CHEMISTRY

BOOKS - CENGAGE CHEMISTRY (HINGLISH)

P-BLOCK GROUP 14 - CARBON FAMILY

Illustration

1. a. Select the member s of grop 14 that (i) forms the most acidic diozide (ii) is commonly found in $+2$ oxidation state and (iii) used as se,ocpmdictpr .

(Solved NCEGT Pronlem 11.5)

b. $\left|SiF_5^{2-}\right.$ is known, whereas $|SiCl_5|^{2-}$ not. Glve possible preasons .

(Solved NCEGT Pronlem 11.6)

c . Diamond is covalent , yet covelnt , yet it has high melting point . Why ?

(Solved NCEGT Pronlem 11.7) .

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2. Give reason for the following :

a. The first ioisation eathalpy of carbon carbon is greater than that foboron, whereas the reverse is true fore the second ionisation enthalpy .

b. Solid carbon dioxie is known as dry ice .

c. Why does not silicon form an analogue fo graphite ?

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3. Give the products formed aon hydrolysis of (a) Al_4C-3 and (b) $CaNCN$.

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4. Identify X and Y in the following reactions .

$$PbS \xrightarrow[\text{in air}]{Heat} (X)$$

$$(X) + PbS \xrightarrow{Y} pb + SO_2.$$

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5. Arrange the following in increasing order :

a. First ionisation enthalpy : Mg, Al, Si, Na

b. Extent of byrolysis : $\mathbb{C}l_4MgCl-2$, $AICI_3$, $SiCI_4$

c. Reducing power : $GeCI_2\_2$, $SnCI_2$, $PbCI_2$

d. Oxididsing power : $Gecl_4$, $SnCI_4$, $PbCi_4$

e. pH of the soulution : $NACl$, $Becl_2MgCl_2$, $AlCl_3$.

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6. What are silliconet ?

(Solved NCERT Problem 11.8)`.

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7. a. Predict the products formed when Pb_3O_4 reacts with conscentratied hydrochloric ancid .

b. In which of the acid lead (II)oxode will dissove : H_2SO_4 ro HNO_3. Give reacson .

c. Give the reaction between (i) HCl and $PbO_2(ii)SO_4$ and PbO_2 . Expain .

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8. Give formula for the following :

a, Water glass

b. Phosgene

c. Litharge

c. Red lead

e. Butter of tin

f . Drykold

g. Chrome hyellow

h. Carborundum

i. Sugar of lead

j. White lead .

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9. a. Whick is more efficient fuel : water gas or pr producer gas ?

b. The formular for mineral oliving e $(Fe.\ Mg)_2SiO_4$ means that 2 mol of any combination fo the metal ions is present pf definite proporiton ? Is ovivine a compound or a solid solution .

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10. Indicate the principle ingrediensts of the following

A. Coal gas

b. Producer gas

c. Water gas

d. Natural gas

e. Soft glasws

f. Hard glass .

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11. Give reasons for the following ,

a. $DilHCl$ is preferred as compared to dil H_2SO_4 for the preparation fo $CO-4$ while SnO is soluble .

b. CO_2 does not support combustion but a burning magnesium ribbon conitnues to burn in it .

c, PbO does not dissolve in H_2SO_4 , while SnO is soluvble

d. $NaOH$ cannot be stored in Sn of pb vessel .

e. Alkances are more stable than silances .

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12. Give reaasons :

a. $\mathbb{C}l_4$ is used as a fire extinguisher but not CS_2 ltbr. B. Sn is used to make solder .

c. The of lead pencil is not lead but greaphite .

d. despite the fact that carbon has only two unpaired elecrons . It is tretraveleant .

e.$\mathbb{C}l_4$ does not act as Lewis acid , wille $SiCl_4$ does ,

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13. A white coloured inorgatnic salt formed by an element fo group 14 give the following reactions :

a. It is soluble in water and the solution has sweet taste .

The salt when heate gives acetone and a yellow colured reside which is used in paints . ltbr. e. The solution of the

salt gives a wihiter precipitate with dil HCi which is soluble in hot water .

Explain the above observations with chemicl reactions invovled .

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14. Give a balanced chemical reaaction for the following :

a. Tin is heated with conc HNO_3

b. Pb_3 is treated with nitric acid .

c. Iodine is added to a solution fo stannous chloride .

d. Dil NHO_2 is slowly reacted with metallic tin.

e. Passing $SiCl_4$ vapour over mlten aluminium .

f. Stannous chloride si added to emrcuric chloride .

g. Red lead is treacte will conc H_2SO_4

h. Red lead is treted with conc $HCl.$

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15. Give reasons for the following : a. Snl_4 is orange in colur

.

b. Solid ice is known as dry ice .

c. Diamond is inert , wheresas gfraphite is not .

d. Nitrolim acts as a good nitrogenous fertiliser .

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Solved Examples

1. Identify(A) based on followihng facts :

a. A reduces $HgCl_2$ solution to white ppt. charging to grey .

b. (A) turns $FeCl_3$ yellow colured solution to green .

c. (A) givewhite pot, with $NaOH$ soluble ine xcess fo $NaOH$. ltrgt d. (A) gives yellow dirty ppt. on passing H_2S gs , soluble in yellow ammium sulpjde (YAS).

e. (A) gives chromyl chloride test .

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2. Oixalic acid on stragheating gives (A) and (B) which are gaseous prouct and (C) which is a liwue . Gas (B) turns lime water miky. Gas (A) on reaction with chlorine gas gives (D) . (D)m as wll as (B) on heating with ammonia gas gives the same produce (E) . Identify (A) ,(B), (C), (D) and (E).

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3. An awueous solution of salt (A) gives a give a whes a white precipitate (B) with sodium chloride solution . Compound (B) dissolves in hot water and the solution on treatment with souium iodide give a uellow precipitate (D) ,. and on passing H_2S through solution (B) gives a blck ppt . (C) . Compound (A) does not gvive any gas with dil HCl, but liberates a reddish brown gas on heating identhigy compounds (A), (B), (C) , and (D) .

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4. Statring form $SiCl_4$ prepare the following in steps not exceeding the aumber give in parnthese (give reaction only)

a. Sillicon (1)

b. Linear sillicon containing methyl froups obnly (4)

c. $Na_2SiO(3)$.

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5. An element of group 14 form a red coloured mized oxide (A) which on treatment with conc GnO_3 gives compound (B) , (B) reacts with HCl to produce a choloride (C) , which is insolubil in cold water hut solububle in ot water . (A) on reaction with conc HCl produces (C) . Identify (A), (B) and (C) .

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6. $CaCO_3$ on beating gives a wbhite solud (A) and a gas (B), (A) on deating eith carbon gives a sollid (C) and a gas (D), (C) on hudroglysis glves a gas (E) and a solide (F) Idebntly (A), (B), (C), (D) , (E) and (F) .

