ Lr
(c) Unnilhexium ⇒ 106 ⇒ Sg
(d) Ununnnium ⇒ 111 ⇒ Rg - Roentgenium

14. Which of the following amine will give the carbylamine test?

a) 

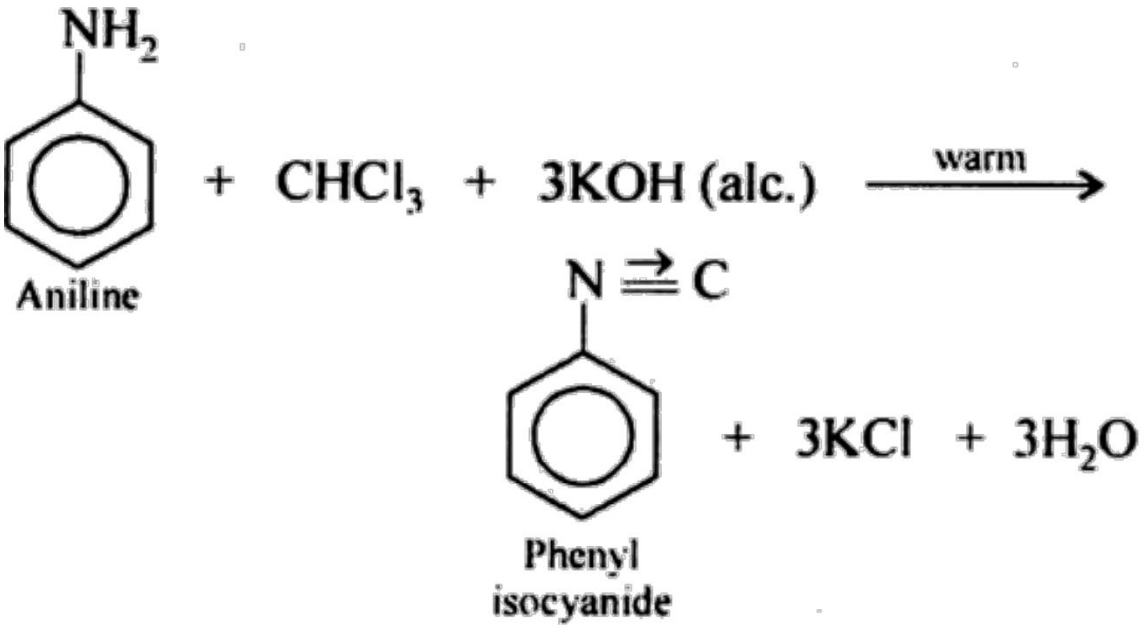
b) 

c) 

d) 

Answer: c

Solution: Primary aromatic and aliphatic amines undergoes carbylamine test



15. Paper chromatography is an example of
    a) Thin layer chromatography
    b) Column chromatography
    c) Adsorption chromatography
    d) Partition chromatography

Ans: d

Solution: Paper chromatography is a type of partition chromatography

16. The A mixture of N2 and Ar gases in a cylinder contains 7g of N2 and 8g of Ar. If the total pressure of the mixture of the gases in the cylinder is 27 bar, the partial pressure of N2 is:

a) 15 bar
b) 18 bar
c) 9 bar
d) 12 bar

Ans: A

Solution:

Mass of N_2 = 7g

moles of N_2 = 7/28 = 0.25

Mass of Ar = 8g

moles of Ar = 8/40 = 0.20

Mole fraction of N2 = 0.25/ (2=0.25+0.20) = 5/9

Pressure of N2 = Molefraction of N2 x total pressure = 5/9 x 27 = 15 bar

17. The number of protons, Neutrons and electrons Lu. respectively, are:

a) 71, 71 and 104
b) 175, 104 and 71
c) 71, 104 and 71
d) 104, 71 and 71

Answer : C

Solution :

Z = 71

A = 175

No. of protons = 71

No. of electrons = 71

No. of neutrons = 175 - 71

= 104

18. The rate constant for a first order reaction 4.606×10^{-3}. The time required to reduce 2.0g of the reactant to 0.2g is:

