CHEMISTRY

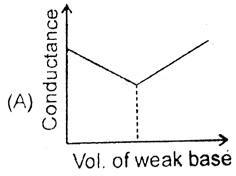
PHYSICAL, INORGANIC, AND ORGANIC CHEMISTRY

TEST SERIES

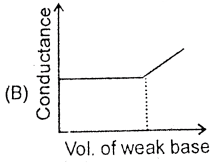
Chemistry

1. Which of the following plots will obtained for a conductomeric titration of strong acid against a weak base?

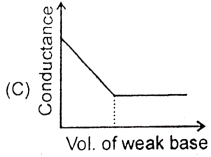
A.



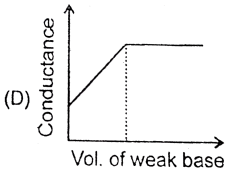
B.



C.



D.



Answer: C

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2. Freundlich adsorption isotherm is given by the expression $\frac{x}{m} = kP^{\frac{1}{n}}$ which of the following conclusions can be draw from this expression?

A. When $\frac{1}{n} = 0$, the adsorption is directly proportional to pressure

B. When $n = 1$, $\frac{x}{m}$ vs p graph is a line parallel to x-axis

C. When $\frac{1}{n} = 0$ the adsorption is independent of pressure

D. When $n = 2$, plot off $\frac{x}{m}$ vs p is a rectangular hyperbola

Answer: C

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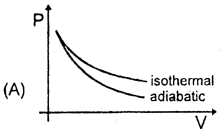
3. The correct figure representing isothermal and adiabatic compression of an ideal gas from the same initial state is:

A.



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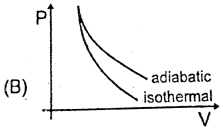
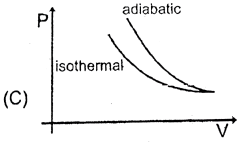
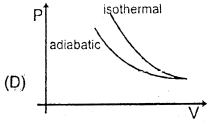


C.



D.



Answer: C

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4. Which of the following reactions does not occur during calcination?

A. $CaCO_3 \rightarrow CaO + CO_2$

B. $CuSo_3.Cu(OH)_2 \rightarrow 2CuO + H_2O \downarrow + CO_2 \downarrow$

C. $CuS + O_2 \rightarrow CuO + SO_2 \downarrow$

D. $CuSO_4.5H_2O \rightarrow CuSO_4 + 5H_2O \downarrow$

Answer: C

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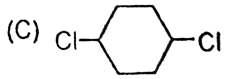
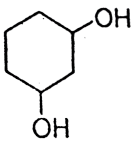
5. Which of the following compounds can show geometrical optical and conformational isomerism.

A. $Cl - CH = CH - CH_3$

B. $CH_3 - C \equiv C - CH(Cl) - CH_3$

C. (C) 

(D) 

D.

Answer: D

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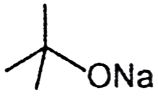
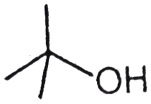
6. Which of the following is the strongest nucleophile?

A. $NaOH$

B. $NaSH$

(C) 

C.

(D) 

D.

Answer: b

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7. Which of the following are low spin complexes which follow EAN rule?

A. $Cr(CO)_6$

B. $\left[Cr(CN)_6\right]^{4-}$

C. $PtCl_6^{2-}$

D. $\left[Cu(NH_3)_3CO\right]^{\oplus}$

Answer: A::C::D

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8. Which of the following statement(s) is/are correct?

A. In B_2 "s-p" mixing is present (significant)

B. Hybridisation for the central atoms in $OPCl_3$, OSF_4 and OIF_5 is respectively sp^3, sp^3d, sp^3d^2

C. In both N_2O_5 and N_2O_4 all type of $N-O$ bond lengths are equivalent.

D. In O_2^+ H.O.M.O. (Highest occupied molecuar orbital) has two nodal planes.

Answer: A::B::D

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9. $\wedge_m^0 H_2O$ is equal to ___

A. $\wedge_{m(HNO_3)}^0 + \wedge_{m(NaNO_3)}^0 - \wedge_{m(NaOH)}^0$

B. $\wedge_{m(HCl)}^0 + \wedge_{m(NaOH)}^0 - \wedge_{m(NaCl)}^0$

C. $\wedge_{m(HNO_3)}^0 + \wedge_{m(NaOH)}^0 - \wedge_{m(NaNO_3)}^0$

D. $\frac{\wedge_m^0 (H_2SO_4) - \wedge_m^0 (K_2SO_4)}{2} + \wedge_{m(KOH)}^0$

Answer: B::C::D

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10. Which of the following is/are oxide ores?