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7. Chooser the correct option :

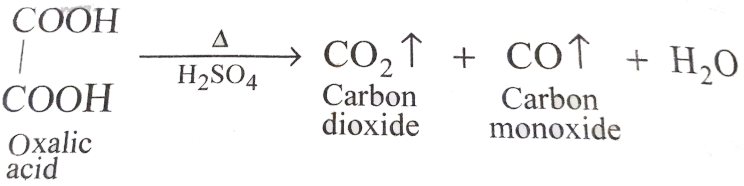
a. A mixtrue of two fgasses is formed when an organic acid is heater with cons H_2SO_4 . When the gaseous mixture is passsed throughh KOH solution on gas is absorbed . The unabsorbed gas combines with chlorine and forms a posisonous gas . The organci acid and the two gases evolved with consc H_2SO_4 ar , respectively :

i. CH_3COOH, CO_2CO

ii , Oxalic acid , CO_2, CO

ii.$HCOOH, COH_2O$

iv. None of these



b) .

(X) is

i. Cyclic silicon

ii. Cross -linkd slilcone

ii. Linear silicon

iv. None of these

c . Lead oxide PbO can be dissoveld in

i. HNO_3, ii. $HCliv$, iii H_2O.

d. A colourless slulution (A) gives halck precipitate on passing H_2S . (A) also give a white precipitate with stannous chloride which graually changes to gvrey . Identigy

(A) .

i. $PbCl_2$

ii. $CdBr_2$

iii. $HgCL_2$

iv . $Cu(NO_3)_2)$.

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8. a .$(NH_4)_4CS_3$

b. $CaCS_3$

c. C_rn_2 ,

d. $H_2C_3N_3O_3$

e. $HCNS$

f. NH_2CSH_2

g . $Fe(CNS)_3$

h. $CSCl_{22}$

i. Na_2CS_2

j. C_3O_2

k. 

i. 

n. $Na_2CO_3.\ H_2O1/2h_2O$

o. $Na_2C_2O_6$

p. Na_2CO_4

q. $BaCO_4$.

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9. HgCl_2 and SmCl_2` cannot exist together in an aqeous solution . Explain.

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Ex Subjective

1. Why CCl_4 is resistant to hydrolysis , but $SiCl_4$ is readily hudrolgysed ?

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2. No form fo elecmental silicon is comparabnle to graphite Give reason .

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3. Why carbon froms covalent compounds whereas lead forms ionic compounds ?

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4. Give reason : Down the group (narr) tendency for catenation increases among froup 14 elecments .

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5. Give one chemical reaction to show that tin (II) is a reducing agent whereas Pb (II) is not .

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6. CO_2 is a gas . While SiO_2 is a high melting solide . Give reason .

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7. Give one chaemical reaction to explain why time (II) chloride is a reducing agent .

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8. C and Si are always tetravelent , but Ge, Sn and Pb show divalency Gvie reason .

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9. Tendency to exhibit $+2$ oxidation state increases with increasing atomic mumber among gropup 14 elements . Explain.

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10. Why trimethylamine si pyramidal but trisiluylamine is planar ?

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11. $(CH_3)_3N$ acts as a Lewis base , but (SiH_3)_3` have very little baklsic chargcter . Explain .

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12. CO is stable , but analogous SiO is not stable . Why ?

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13. Why PbX_2 is more stable than PbX_4?.

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14. PbO_2 acts as a stronger oxidising agent than SnO_2. Cmment .

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15. Give reason : CO is readily absorbed by ammonitcal cuprous chloride , but not CO_2 .

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16. Silanes are feq in mumber whereas alkances are large in muimber . Explain .

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17. Are $(CH_3)_3N$ and $(SiH_3)_3N$ siostructurel , Justify uour answer .

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18. For a mineral . $liAl(SiO_3)_2$, what is the charge on SiO_3 unit ? What is the arrangement fo oxugen atoms around the silicon atom ?

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19. A metal M forms two chlofrodes MCl_2 and MCl_4 respectively . In which group , metal M can be placed ?

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20. An inorfanic compound (X) made up of two most occurring elements in the earth`s crust and used in bulding construction . When (X) reacts with carbon . It forms a posionous gas (Y) which is most stable disatomic molecule . Identicy compounds (X) and (Y) .

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21. Explain the following :

a. Oil paintings trun blackish after sometime . What is the salt formed ? Assume oil painsts contian leas .

b. While testing oxalate ion . Gas obtained burns with a blue flame initally but is put off instantly even as fas appears coming .

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Ex Objective

1. i. $SiCl_4 \xrightarrow{H_2O} (X) \xrightarrow{100^\circ C} (Y)$

In the above reaction (X) and (Y) respectively are :

A. SiO_2 and Si

B. H_4SiO_4 and SiO_2

C. H_2SiCl_6 and SiO_2

D. H_2SiO_4 and Si

Answer:

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2. ii. Al_4C_3 on hydrolysis gives

A. CH_4

B. C_2H_6

C. C_2H_4

D. C_2H_2

Answer:

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3. In SiF_6^{2-} and $SiCl_6^{2-}$, which one is known and why ?

A. SiF_6^{2-} because of the small size of F.

B. SiF_6^{2-} because of the large size of F.

C. $SiCl_6^{2-}$ because of the small size of Cl.

D. $SiCl_6^{2-}$ because of the large size of Cl.

Answer: A

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4. iv. PbR_4 and $PbCl_4$ exists , but $PbBr_4$ and Pbl_4` do not exist because of

A. large size of Br^{Θ} and $I^{(\Theta)}$

B. strong oxidising character of Pb^{4+}

C. strong reducing character of Pb^{4+}

D. low electronegativity of Br^{Θ} and I^{Θ}

Answer:

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5. Biogas and producer gas are made up of more than one gaseous substances. Which of the following is correct?

A. biogas contains CO_2 but producer gas does not.

B. producer gas contains CO but not CO_2

C. both biogas and producer gas have N_2.

D. all are correct.

Answer: D

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6. For making good quality mirrors, the plates of flint glass are used. These are obtained by floating molten glass over a liquid metal which does not solidify before glass. The metal used can be

A. Hg

B. Sn

C. Na

D. Mg

Answer:

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7. vii. The stability of dihlides of Si, Ge, Sn and Pb increases steadily in the sequence :

A. $PbX_2 < SnX_2 < GeX_2 < SiX_2$

B. $GeX_2 < SiX_2 < SnX_2 < PbX_2$

C. $SiX_2 < GeX_2 < PbX_2 < SnX_2$

D. $SiX_2 < GeX_2 < SnX_2 < PbX_2$

Answer:

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8. viii. Which is likely to show inert pair effict ?

A. K

B. Mg

C. Al

D. Pb

Answer:

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9. Which of the following oxidation states are the most characteristics for lead and tin, respectively?

A. $+2,\ +2$

B. $+4,\ +2$

C. $+2,\ +4$

D. $+4,\ +4$

Answer:

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10. x. The hubrid state fo carbon atoms in C_{60} molecule is :

A. sp

B. sp^2

C. sp^3

D. dsp^2

Answer:

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11. xi. Hydroglysis fo $(CH_2)_2SiCl_4$ and CH_3SiCl_3 leads to .