A. 500s

B. 1000s

C. 100s

D. 200s

Solution:

$$Kt = 2.303 \log \frac{[A_0]}{[A_t]}$$

$$t = \frac{2.303}{4.606 \times 10^{-3}} \log \frac{2}{0.2}$$

$$\left(As\ k = 4.606 \times 10^{-3} \right)$$

$$t = 500 \text{sec}.$$

19. Identify a molecule which does not exist.

A. C_2

B. O_2

C. He_2

D. Li_2

Solution:

$He_2 \rightarrow$ No of e^- in BMO = No of e^- in ABMO.

20. Hydrolysis of sucrose is given by the following reaction

Sucrose + H2O ⇌ Glucose + Fructose

If the equilibrium constant (K_C) is 2×10^{13} 300 K, the value of $\Delta_r G^0$ at the same temperature will be:

A. 8.314 J mol^{-1} K^{-1} × 300 K × ln(3n × 10^{13})

B. -8.314 J mol^{-1} K^{-1} × 300 K × ln (4 × 10^{13})

C. -8.314 J mol^{-1} K^{-1} × 300 K × ln (2 × 10^{13})

D. 8.314 J mol^{-1} K^{-1} × 300 K × ln (2 × 10^{13})

Answer : c

Solution:

As $\Delta G^0 = - RT \ln Kc$

$\Delta G^0 = - 8.314 \times 300 \ln (2 \times 10^{13})$

21. For the reaction, $2Cl(g) \rightarrow Cl_2(g)$, the correct option is:

A. $\Delta_r H < 0$ and $\Delta_r S > 0$

B. $\Delta_r H < 0$ and $\Delta_r S < 0$

C. $\Delta_r H > 0$ and $\Delta_r S > 0$

D. $\Delta_r H > 0$ and $\Delta_r S < 0$

Answer : B

Solution:

$2Cl (g) \rightarrow Cl_2(g)$

As bond formation is accompanied by release of energy

ΔH = -ve.

Also, no. of particles decreases. so

ΔS = -ve

22. Find out the solubility of $Ni(OH)_2$ in 0.1 M NaOH given that the solubility product of Ni(OH)2 is 2×10^{15}

A. 1×10^{-13}M

B. 1×10^{8} M

C. 2×10^{-13} M

D. 2×10^{-8} M

Solution:

Ni(OH)2

Let solubility be s

$Ni(OH)_2 \rightleftharpoons Ni^{2+} + 2OH^-$

s 2S + 0.1

$K_{sp} = [Ni^{2+}] [OH^-]^2$

$\Rightarrow 2 \times 10^{-15} = S (2s + 0.1)^2$

$s = 2 \times 10^{-13}$M

23. On electrolysis of dil. Sulphuric acid using platinum (Pt) electrode, the product obtained at anode will be:

A. H_2S gas

B. SO_2 gas
C. Hydrogen gas
D. Oxygen gas

Answer: c

Solution:

On electrolysis of dil. H_2SO_4 using it electrolysis,

At cathode we obtain H_2

At anode we obtain O_2

Cathode:

$2H^+ + 2\ e^- \rightarrow H_2(g)$

Anode:

$4(OH^-) \rightarrow 2H_2O + O_2(g) + 4e^-$

24. Which of the following is not correct about carbon monoxide?

A. The carboxyhemoglobin (haemoglobin bound to CO) is less stable than oxyhaemoglobin.
B. It is produced due to incomplete combustion.
C. It forms carboxyhaemoglobin.
D. It reduces oxygen carrying ability of blood

Answer:

Solution: A

Carboxyhemoglobin is more stable complex because CO is stronger ligand than O_2

25. The number of Faradays(F) required to produce 20g of calcium from molten $CaCl_2$(Atomic mass of Ca = 40 g mol^{-1}) is:

A. 3
B. 4
C. 1
D. 2

Answer : 2

Solution:

As, m = Zq

⇒ 20 g = mass of Ca deposited

$Ca^{2+} + 2e^- \rightarrow Ca$

40g Ca deposited by 2F change 20g Ca deposited by 1F change

26. Elimination reaction of 2-Bromo-pentane to form pent-2-ene is:

(a) β-Elimination reaction

(b) Follows Zaitsev rule

(c) Dehydrohalogenation reaction

(d) Dehydration reaction

A. (b), (c), (d)

B. (a), (b), (d)

C. (a), (b), (c)

D. (a), (c), (d)

Answer: c

Solution:

a) **β**-Elimination reaction

b) Zaitsev rule: Double bond "C" has more substitution.

c) removal of both H and Br - "De" "Hydro" "Halogenation"

27. What is change in oxidation number of carbon in the following reaction?

$CH_4(g) + 4Cl_2(g) \rightarrow CCl_4(l) + 4HCl(g)$

A. -4 to +4

B. 0 to -4

C. +4 to +4

D. 0 to + 4

Answer: A

Solution:

ln CH4 the or. st. of C = -4 and in CCl_4 or. st. of C = +4

28. Which of the following alkane cannot be made in good yield by wurtz reaction

A. n-Heptane

B. n-Butane

C. n-Hexane

D. 2,3-dimethylbutane

Answer: d

Solution:

Wurtz Reaction is limited to the synthesis of symmetrical alkanes. So, 2,3-dimethylbutane can't be produced

29. Sucrose on hydrolysis gives:

A. α-D-Glucose + β-D-Fructose

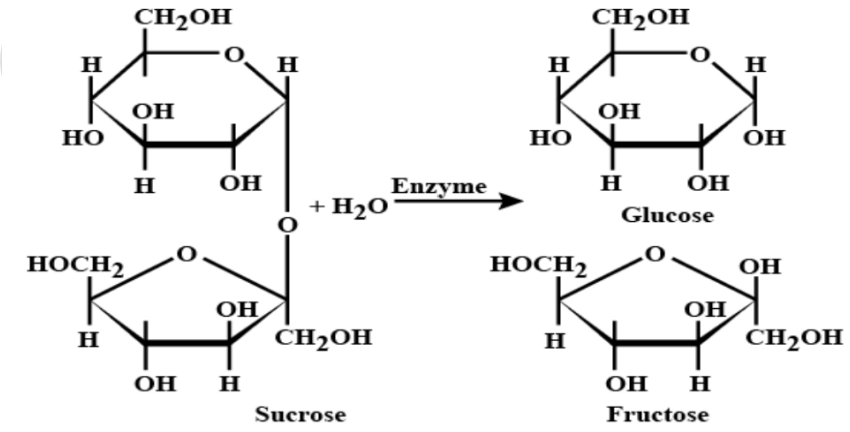
B. α-D-Fructose + β-D-Fructose

C. β-D-Glucose + α-D-Fructose

D. α-D-Glucose + β-D-Glucose

Answer: A

Solution:



30. Identify the incorrect statement.

A. Interstitial compounds are those that are formed when small atoms like H, C or N are trapped inside the crystal lattices of metals.
B. The oxidation states of chromium in CrO_4^{2-} and
C. $Cr_2O_7^{2-}$ are not teh same
D. $Cr^{2+}(d^4)$ is a stronger reducing agent than $Fe^{2+}(d^6)$ in water.
E. The transition metals and their compounds are known for their catalytic activity due to their ability to adopt multiple oxidation states and to form complexes

Answer: B

Solution:

CrO_4^{2-}	$Cr_2O_7^{2-}$
x = 8 = -2	2x - 14 = -2
x = + 6	2x = 12
x = + 6	

31. CHI was passed through a solution of $CaCl_2$ and NaCl. Which of the following compound(s) crystallise(s)?

A. Only $MgCl_2$
B. NaCl, $MgCl_2$ and $CaCl_2$
C. Both CaCl2 and $CaCl_2$
D. Only NaCl

Answer: B

Solution:

Crude $CaCl_2 \xrightarrow{H2O,filter}$ solution

↓CHI gas

NaCl ↓

$CaCl_2$ and $MgCl_2$ due to solubility remain in solution

32. Identify the correct statements from the following:

(a) $CO_{2(}$M) is used as refrigerant for ice-cream and frozen food

(b)The structure of C_{60} contains twelve six carbon rings and twenty five carbon rings.