A. Cassiterite

B. Malachite

C. Chromite

D. Dolomite

Answer: A::C::D

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11. Zn Amalgan is prepated by electrolysis of aqueous $ZnCl_2$ using Hg catode $(9gm)$. Current is passed through $ZnCl_2$ solution for 1000 seconds to prepare a Zn Amalam with $25\ \%\ Zn$ by wt. $(Zn = 65.4)$

A. Current off 8.85 amp is passed in the process.

B. Current of 5.65 amp is passed in the process

C. Mass of Zn in Amalgam is $3gm$

D. Mass of Zn in Amalgam is $6gm$.

Answer: A::C::D

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12. In which of the following electrolysis in aqueous medium, mass of anode decreases and pH of solution remains unchanged?

A. Electrolysis of aqueous $AgNO_3$ using silver anode and copper cathode

B. Electrolysis of aqeous $CuSO_4$ using pure copper anode and impure copper cathode.

C. Electrolysis of aqeous $AgNO_3$ using gold anode and silver cathode

D. Electrolysis of aqeous $CuSO_4$ using silver anode and platium cathode.

Answer: A::B::D

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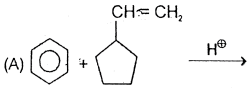
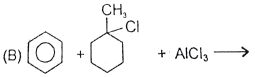
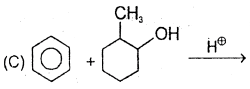
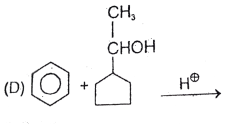
13. Which of the following reaction/s give same product?

A. 

B. 

C. 

D. 

Answer: A::B::C::D

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14. The correct statements among the following is/are

A. Stability of triphenyl methyl carbocation can be explained only by resonance effect

B. Cyclopropyl cation is more stable than tropylium cation

C. p-methoxy benzyl carbocation is more stable than p- nitrobenzyl carbocation

D. 1° Allyl carbocation is more stable than isopropyl cation.

Answer: A::C::D

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15. Which of the following substrates is/are more reactive than ethyl bromide for S_N2 reaction?

A. $Br - CH_2 - Br$

B. $OHC - CH_2 - Br$

C. $CH_2 = CH - CH_2 - Br$

D. $Ph - CH_2 - Br$

Answer: B::C::D

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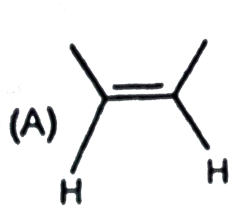
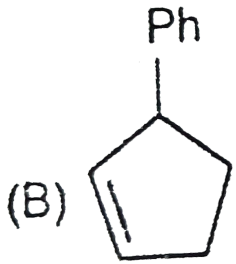
16. Choose the correct option(s)

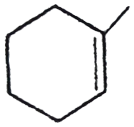
A. 

$\xrightarrow{HOBr}$ Major products are enantiomers

B. 

$\xrightarrow{H_3O^{\oplus}}$ Major products is optically active

C. $CH_2 = CH_2 \xrightarrow{OsO_4 / NaHSO_3}$ product is $\underset{|}{\overset{OH}{CH_2}} - \underset{|}{\overset{OH}{CH_2}}$

(D) 

D. $\xrightarrow{MCPBA}$ products are diasteromers

Answer: A::C::D

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17. Metallic gold frequently is found in aluminosilicate rocks and it is finely dispersed among other minerals. It may be extracted by treating the crushed rock with aerated sodium cyanide solution. During this process metallic gold is slowly converted t $\left[Au(CN)_2\right]^-$, which is soluble in water. After equlibrium has been reached, the aqueous phase is pumped off and the metallic gold is recovered from it by reacting the gold complex with zinc, which is converted to $\left[Zn(CN)_4\right]^{2-}$, Gold in nature is frequently alloyed with silver is also oxidised by aerated sodium cyanide solution.