A. linear sheet and cross-linking sillicones respectively

B. Cross-linked and linear chain silicones respectively

C. Linear chain silicones only

D. cross-linked silicones only

Answer:

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12. xii. Egyptian blue (CaCuSi_4O_(10))` is an example of .

A. sheet sillicates

B. pyrosilicates

C. chain silicates

D. cyclic silicates

Answer:

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13. xiii. Among the following the INCORRECT statement is :

A. Diamond and graphite are two allotrpes of carbon.

B. In diamond each C is sp^3 hybridised.

C. In graphite each C is sp^2 hybridised.

D. Graphite shows high elecrical conductivity in one direction only.

Answer:

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14. The average value of C-C bond order in graphite is

A. 4/3

B. 3/4

C. 3/2

D. 1

Answer:

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15. xv. Brilliance fo diamodnd is due to .

A. shape

B. cutting

C. reflection

D. Total internal reflection

Answer:

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16. xvi. Silicon shows diagonal reationship with .

A. Al

B. Be

C. B

D.

Answer:

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17. a. $SnCl_4$ + HCl+I_2 rarr (X) +(Y) `

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18. Bucky ball Buckministerfulleren is

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19. c. When a mixtgure of air and steam is passsed over red bot coke , the outgoin gas contains .....

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Exercises Linked Comprehension

1. Gaseous fuels due to their advantages over ther tupes of fuels are becoming highly popular . The advantages fo the fgaseous fuels are as follows :

a. High calorigic value .

b. Do not produce smoke and do not leave ash after combstion .

c. They can flow through pipes and can be ignige at a moment's notic eat any place . No sp-ecial devices are required for their combustion .

i. Coal gas is a good gaseous fuel as it conitains 95^5 combustible gaseous such as H_2, CH_4, CO etc , It is obtained buy destructive distillation of coal at $100^\circ C$.

ii. Water gas is a mixture of CO and H_2 and is prepared by passing steam over incandescnt coke . The reaction is owever endothermic .

iii. Producer gas , which possesses low calorific value, so prepared by passing aair over red hot coke . It contains mainly nitrogen and CO

iv. Semi-water gas is a mixture of water fas and producer fas

.

v. oil gas , which is used in laboratries , is obtained by cracking of kerosene . It is a mixture of hydrocarbon (saturated and unsatureated) mainly lower hudrocarons .

iv. LPG, which contains C_3 and C_4 hydrocarbon of the alkane and alkene serties , suppied in cylinders for domestic uses is very populsr these days .

Wich fgas is the essential constituent of most of the fuels ?

A. CO

B. O_2

C. CO_2

D. N_2

Answer: A

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Which fuel has the highest calorific value ?

A. Coal gas

B. Water gas

C. Producer gas

D. Natural gas

Answer: A

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Which one is the best fuel in kitchen ?

A. Wood

B. Coal

C. Kerosene

D. LPG

Answer: D

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Which one of following fuels has highest percentage of CO?

A. Coal gas

B. Water gas

C. Producer fas

D. Natural gas

Answer: B

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Wich one fo following is a caraking process ?

A. $C_3H_6 + H_2 \rightarrow C_3H_8$

B. $nC_2H_4 \rightarrow (C_2H_4)_n$

C. $C_6H_{34} \rightarrow 6CH_4 + 2C_2H_4 + C_2H_2 + 4C$

D. $3C_2H - 2 \rightarrow C - 6H_6$

Answer: C

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PGL stands for :

A. Liquefied pertoleum fas

B. LiQuefied producer fas

C. Laboratory petroleum gas

D. Laboratory producer gas

Answer: A

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Producer fas is .

A. $CO + H_2$

B. $CO + N_2$

C. $CO + CH_4 + H_2$

D. $CO + H_2O$

Answer: B

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8. On fusion of a mixture of $Na - 2CO_3$ and $CaCO_3$ with silica at $1500^\circ C$, a liquid consisting of silicatees of sdium and calcium is formed. On cooling . Liquid become viscous and eventually ceasesto flow . It becomes solid and is known as flass. By varying the proportions of the three basic ingredients and by adding other substances, the properties of glass can be altered, Glass can be represented as $R_2O.\ MO.6SiO_2$, where $R = Na$ or K, $M = CaBa$, Zn or $pbSiO_2$ may be replaced by Akl_2O_3, b_2O_3 or P_2O_5. Colourd glasses are obtained by adding certain metallic oxdes or

salts in the fused mass, Glass is attached by HF and this property is used to make marking on the galss , This is known as etching . The glass on rapid coolling becomes brittle and fragile . The artciles of glass are cooled neither slowly nor very rapidly . The process of graducal cooling of flass iscalled annealing .

Glass is .

A. Solid

B. Liquid

C. Supercooled liquid

D. Colloidal solution

Answer: C

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9. On fusion of a mixture of $Na-2CO_3$ and $CaCO_3$ with silica at $1500^\circ C$, a liquid consisting of silicatees of sdium and calcium is formed. On cooling . Liquid become viscous and eventually ceasesto flow . It becomes solid and is known as flass. By varying the proportions of the three basic ingredients and by adding other substances, the properties of glass can be altered, Glass can be represented as $R_2O.\ MO.6SiO_2$, where $R=Na$ or K, $M=CaBa$, Zn or $pbSiO_2$ may be replaced by Akl_2O_3, b_2O_3 or P_2O_5. Colourd glasses are obtained by adding certain metallic oxdes or salts in the fused mass, Glass is attached by HF and this property is used to make marking on the galss , This is known as etching . The glass on rapid coolling becomes brittle and fragile . The artciles of glass are cooled neither slowly nor very rapidly . The process of graducal cooling of

flass iscalled annealing .

Ordinary flass is .

A. Sodium silicate andsilica

B. Calcium silicate and silica

C. Porassium silicate and silica

D. Mixture of sodium and calcium silicates with siilca

Answer: D

Watch Video Solution

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The acid that cannot be stroed in galss is .

A. HF

B. Hcl

C. HBr`

D. HI`

Answer: A

Watch Video Solution

11. On fusion of a mixture of $Na-2CO_3$ and $CaCO_3$ with silica at $1500^\circ C$, a liquid consisting of silicatees of sdium and calcium is formed. On cooling . Liquid become viscous and eventually ceasesto flow . It becomes solid and is known as flass. By varying the proportions of the three basic ingredients and by adding other substances, the properties of glass can be altered, Glass can be represented as $R_2O.MO.6SiO_2$, where $R=Na$ or K, $M=CaBa$, Zn or

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Annealing is .

A. Slow and gradual cooling

B. Rapid cooling

C. Cooling by water

D. Slow cooling

Answer: A

Watch Video Solution

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brittle and fragile . The artciles of glass are cooled neither slowly nor very rapidly . The process of graducal cooling of flass iscalled annealing .

A special type of glass which contains cerium oxide and does not allow the passage of ultraviolet rays is called .