(c)ZSM-5, a type of zeolite, is used to convert alcohols into gasoline.

(d)CO is colorless and odourless gas.

A. (b) and (c) only
B. (c) and (d) only
C. (a), (b) and (c) only
D. (a) and (c) only

Answer: b

Solution:

ZSM-5 is a zeolite which converts alcohol directly into gasoline(petrol)

Carbon dioxide, CO is a colorless, odorless, and tasteless gas.

33. An increase in the concentration of the reactants of a reaction leads to change in:

A. Threshold energy
B. Collision frequency
C. Activation energy
D. Heat of reaction

Answer: b

Solution:

As No. of particles increase, No. of collisions increase

34. The calculated spin only magnetic moment of Cr2+ ion is:

A. 5.92 BM
B. 2.84 BM
C. 3.87 BM
D. 4.90 BM

Answer: d

Solution:

$Cr = 3d^5\ 4s^1$

$Cr^{+2} = 3d^4$

u=$\sqrt{n(n+2)} = \sqrt{4(4+2)} = \sqrt{24}$ = 4.90BM

35. Match the following and identify the correct option.

(a) $CO(g) + H_2(g)$	(i)$Mg(HCO_3)_2$+ $Ca(HCO_3)_2$
(b)Temporary hardness of water	(ii) An electron deficient hydride
(c)B_2H_6	(iii) Synthesis gas
(d)H_2O_2	(iv) Non-planar structure

A. (a)(iii); (b)(iv); (c)(ii); (d)(i)
B. (a)(i); (b)(iii); (c)(ii); (d)(iv)
C. (a)(iii); (b)(i); (c)(ii); (d)(iv)
D. (a)(iii); (b)(ii); (c)(i); (d)(iv);

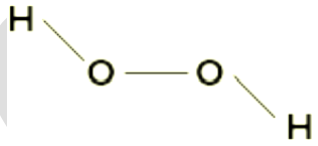
Solution:

$Co + H_2 \longrightarrow$ Syn gas

Temporaty hardness ⇒ sue to bicarbonates of Mg^{+2} and Ca^{+2}

$B_2H_6 \longrightarrow e^-$ defficient

$H_2O_2 \longrightarrow$ Half open book ⇒ Non-planar



36. The mixture which shows positive deviation from Raoult's law is:

A. Acetone + Chloroform
B. Chloroethane + Bromoethane
C. Ethanol + Acetone
D. Benzene + Toluene

Answer: c

Solution:

A mixture of ethanol and acetone shows positive deviation from Raoult's Law.

Introduction of acetone between the molecules of ethanol results in breaking of some of these hydrogen bonds

Due to weakening of interactions, the solution shows positive deviation from Raoult's law

37. Anisole on cleavage with HI gives

A. $C_6H_5OH + C_2H_5I$

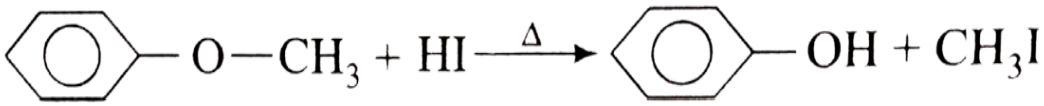
B. $C_6H_5I + C_2H_5OH$

C. $C_6H_5OH + CH_3I$

D. $C_6H_5I + CH_3OH$

Answer: c

Solution:



Anisole Phenol

38. Urea reacts with water to form A which will decompose to form B. B when passed through Cu^{2+} (aq), deep blue colour solution C is formed. What is the formula of C from the following?