The correct ionic reaction for the process is//are:

A. $Au + 2CN^- \rightarrow Ar\left[(CN)_2\right]^-$

B. $Zn + 2CN^- rar Zn\left[(CN)_2\right]^-$

C.

$$4Au + 8CN^- + 2H_2O + O_2(\text{air}) \rightarrow 4\left[Au(CN)_2\right]^-(\text{soluble}) + 4OH$$

D. $Zn + 4CN^- \rightarrow Zn\left[(CN)_4\right]^{2-}$

Answer: C

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18. Metallic gold frequently is found in aluminosilicate rocks and it is finely dispersed among other minerals. It may be extracted by treating the crushed rock with aerated sodium cyanide solution. During this process metallic gold is slowly converted t $\left[Au(CN)_2\right]^-$, which is soluble in water. After equlibrium has been reached, the aqueous phase is pumped off and the metallic gold is recovered from it by reacting the gold complex with zinc, which is converted to $\left[Zn(CN)_4\right]^{2-}$, Gold in nature is frequently alloyed with silver is also oxidised by aerated sodium

cyanide solution.

Which of the follwing is/are correct for cyanide process of extraction of gold?

A. Sodium cynaide is sweet in taste and is also used in making chocolates

B. Sodium cyanide if escapes into ground water then it produces hydrogen cyanide which is toxic to many animals.

C. It is an example of pyrometallurgy.

D. It is an example of leaching process

Answer: B::D

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19. $X(C_4H_9Br) \xrightarrow[\Delta]{alc.KOH} Y \xrightarrow{Br_2/CCl_4} Z \xrightarrow[\Delta]{NaNH_2\,(2eq.)} W \xrightarrow[(\text{Tollen's reagent})]{AgNO_3+NH_4OH}$

white ppt

Reductive ozonolysis of Y yields

A. CH_3CH_2CHO and $HCHO$

B. 2 moles of CH_3CHO

C. CH_3COCH_3 and $HCHO$

D. CH_3CH_2COOH and $HCOOH$

Answer: A

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20. $X(C_4H_9Br) \xrightarrow[\Delta]{alc.KOH} Y \xrightarrow{Br_2/CCl_4} Z \xrightarrow[\Delta]{NaNH_2(2eq.)} W \xrightarrow[(\text{Tollen's reagent})]{AgNO_3+NH_4OH}$

white ppt

Which of the following statement(s) is//are incorrect?

A. Y and W are chain isomers

B. Y and W are functional isomers

C. W can be converted into Y with H_2/Pt

D. W can be converted into Y with Lindlar catalyst

Answer: A::B::C

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21. If 0.1 molar solution of glucose (Molecular weight $= 180$) is separated from 0.1 molar solution of cane sugar (Molecular weight $= 242$) by a semi -permeable membrane, then which one of the following statements is correct?

A. Water will flow from glucose solution into cane sugar solution.

B. Cane sugar will flow across the mebrane into glucose solution.

C. Glucose will flow across the membrane into cane sugar solution.

D. There will be no net movement across the semi-permeable membrane.

Answer: D

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22. Amongst the following ions which one has the highest magnetic moment value?

A. $\left[Cr(H_2O)_6\right]^{3+}$

B. $\left[Fe(H_2O)_6\right]^{2+}$

C. $\left[Zn(H_2O)_6\right]^{2+}$

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

Answer: B

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23. The oxidation number of cobalt in $K\left[Co(CO)_4\right]$ is:

A. $+1$

B. $+3$

C. -1

D. -3

Answer: C

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24. Choose the incorrect statement about corrosion on the metal surface.

A. In the corosion of iron, reduction of oxygen while oxidation of metal take place.

B. Rusting is reduced in highly alkaline medium.

C. Mg can act as sacrifical electrode.

D. CO_2 gas can prevent the metal surface from corrosion.

Answer: D

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25. The standard electrode potential for Daniel cell is $1.1V$. Calculate the standard Gibbs energy of the reaction (In KJ/mol)

$Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$

A. 106.15

B. 212.3

C. 193

D. 403

Answer: B

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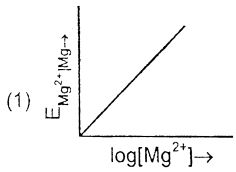
26. Electrode potential for Mg electrode varies according to the equation

$$E_{Mg^{2+}|Mg} = E^{\Theta}_{Mg^{2+}|Mg} - \frac{0.059}{2}\log\frac{1}{[Mg^{2+}]}$$

The graph of $E_{Mg^{2+}|Mg} vs \log\left[Mg^{2+}\right]$ is

A.