A. Flint flass

B. Crooke`s glass

C. Hard glass

D. Pyrex glass

Answer: C

Watch Video Solution

13. On fusion of a mixture of $Na-2CO_3$ and $CaCO_3$ with silica at $1500^\circ C$, a liquid consisting of silicatees of sdium and calcium is formed. On cooling . Liquid become viscous and eventually ceasesto flow . It becomes solid and is known as flass. By varying the proportions of the three basic ingredients and by adding other substances, the properties of glass can be altered, Glass can be represented as $R_2O.\ MO.6SiO_2$, where $R=Na$ or K, $M=CaBa$, Zn or $pbSiO_2$ may be replaced by Akl_2O_3, b_2O_3 or P_2O_5. Colourd glasses are obtained by adding certain metallic oxdes or salts in the fused mass, Glass is attached by HF and this property is used to make marking on the galss , This is known as etching . The glass on rapid coolling becomes brittle and fragile . The artciles of glass are cooled neither slowly nor very rapidly . The process of graducal cooling of

flass iscalled annealing .

Blue collour can be imparted to the flass by.

A. CoO

B. Fe_2O-3

C. NiO

D. Cu_2O

Answer: A

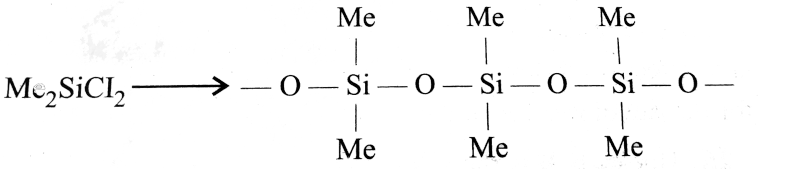
Watch Video Solution

14. Silicones are sunthetic polyners conitainging repeated R_2SiO units . Since the empirical formula is that of a ketone (R_2CO), the name Silicone has eeen given to these materils . Siliconse can be makde intio oils , rubbery eleastomers and

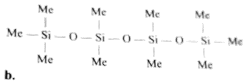
resins . They find a varely of appoications because of their chemical inctness , water repelling nature m heat resistance and good electical insulationg property .

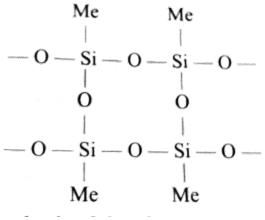
Commerical silicon polumers are usuallly metghly synthesised by the hudroluysis of

$R_2SiCl_2[R = Methyl(Me) \text{ or } phenyl(\phi)]$



If we mix $SiMe_3Cl$ with $SiMe_2Cl_2$, we get silicones of the type .

A. 

B. 

C. both of the above

D. none fo the above

Answer: A

Watch Video Solution

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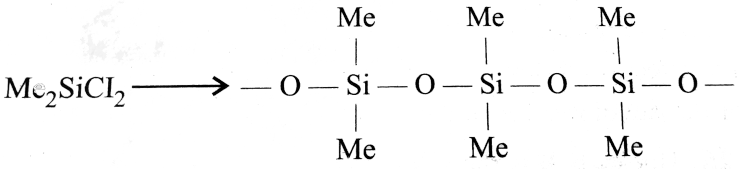
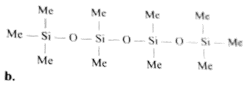


If we strt with $SiMeCl_3$ as the starting material silicones formed is :

A. 

B. 

C. Both of the above

D. none of the above

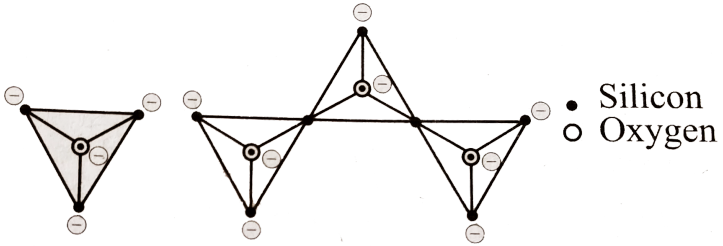
Answer: B

Watch Video Solution

16. The name 'silica' covers an entire froup of minerals which have the general formula SiO_2 the most tetrahedra arratnged in spirals . The spirals can turn in a clockwise or anti-clockwise direction - a feature that results in these being two mirror images optically active, varieties of quartz.

The following pictures represent various silicate anions.

Their formulae are respectively :



A. SiO_3^{2-} $Si_3O_2^{2-}$

B. SiO_4^{4-} $Si_3O_{10}^{8-}$

C. SiO_2^{4-} $Si_3O_9^{2-}$

D. SiO_3^{4-} $Si_3O_7^{8-}$

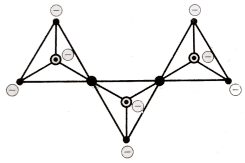
Answer: B

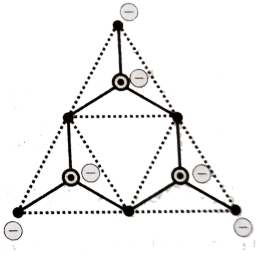
Watch Video Solution

17. The name 'silica' covers an entire froup of minerals which have the general formula SiO_2 the most tetrahedra arratnged in spirals . The spirals can turn in a clockwise or anti-clockwise direction - a feature that results in these being two mirror images optically active, varieties of quartz.

$Si_3O_9^{6-}$ (having three tetrahedra) is represented as :

A. a.



B. 

C. both

D. none

Answer: B

Watch Video Solution

18. The name 'silica' covers an entire froup of minerals which have the general formula SiO_2 the most tetrahedra arratnged in spirals . The spirals can turn in a clockwise or anti-clockwise direction - a feature that results in these being two mirror images optically active, varieties of

quartz.

The silicate anion in the mineral kinoite is a chain of three SiO_4^{-4} tetrahedra that share corners with the adacent tatrahdr . The mineral also contains $Ca^2 = 0$ ions , Cu^{2+} ions and water molecules in $a1:1:1$ ratio . This mineral is represented as :

A. $CaCuSi_3O_{10}.\ H_2O$

B. $CaCuSi_3O_{10}.\ 2H_2O$

C. $Ca_2Cu_2Si_3O_{10}.2H_2O$

D. none of these

Answer: C

Watch Video Solution

19. In some foam-type fre extinguishers, the treactants are $Al_2(SO_4)_3$ (aq) and $NaHCO_3$ (aq). T=When the extinguisher is activated, these reactants are allowed to mix producing $Al(OH)_{3(s)}$ and $CO_{2(g)}$. The $al(OH)_3 - CO_2$ foram extinguishes the fires .

CO_2 is formed as a result of :

A. reaction between $Al^{3=}$ and HCO_3^{Θ}

B. reaction between hydrolysis product of Al^{3+} and HCO_3^{Θ}

C. reaction between hydrolysis product of $NaHCO_3$ and $Al_2(SO_4)_3$

D. direct reaction between $Al_2(SO_4)_3$ and $NaHCO_3$

Answer: B

Watch Video Solution

20. In some foam-type fre extinguishers, the treactants are $Al_2(SO_4)_3$ (aq) and $NaHCO_3$ (aq). T=When the extinguisher is activated, these reactants are allowed to mix producing $Al(OH)_{3(s)}$ and $CO_{2(g)}$. The $al(OH)_3 - CO_2$ foram extinguishes the fires .