A. $Cu(OH)_2$

B. $CuCO_3$. Cu(OH)2

C. $CuSO_4$

D. $[Cu(NH_3)_4]^{2+}$

Solution:

$$NH_2CONH_2 + H_2O \rightarrow NH_2COO^-NH_4^+$$

$$NH_2COO^-NH_4^+ \xrightarrow{\Delta} 2NH_3 + CO_2$$

$Cu^{2+} + NH_3 \longrightarrow [Cu(NH_3)_4]^{+2}$
deep-blue.

39. The freezing point depression constant (K_f) of benzene is 5.12 K kg mol^{-1}. The freezing points depression for the solution of molality 0.087 m containing a non-electrolyte solute in benzene is (rounded off upto two decimal places):

A. 0.40K
B. 0.60K
C. 0.20K
D. 0.80K

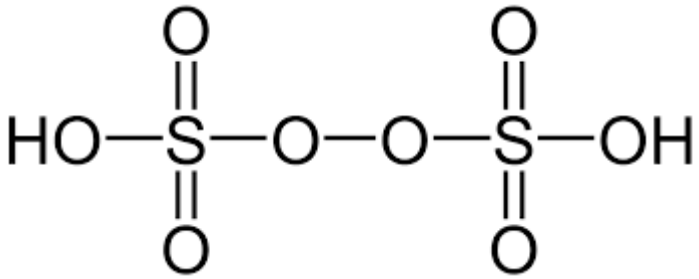
Answer: A
Solution:
$\Delta T_f = K_f$ m
K_f of benzene = 5.12 kg mol^{-1}
molality, m of solution = 0.078 m
$\Delta Tf = 5.12 \times 0.078$ K
$= 0.399$ K ≈ 0.40 K

40. Which of the following oxoacid of sulphur has - O - O - linkage?

A. $H_2S_2O_8$, peroxodisulphuric acid
B. $H_2S_2O_7$, pyrosulphuric acid
C. H_2SO_3, sulphurous acid
D. H_2SO_4, sulphuric acid

Answer: A

Solution:



41. Identify the correct statement from the following:

A. Vapour phase refining is carried out for Nickel by Van Arkel method.

B. Pig iron can be moulded into a variety of shapes.

C. Wrought iron is impure iron with 4% carbon.

D. Blister copper has blistered appearance due to evolution of CO_2.

Answer: B

Solution:

Correct option is B. Pig iron can be moulded into a variety of shapes

Blister copper has a blistered appearance due to the evolution of, not Vapour phase refining is carried out to obtain ultra Pure Titanium by Van Arkel method.

The iron obtained from the Blast furnace contains about 4% carbon and many impurities in smaller amounts (e.g., S, P, Si, Mn). This is known as pig iron. It can be moulded into a variety of shapes. This is the only correct statement.

Wrought iron is impure iron with 0.1% carbon.

Option B is correct..

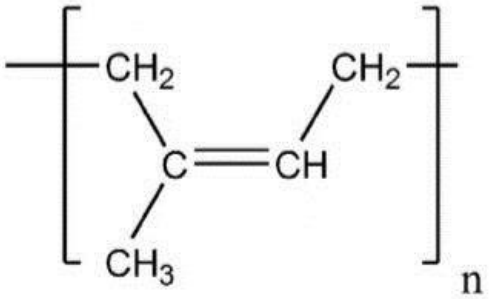
42. Which of the following is a natural polymer?