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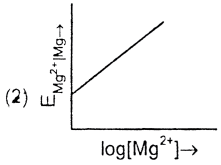

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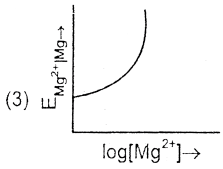
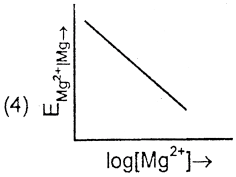


D.



Answer: B

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27. The number of moles of water which must be electrolyzed to produce $22.4L$ of O_2 at $273K$ and 2 atmospheric pressure is

A. 1

B. 2

C. 4

D. none of these

Answer: C

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28. Choose the incorrect statement from the following:

A. In the metallurgy of Cu, matte obtained from roasting consist of $Cu_2S(\text{major}) + FeO$

B. At temperature below $983K$ (approx) CO is chief reducing agesnt in blast furnance.

C. In zone refining impurities moves in the direction of heater.

D. Electrolytic reduction of Al_2O_3 is known as Hall-Heroult process

Answer: A

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29. Select in incorrect match

A. $Hg, Cu, Pb \Rightarrow$ Self reduction

B. $Mn_3O_4, B_2O_3 \Rightarrow$ Reduction by aluminium

C. $Zr, Ti, Ni \Rightarrow$ Vapour phase refining

D. Molten $MgCl_2 + CaCl_2 + NaC \lim plies$ Hoop's process (electrolysis)

Answer: D

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30. Select the incorrect statement.

A. The geometry of phosphorus in H_3PO_2, H_3PO_3 and H_3PO_{34} is tetrahedral

B. H_3PO_2, H_3PO_3 and H_3PO_4 are tribasic acids

C. $NH_3 < PH_3 > AsH_3 < SbH_3$: increasing acidic character.

D. $CO_2 < SiO_2 < SnO_2 < PbO_2$: increasing oxidising power.

Answer: B

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31. Silicones repel water due to:

A. Low surface area

B. Strong $Si - O - Si$ bonds

C. High vender Waal's forces

D. The presence of alkyl group pointed towards surface

Answer: D

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32. The colour developed when Na_2S is added to $Na_2\left[Fe(CN)_5NO\right]$ is,

A. Violet

B. Yellow

C. Red

D. Black

Answer: A

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33. Select incorrect statement

A. The oxidation state of iron in the complex $\left[Fe(H_2O)_5NO\right]SO_4$ is

+1

B. Sodium nitroprusside test is not performed by free H_2S

C. KBr in heating with MnO_2 and concentrated H_2SO_4 liberates both Br_2 and SO_2 gases as major products.

D. All the statements are correct.

Answer: C

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34. Which of the following interface cannot be obtained?

A. liquid-liquid

B. solid-solid

C. liquid-gas

D. gas-gas

Answer: D

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35. Which of the following statement is true?

A. Lower the gold number, more will be protective power

B. Higher the gold number more will be the protective power

C. Higher the coagulation value, more will be coagulation power

D. none of these

Answer: A

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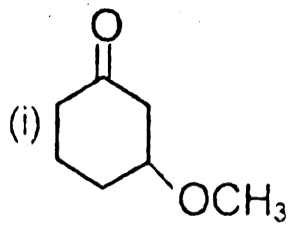
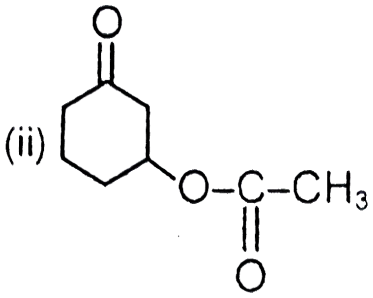
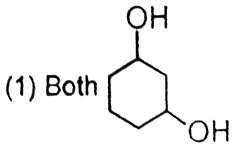
(i)  $\xrightarrow[(2)H_2O]{(1)\ LiAlH_4}$ A,

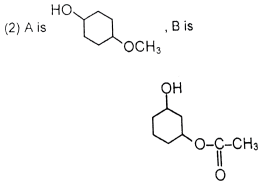
(ii)  $\xrightarrow[(2)H_2O]{(1)\ LiAlH_4\ (excess)}$ B +

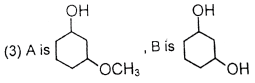
36.