Net ionic reaction of the above chemical chamge is :

A. $Al^{3+} + HCO_3^{\Theta} + H_2O \rightarrow Al(OH)_3 + CO_2.$

B.

$$Al^{3+} + HCO_3^{\Theta} + OH \xrightarrow{\Theta} Al(OH)_3 + CO_2 + H_2O$$

C. $\left[Al(H_2O)_6\right]^{3+} HCO_3^{\Theta} \rightarrow Al(OH)_3 + CO_2 + H_2O$

D.

$$Al_2(SO_4)_3 + NaHCO_3 \rightarrow Na_2SO_4 + Al(OH)_3 + H_2O$$

.

Answer: C

Watch Video Solution

21. In some foam-type fre extinguishers, the treactants are $Al_2(SO_4)_3$ (aq) and $NaHCO_3$ (aq). T=When the extinguisher is activated, these reactants are allowed to mix producing $Al(OH)_{3(s)}$ and $CO_{2(g)}$. The $al(OH)_3 - CO_2$ foram extinguishes the fires .

Addition of Na_2CO_3 to a solution of an oxide in eater produces CO_2. This experiment indicaltes that :

A. the oxide is that of non-metal

B. the oxide is amphoteric

C. the oxide is basic

D. the oxide is neutral

Answer: A

Watch Video Solution

22. CO_2 and H_2O absorbs strongly in the infrared rrgion and its presence in the atmospheere dectrases the loss fo heat form the enrth by radistiion . This global warming is called the greenhouse effect (other gases , including the oxides of nitraongen form car exhauset freons from aerosols and refrigeratirs and methane from bacteria in the soil and in the rument cows , also add to the reeenhouse effect). The concentration fo atmospheric CO_2 has

increased by 10% . The is rsulting in the increase in the mean temperature fo the earth by $2.5^{\circ}C$, varying form $2^{\circ}C$ t the equlator to $4^{\circ}C$ at the poles . This could have dramatic effects on the climate.

As a result of freenhouse effect , thers can be :

A: an increase in rate of egvaporation of water thus, untimely more rain , floodingn tec .

B: tropical storms in certain parts of the workd

C: a decrease in pH of the soil

D: an increase in pH of the soil

select correct altemate :

A. B, C, D

B. A, C, D

C. A, B, D

D. A, B, C

Answer: D

Watch Video Solution

23. CO_2 and H_2O absorbs strongly in the infrared rrgion and its presence in the atmospheere dectrases the loss fo heat form the enrth by radistiion . This global warming is called the greenhouse effect (other gases , including the oxides of nitraongen form car exhauset freons from aerosols and refrigeratirs and methane from bacteria in the soil and in the rument cows , also add to the reeenhouse effect). The concentration fo atmospheric CO_2 has increased by 10% . The is rsulting in the increase in the mean temperature fo the earth by $2.5^\circ C$, varying form $2^\circ C$ t the equlator to $4^\circ C$ at the poles . This could have

dramatic effects on the climate.

Which of the following is growing at a fastre rate than CO_2 and thus responsible for the greenhouse effect ?

A. CFC

B. N_2O

C. O_3

D. CH_4

Answer: A

Watch Video Solution

24. CO_2 and H_2O absorbs strongly in the infrared rrgion and its presence in the atmospheere dectrases the loss fo heat form the enrth by radistiion . This global warming is

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Instead of monitoring carbon dioxide suggest another gas that scientists could studey to substantiate the fact that CO_2 conentration is steadily increasing in the atmosphere ?

A. N_2O

B. O_2

C. CH_4

D. O_3

Answer: B

Watch Video Solution

25. CO_2 and H_2O absorbs strongly in the infrared rrgion and its presence in the atmospheere dectrases the loss fo heat form the enrth by radistiion . This global warming is called the greenhouse effect (other gases , including the oxides of nitraongen form car exhauset freons from aerosols and refrigeratirs and methane from bacteria in the soil and in the rument cows , also add to the reeenhouse effect). The concentration fo atmospheric CO_2 has increased by 10% . The is rsulting in the increase in the mean temperature fo the earth by $2.5^\circ C$, varying form $2^\circ C$

t the equlator to $4^{\circ}C$ at the poles . This could have dramatic effects on the climate.

The equilibrium constant (K_p) for the reaction

$2CO_{(g)} \underset{\longleftarrow}{\longrightarrow} 2CO_{2(g)}$

is 1.4×10^{90} at $25^{\circ}C$. Given this enormous value, why does not CO convert totally into CO_2 in the troposphere?.

A. CO forms complex with haemoglobnin

B. CO has low soluility in H_2O

C. CO has high activation enrgy

D. CO is toxic in nature

Answer: C

Watch Video Solution

26. In the first biological applicativon of bucky ball , chemists at the University of Califorminaat San F Francisoc and Santa Barbra made a discovery in 1993 that could help I designing drugs to rtreat $AIDS$. The human immunodeficienrcy virus (HIV) that causes AIES reproduces by syntheising a long protein chain , which is cut into smaller segments by an enzymecalled HiV-proteases . ONe way to stop AIDS, then might be to inacivate the enzyme. when the chemists reacted a water-soluble derivative of bucky ball with HIV-protease , they found that itbinds to the portion of th enzyme that would ordinarily clareve the repreouctive protein , preventing the HIV virus from reproducing . Consequently the virus could no bnolgre infect the human cells they had frown in the laboratory . The buycky ball compound itself is not a suitable drug for use against AIDS because of potential side effects and delivery difficaultes ,

but it does provide a model for the development of such drugs .

Bucky ball is the allotrope of :

A. phosphorus

B. sulphur

C. carbon

D. titanium

Answer: C

Watch Video Solution

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What is the formula fo the bucky ball ?

A. P_4

B. S_8

C. Ti_3

D. C_{60}

Answer: D

Watch Video Solution

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In bucky bucky ball each atom is :

A. sp^2-hybridised element with extensive delocalised molecular orbital

B. sp^2-hybridised element withlocalised molecular orbital

.

C. sp^2 – hybridised element with delocalisd molecular orbital .

D. sp^3 – hybridsed element with localised molecular orbital .

Answer: A

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Consider following statements about bucky ball :

A , It is also called fullerene

B: It is also called Buckministerfullerene

C: Bucky tubes (made of fullerenes) are several times stronger than stel whnires

D: Bucky ball is a plastic polymer

Select correct statement (s) :

A. A, C, D

B. A, B, C

C. A, B, D

D. B, C, D

Answer: B

Watch Video Solution

30. Elemental carbon appears in many structural forms or allotropes . Three of these formssare crystalline -diamond ,graphite and the recentluy discovered fullerne (bucky ball) - while more than 40 others including coke and carbon black ae amorphous . Now there seems to be set afourth crystalline allotrope of carbon. reported in 1995 by ` Lagow at the University of Texas .