A. Polybutadiene

B. Poly (Butadiene - acrylonitrile)
C. Cis - 1, 4 - polyisoprene
D. Poly (butadiene - styrene)

Answer: C

Solution:



cis-1,4-polyisoprene

Natural polymers are always cis isomers

43. An element has a body centered cubic (bcc) structure with a cell edge of 288 pm. The atomic radius is:

A. $\frac{4}{\sqrt{3}}$×283pm
B. $\frac{4}{\sqrt{2}}$×288pm
C. $\frac{\sqrt{3}}{4}$×288pm
D. $\frac{\sqrt{2}}{4}$×288pm

Answer: C

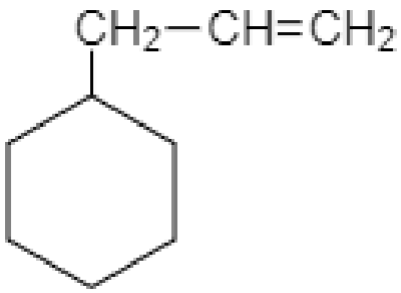
Solution:
In bcc unit cell,
A = 288 pm

$$\sqrt{3}a = 4r$$

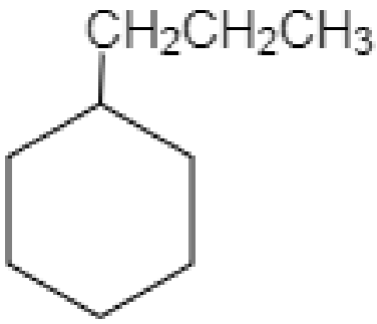
$$\Rightarrow r = \frac{\sqrt{3}}{4}s = \frac{\sqrt{3}}{4} \times 288\,pm$$

44. An alkene on ozonolysis gives methanal as one of the product. Its structure is:

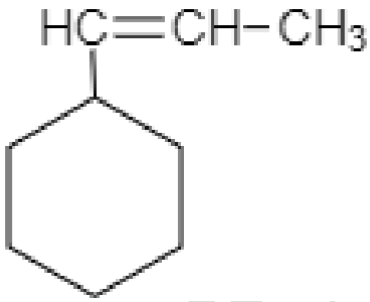
A.



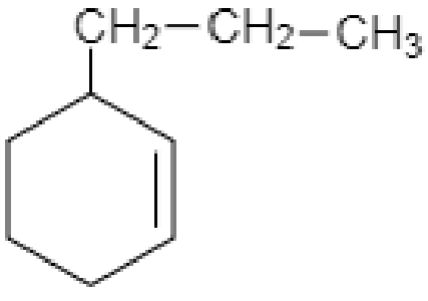
B.



C.

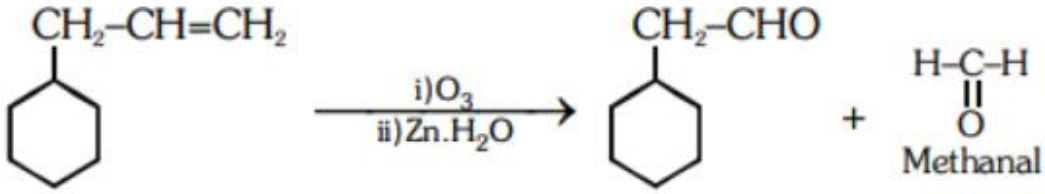


D.



Answer: A

Solution:



45. Which of the following set of molecules will have zero dipole moment?

A. Nitrogen trifluoride, beryllium difluoride, water, 1, 3 - dichlorobenzene

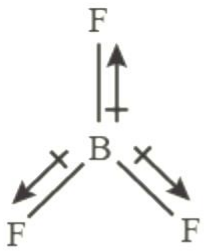
B. Boron trifluoride, Carbon tetrachloride, carbon dioxide, 1, 4- dichlorobenzene

C. Ammonia, beryllium difluoride, water, 1, 4 - dichlorobenzene

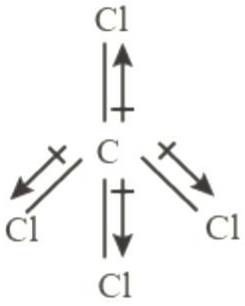
D. Boron trifluoride, hydrogen fluoride, carbon dioxide, 1, 3- dichlorobenzene

Answer:B

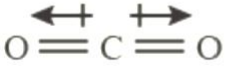
Solution:



$\mu = 0$



$\mu = 0$



$\mu = 0$

$\mu = 0$