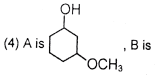
$CH_3 - CH_2 - OH$

In the given reaction A & B are respectively:

A. 

B. 

C. 

D. (4) A is  , B is 

Answer: C

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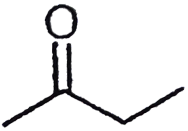
37. Which of the following reaction correctly reports the major product?

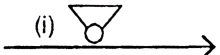


A. $CH_3\underset{\underset{O}{||}}{C}-O-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_3 \xrightarrow[(ii)\,H_2O]{(i)\,CH_3MgBr\,(\text{excess})}$

B. $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-MgBr \xrightarrow[(i)\,H_2O]{(i)\,O_2} CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-OH$

C.

$$CH_3-CH_2-CH_2\_MgBr \xrightarrow[(ii)\,H_2O]{(i)\,CO_2} CH_3-CH_2-CH_2-\underset{\underset{OH}{|}}{CH_2}$$

D. $CH_3-CH_2-MgBr \xrightarrow[(ii)\ H_2O]{(i)}$ 

$CH_3-CH_2-\underset{\underset{OH}{|}}{CH}-CH_3$

Answer: B

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38. Rate of S_N1 & S_N2 reactions for the isomers of C_4H_9Br is

i. n- Butylbromide

ii isobutylborimide

ii s-Butylbromide

iv. t-Butylbromide

a. $i > ii > iii > iv$ for S_N2

b. $i > ii > iii > iv$ for S_N1

c. $iv > iii > ii >$ for S_N2

d. $iv > iii > ii > i$ for S_N1

A. a & b

B. c & d

C. a & d

D. b & c

Answer: C

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39. How many position isomers are possible of trichlorocyclohexane which can show geometrical isomerism.

A. 2

B. 3

C. 4

D. 6

Answer: B

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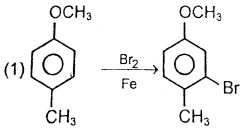
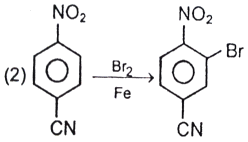
40. Which of the following reaction correctly reports the major product?

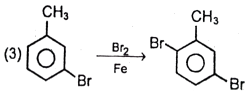
A.



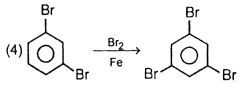
B.



C.



D.



Answer: C

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41. The correct order of $S_N2/E2$ ratio for the % yield of product of the following halide is,

P. $CH_3 - CH_2 - \underset{\underset{I}{|}}{\overset{\overset{Ph}{|}}{C}} - CH_3$

Q. $CH_3 - \underset{\underset{Ph}{|}}{CH} - \underset{\underset{I}{|}}{CH} - CH_3$

R. $CH_3 - CH_2 - I$

S. $CH_3 - CH - \underset{\underset{I}{|}}{CH} - CH_3$

A. $R > S > Q > P$

B. $R > Q > S > P$

C. $P > R > S > Q$

D. $Q > P > R > S$

Answer: A

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42. Which of the following is correct order?

A. $-NH_2 > -NO_2(-I\text{effect})$

B. $-F > -Br(+M\text{effect})$

C. $-CHO > -CN-(-M\text{effect})$

D. $-CH_2CH_3 > -COO^-(+I\text{effect})$

Answer: B

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43. $CH_3 - \underset{\underset{CH_3}{|}}{C} = CH_2 \xrightarrow[\text{Peroxide}]{HBr} CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2Br$ reaction intermediate of this reaction is:

A. $CH_3 - \underset{\underset{CH_3}{|}}{\dot{C}} - CH_2Br$

B. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - \dot{C}H_2$

C. $CH_3 - \underset{\substack{\underset{CH_3}{|} \\ Br}}{\dot{C}} - CH_3$

D. $CH_3 - \underset{\underset{CH_3}{|}}{C} - \dot{C}H_2$

Answer: A

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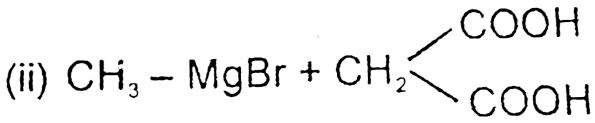
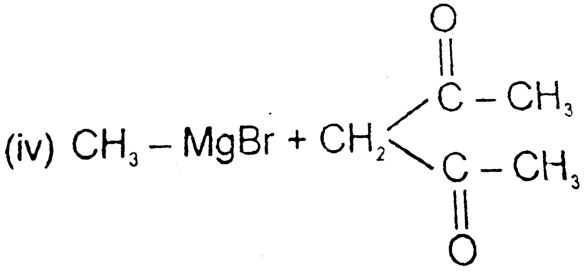
44. In which of the following reaction CH_4 will be obtained?

i. $CH_3 - MgBr + CH_3 - C \equiv CH$



ii.

iii. $CH_3 - MgBr + CH_3OH$



iv

A. i, ii & iii

B. i, ii, iii & iv

C. iii & iv

D. iii & i, iv

Answer: B

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45. S_N1 reaction underoges through carbocation intermediate as follows:

$R-X(aq.) \overset{\text{Slow}}{\Longleftrightarrow} R^+(aq.) +$

$X^-(aq.) \xrightarrow[\text{fast}]{H_2O} ROH(aq.) + H^+(aq.)$

[R=t-Bu, iso-Pr, Me] $(X = Cl, Br, I)$

The correct statements are

I. The decreasing order of rate of S_N1 reaction is

$t-BuX > iso-PrX > EtX > MeX$

II. The decreasing order of ionisation energy is

$MeX > EtX > iso-PrX > t-BuX$

III. The decreasing order of energy of activation is

$t-BuX > iso-PrX > EtX > MeX$

A. I & II are correct

B. I & III are correct

C. II and III are correct

D. I, II & III are correct

Answer: A

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46. In Mond's process following chemcial changes occurs:

$$\underset{(\text{Impure})}{Ni} + CO \xrightarrow{330-350K} [P]$$

$$[P] \xrightarrow{450-470K} \underset{(\text{Pure})}{Ni} + CO$$

Coordination number of Ni in $[P]$ is.....

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47. $Na_2[PtBrCl](CN)]$

No of geometrical isomers $= x$

No of optical isomers $= y$

No of ions produced in

aqueous solution $= z$

Fine the value of $x + y + z$

$Na_2[PtBrCl(CN)]$

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48. How many of the following gases/vapours are colourless?

$CO_2, SO_2, H_2S, NO_2, HCl, Br_2, I_2, CO, Cl_2$

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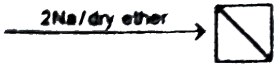
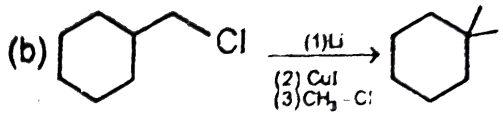
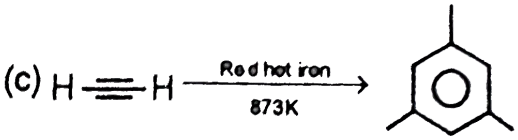
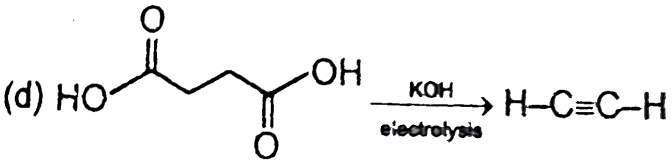
49. How many reactions show correct major product?

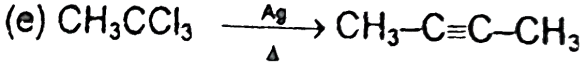
(a) 1-Bromo-3-chlorocyclobutane

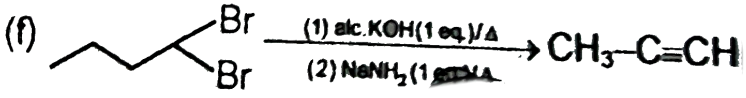












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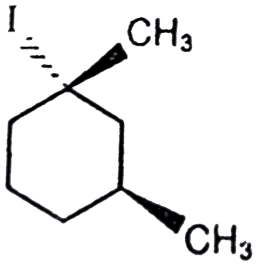
50. 

$\xrightarrow[\Delta]{\text{alc. KOH}}$ Number of

Number of possible alkene isomers will be:

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