Newly discovered allotrope if carbon has the form :

A. polyyne

B. fullerene

C. bucky ball

D. none of these

Answer: A

Watch Video Solution

31. Elemental carbon appears in many structural forms or allotropes . Three of these formssare crystalline -diamond ,graphite and the recentluy discovered fullerne (bucky ball) - while more than 40 others including coke and carbon black ae amorphous . Now there seems to be set afourth crystalline allotrope of carbon. reported in 1995 by Lagow at the University of Texas .

Structures fodifferentallotropes of carbon have been compared . Which represents incorrect comparison ?

A. allotrope discovered in 1995 sp-hybridised carbon

B. bucky ball sp-hybridised carbon

C. graphite sp2-hybridised carbon

D. diamond sp3-hybridised carbon

Answer: B

Watch Video Solution

Exercises Multiple Correct

1. Compounds wich readily unfergo hydrolysis are :

A. $\mathbb{C}l_4$

B. BCl_3

C. $SiCl_4$

D. CF_4

Answer: B::C

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2. The non-existence of Pbl_4 is due to .

A. highly oxidising nature of Pb^{+4}

B. highly reducing nature of Pb^{+2}

C. sufficiently large covalent charcter

D. highly reducing nature of ` I^(Θ)ions

Answer: A::D

Watch Video Solution

3. Which are not correct ?

A. $Ge(OH)_2$ is amphoteric

B. $SnCl_4$ is more stbale than $SnCl_2$

C. Trisily lamine si pyramidal

D. $GeCl_4$ in HCl forms $H_2[GeCl_6]$

Answer: B::C

Watch Video Solution

4. Carbon differs from therest fo thefamily menbers because of :

A. Number of unpaired elecrons in valence shell

B. Small size

C. Non-availability of vacant orbitals in valence shell

D. Non-availability of vacant d orbitals in valence shell

Answer: B::D

Watch Video Solution

5. Which of the following carbides on treatment with water give methane ?

A. CaC_2

B. Be_2C

C. Al_4C_3

D. Mg_2C_3

Answer: B::C

Watch Video Solution

6. Carbon disoxide si isostructural with .

A. $HgCl_2$

B. $SnCl_2$

C. C_2H_2

D. NO_2

Answer: A::C

Watch Video Solution

7. CO is isostructural with :

A. $SnCl_2$

B. $HgCl_2$

C. SCl_2

D. NO_2

Answer: B::C

Watch Video Solution

8. Which of the following is // are amphotelic ?

A. BeO

B. Ag_2O

C. CO_2

D. SnO_2`

Answer: A::D

Watch Video Solution

9. Decomposition of oxalic acid in the presence of conc $H-2SO_4$ gives :

A. CO

B. CO_2

C. Formic acid

D. H_2O

Answer: A::B::D

Watch Video Solution

10. Which of the following is //ae true about silicaones ?

A. They are formed by hydrolysis of R_2SiCl_2

B. They are polymer made up of R_2SiO_2 units

C. They are made up of $SiO^{4\ \hat{}\ -}$ units

D. They are macromlecules

Answer: A::B::D

Watch Video Solution

11. Which among the following statements are correct ?

A. Aquadig and oildig are made up of graphite

B. Graphite reacts with conc HNO_3 acid to form mellitic acid $C_6(COOH)_6$

C. both CO and C_3O_2 are toxic

D. Zircon $(ZrSiO_4)$ is a gemstone .

Answer: A::B::D

Watch Video Solution

12. which of the following arethe ores of lead ?

A. Galena

B. Cassiterite

C. Anglesite

D. Cerussite

Answer: A::C::D

Watch Video Solution

13. Which of the following metal oxides are reduced by Co?

A. ZnO

B. Fe_2O_3

C. CaO`

D. $Al2O_3$

Answer: A::B

Watch Video Solution

14. Which of the following species are not known ?

A. $[SiCl_6]^{2-}$

B. $[CF_6]^{2-}$

C. $[PbCl_6]^{2-}$

D. $[SiF_6]^{2-}$

Answer: B::D

Watch Video Solution

15. The incorrect statement (s0 among the following is //are

:

A. Nci_5 does not exist buyt PCl_5 does

B. Lead prefers to form tetravalent compounds

C. The three $C-O$ bonds are not equal in the CO_3^{2-} ion.

D. Both $O_2^{\oplus}$ and NO are paramagnetic .

Answer: B::C

Watch Video Solution

16. In its compounds . Tin exhibits the oxidation numbers .

A. $+2$

B. $+4$

C. $+6$

D. $+3$

Answer: A::B

Watch Video Solution

17. Coal gas .

A. burns with a smoky flam

B. burns with non-smoky flame

C. is a good fuel

D. is not use for lighting purposes

Answer: B::C

Watch Video Solution

18. Which is //are likely to show inert pair effect ?

A. K

B. Mg

C. Ga`

D. Pb

Answer: C::D

Watch Video Solution

19. With respect to graphite and diamond, which of the statements given below are correct?

(1) Graphite is harder than diamond.

(2) Graphite has higher electrical conductivity than diamond.

(3) Graphite has higher thermal conductivity than diamond.

(4)Graphite has higher $C - C$ bond order than diamond.

A. Graphite is hardr thann diamond

B. Graphite ahs higher electrocal conducti8vtiy then diamond

C. Graphite has higher thermal coneductivity than disamond

D. Graphite has higher $C - C$ bodn ordr tha diamond .

Answer: B::D

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Exercises Single Correct

1. In the carbon family , the elements other than carbon do not form $pn - p\pi$ nonds because the atomic orbitals are :

A. Small and diffuse to undergo effective lateral overlap

B. Large and diffuse to undrgo effective lateral overlap

C. Large and for too less diffuse to overlap lineraly

D. Small to overlap both laterally and linearly

Answer: B

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2. The interlayer distance in graphite is

A. Very smll the layrs being tihtly packed

B. Many times larfger rhan the comvalent radius fo carbnon more than twic the covalent eradius fo carbon the

C. ThMore than twice he covalent radius fo carbnon

D. The same as the covalent raidus fo carbon

Answer: C

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3. Carbon forms a large number of compounds due to :

A. Tertravalency

B. Variable valency

C. Large chemical affinity

D. Property of catention

Answer: D

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4. which fot the following statcment is fise about co_2 ?

A. It has linear structure

B. It has same number of sigma and pi bonds

C. Its molcule contains two pi-electrons .

D. It turns lime water milky .

Answer: C

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5. Which oxide fo carbon is useful in prepring metal carbonyls ?

A. CO_2 and CO

B. CO

C. CO_2

D. CO_2 and C_2O_3`

Answer: B

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6. Producer gas is a mixture of

A. $CO + N_2$

B. $N_2 + H_2$

C. $CO + H_2$

D. $CO_2 + H_2O$

Answer: A

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7. The hybrid statems fo C in diamond and praphite are respectively :

A. sp^2, sp^3

B. sp^3, sp^2

C. sp^2, sp^2

D. sp^3, sp^3

Answer: B

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8. Which of the following statement is false about cabon ?

A. C_{60} is also one of the allotrope of carbon

B. It has crystalline as well as amorphous allotropes

C. It can form $p\pi - p\pi$ bonds with other c-atoms

D. It cAnnot form $p\pi - p\pi$ bond with atoms such as N and O.

Answer: D

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9. Which statement is not true about CO?

A. It is a colurless gas.

B. It is an doourless fas .

C. it is highly soluyble in water .

D. It is a posonous fgas .

Answer: C

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10. Which of the following is known as pyrene ?

A. CaC_2

B. Al_4C_3

C. WC

D. SiC`

Answer: D

Watch Video Solution

11. Which of following is known as pyrene ?

A. CS_2

B. Al_4C_3

C. $\mathbb{C}l_4$

D. $SolidCO_2$

Answer: C

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12. Which fo the following oxide will produce hydrogen peroxide on treatmenty with water ?

A. $KClO_3$

B. Na_2O_2

C. CaO

D. SO_3

Answer: D

Watch Video Solution

13. A bottle of fire exitingushers contain H_2SO_4 and:

A. $CaCO_3$

B. Na_2O_2

C. Na_2O_2

D. Any carbonate

Answer: C

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14. A colourless gas which burns with blue flame and reduction Cuo to Cu is.

A. N_2

B. CO

C. CO_2

D. NO_2

Answer: B

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15. The use fo diamond as a gem depends on its

A. hardness

B. high refractive index

C. purest form fo carbon

D. chemical inertenss

Answer: B

Watch Video Solution

16. Which of the following is chemically inative allotropic form fo carbnon ?

A. Coal

B. Diamond

C. Charcoal

D. AnimAl charcoal

Answer: B

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17. In CH_4, velency fo carbon is four . Valency of carbon in acetylene is .

A. 1

B. 2

C. 3

D. 4

Answer: D

Watch Video Solution

18. Which of the following is a good conductors of electricity?

A. Diamond

B. Graphite

C. Coal

D. None fo these

Answer: B

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19. Carnon shows tetravelency due to .

A. sp^3 hybridisation

B. dsp^2 hybridsation

C. sp^2 hybridisation

D. All of these

Answer: A

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20. The speciies present in slution when $CO-2$ is dissolved in water are :

A. H_2CO_3, CO_3^{2-}

B. $HCO_3^{\oplus}, CO_3^{2-}$

C. $CO_2H_2CO_3$

D. $CO_2H_2CO_3HCO_3^{\oplus}CO_3^{2-}$

Answer: D

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21. The element which forms only one hydride is :

A. C

B. Si

C. Ge

D. Pb

Answer: D

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22. In the grouns statem carbon atom has ow manuy unpaired electron (s0 ?

A. 1

B. 2

C. 3

D. 4

Answer: B

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23. A when added to silica gives B. A and (B) are :

A. HF, H_2SiF_4

B. HCl, H_2SiCl_6

C. HCl, H_2SiCl_6

D. HI, H_2SiI_6

Answer: A

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24. A mong the following substitute stlanes the one which will give rese to cres - linked silicaone plolymer on ghydrolysis is :

A. R_3SiCl

B. R_4Si

C. $RSiCl_3$

D. R_2SiCl_2

Answer: C

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25. The correct order of increasing $C - O$ bond lengths in CO, CO_3^{2-} and CO_2 is :

A. $CO_2^{2-} < CO_2 < CO$

B. $CO_2 < CO_3^{2-} < CO$

C. $CO < CO_3^{2-} < CO_2$

D. $CO < CO_2CO_3^{2-}$

Answer: D

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26. Which of the following has least tendncy to undegrgo catentaion ?

A. C

B. Si

C. Ge

D. Sn`

Answer: D

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27. which of the following statement is not correct ?

A. Silicon is extenstively used as a semiconductor

B. Carborundum si SiC.

C. Silicon occurS in free state in nature

D. Mica contains the element silica.

Answer: C

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28. On heating $Pb(NO_3)_2$ the products formed ate :

A. PbO, N_2, O_2

B. $Pb(NO_2)_2$, O_2

C. Pb, NO_2, O_2

D. Pb, N_2, O_2

Answer: C

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29. The product of the following reaction are :

A. SiC and CIO_2

B. SiO and CO

C. SiC and CO

D. Si and CO

Answer: C

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30. in silicon dioxide :

A. There are double bonds between silIcOn and oxygen atoms

B. Each silicon atom is surrounded by four oxygen atoms and each oxygen atom is bonded to two silicon atoms .

C. Silicon is bonded to two silicon atoms .

D. Each silicon atom si surrounded by two oxgyen atoms and each oxygen atom is bonded to two silicon atoms .

Answer: B

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31. In the manufacture fo giass , the addition fo Mao_2 gives ,

A. Yellow color

B. Red colour

C. Violet colout

D. Pink colour

Answer: D

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32. Solder is an alloy of :

A. $70\ \%\ Pb30\ \%\ Sn$

B. $33\ \%\ Pb.\ 687\ \%\ Sn$

C. $80\ \%\ Pb.\ 20\ \%\ Sn$

D. $90\ \%\ Cu10\ \%\ Sn$

Answer: B

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33. Solder carbon sioxide is used as :

A. Posion

B. Fire extinguisher

C. Refrigrant

D. Artitifical respeiration

Answer: C

Watch Video Solution

34. Which gas is evolved when PbO_2 is treated with conc HNO_3 ?

A. NO_2

B. O_2

C. N_2

D. N_1O_2

Answer: B

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35. When steam reacts with red bot coke to formco_2 and hydrogen :

A. Water acts as oxidising agent

B. Water acts as a reducing agent

C. Carbon acts as an oxidising agent

D. There is no oxidation or reduction .

Answer: A

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36. CCl_4 is used as fire extinguisher because :

A. It has high melting point .

B. It forms covalent bond .

C. Its boiling point is low .

D. It gives combustible vapours .

Answer: D

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37. Lead dissolves most readily in

A. acetic acid

B. sulphuric acid

C. nitric acid

D. hydrochloic acid

Answer: C

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38. Which of the following metals in an ujmportant ingredient fo transiontors ?

A. Osmium

B. Germanium

C. Gold

D. Sodium

Answer: B

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39. The most unstable compounds fo the following are :

A. hydrides of C

B. hydrides fo Sn

C. hydrides of Ge

D. hydrides of Pb

Answer: D

Watch Video Solution

40. Which of the following is most bsic ?

A. CO

B. GeO

C. SnO

D. PbO

Answer: D

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41. The materical used in solar cells contains

A. Si

B. Sn

C. Ti

D. Cs

Answer: A

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42. Softening of lead means:

A. Conversion of lead to PbO

B. Conversion of lead to Pb_3O_4

C. removal of impurities(metallic) from lead

D. Washing lead with HNO_3 followed by a dilute alkali solution .

Answer:

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43. Bond energy is highest for :

A. $Sn - Sn$

B. $C - C$

C. $Si - Si$

D. $Ge - Ge$

Answer: B

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44. Graphite is soft solid lubricant extreamly to melt. The reason for this anomalous behaviour is that graphite:

A. has carbon stoms anrranged in large plaens of ringes of strongly boun caraon atoms with weak inteplanar bonda

B. is a non -cystallline substane

C. is an allotropic form of carbon

D. has molecules of variable molecular masses like polymers

Answer: A

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45. Beryllium and aluminium carbides contain

A. C^{4-}

B. C_2^{2-}

C. C_3^{2-}

D. C^{4+}

Answer: A

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46. What is the formula of carbon suboxide ?

A. CO

B. CO_2

C. C_2O_4

D. C_3O_2

Answer: D

Watch Video Solution

47. Which of the following halide fo carbon is used as refrigerant ?

A. $\mathbb{C}l_4$

B. CF_4

C. CH_2Cl_2

D. $\mathbb{C}l_2F_2$

Answer: D

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48. CO is absorbd by:

A. Alcohols

B. PLants

C. An ammonical solution OF cuprous chloride

D. Nickel teracarbonYL

Answer: C

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49. Carbogen is given to pneumonia patients and victims of (CO)` poisoning as a,

A. Mixture of oxygen with $5-10\,\%\,CO_2$

B. Mixture of helium with $5-10\,\%\,CO_2$

C. Mixture of oxygen with $5-10\,\%\,CO_2$

D. Mixture of oxygen with $10-\ =30\,\%\,CO_2$

Answer: A

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50. [SiO_4]^(4-)` has a tetrahedral structure . The silicate formed by using three oxygen has a:

A. Linear polymeric strciture

B. Three-dimesional structure

C. pyrosilicate structure

D. Two-dimensional sheet structure

Answer: D

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51. The struclure and hubreidisation fo $Si9CH_{30}\ \_\ 4$ is :

A. Bent . Sp

B. Trigonal sp^2

C. Octahedral sp^3d^2

D. Tetrahedral sp^3

Answer: D

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52. Structureal units fo ice and dry ice are , respectively .

A. H_2O, CO

B. H_2O, CO_2

C. CO_2, H_2O

D. CO, CO_2

Answer: B

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53. A fuel will have alarge fueld velaue when one gram of it on heationg gives more of.

A. CO_2

B. Ash

C. Water vapours

D. Calories

Answer: D

Watch Video Solution

54. Which of the following oxides has a three-dimensional structure ?

A. CO

B. CO_2

C. SiO_2

D. SO_2

Answer: C

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55. CCl_4 does not show hydrolysis but $SiCl_4$ is readily hydrolysed because:

A. Carbon cannot expand its octet but silicon can expand its octet .

B. Ionistatione nthalpy of carbon si hgithe thabn silicon

C. elecitrongatiivutty of carnon si higher than that of silicon

D. Caron forms double and tripple bnons .

Answer: A

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56. The number and type of bonds between two carbon atoms in CaC_2 are:

A. One singma and one pi bond

B. One sigam two pi bond .

C. One sigam and one half pi bond .

D. One sigma nond.

Answer: B

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57. The anhydride of carbonic acid is :

A. CO

B. CO_2

C. $C_3O + 2$

D. none of these

Answer: B

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58. Which of the following statements is not correet ?

A. Lead salts are slow poisons .

B. Lead metal is used in accoumlatores

C. Plumbosolvency increases by the presence of carbonates sulphates phosphates etc .

D. Lead is a soft metal

Answer: B

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59. C_{60} conains

A. 20 pentagons and 12 hexagons

B. 12 pentagons and 20 hexagons

C. 30 pentagons and 30 hexagons

D. 24 pentagons and 36 hexagons

Answer: C

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60. C_{60} can be regarded asabyge ball made up of :

A. Several conjugated alkene units rather than an aromatic molecule

B. Graphite units

C. Several aromatic benzene molecules

D. Several terahedrons

Answer: A

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61. Oftern agroundglas stropper gets stuck in the neck of a glass blttlecontinng $NaOH$ solution . This is due to ,

A. The presence of dirt particles in bhetweemn

B. The formation of solid silicate sin-between by the reaction sof SiO_2 of galss with $NaOH$.

C. The formation of Na_2CO_3 in-between by the reaction of CO_2 of aire and $NaOH$.

D. Glass contains a born compound which forms a precipotte with the $NaOH$ solution .

Answer: B

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62. $(Me)_2SiCl_2$ on hydrolysis will produce.

A. $Me_2(OH)_2$

B. $Me_2Si = O$

C. 

D. $Me_2SiClOH$

Answer: C

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63. $C - C$ bond length is maximum in

A. diamond

B. graphite

C. naphthalene

D. fullerene

Answer: A

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64. Silica is reacted with sodium carbonate . What is the gfas liberateed ?

A. CO

B. O_2

C. CO_2

D. O_3

Answer: C

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65. The straight chain polymer is formed by

A. Hydrolysis of VH_3SiCl_3 followed by condensation polymerisation

B. Hyerolysis of $(CH_3)_4Si$ followed by addition plouymersation .

C. Hyerolysis of $(CH_3)_2Si$ followed by addition plouymersation .

D. Hyerolysis of $(CH_3)Si$ followed by addition plouymersation .

Answer: C

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66. $K_2C_6O_6$ is called .

A. Postassium per carbonte

B. Postassium permono carbonte

C. Potassium perdicarbonate

D. Potassiuym subacarbnonate

Answer: C

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67. Carbon suboxide $CO_3O_2(O=C=C=O)$ is obtaind as a corlurless gas by the dehyration of malonic acid with .

A. Caonc H_2SO_4

B. H_2PO_4

C. P_4O_{10}

D. All

Answer: C

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68. What of the following anions are present in clay ?

A. Al_2O_3

B. CO

C. CO_2

D. CaO

Answer: C

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69. Which of the following anion are prescnt in caly ?

A. $\left(Si_2O_5^{2-}\right)_n$

B. $\left(Si_4O_{11}^{6-}\right)_n$

C. $\left(SiO_3^{2-}\right)_n$

D. $\left(Si_O\_4^{4-}\right)_n$

Answer: A

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70. Double cahin structures are present in asbsestor . Which of the anion are present in them ?

A. $\left(Si_2O_5^{2-}\right)_n$

B. $\left(Si_2O_{12}^{6-}\right)_n$

C. $\left(Si_2O_3^{2-}\right)_n$

D. $\left(Si_2O_4^{4-}\right)_n$

Answer: B

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71. Diffenennf froms fo slilca scuh as quartz, tridymite and cristonlite are as follows :

$$\underset{(SiO_2)}{Quartz} \xrightarrow{870\,\&\,\circ C} \underset{(Suo_2)}{Tridymite} \xrightleftharpoons{1470^\circ C} \underset{(Sio_2)}{Cristioalite.}$$

A. Sheet silicate

B. There-Dimensional silicate

C. Chain silicate

D. Cycilec or ring silicate

Answer: B

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72. Pyro-silicates are formed by

A. SiO_4^{4-} tetrahedra

B. $\left(Si_2O_7^{6-}\right)$

C. $\left(Si_{O\_}3^{2-}\right)$

D. $\left(Si_2O_5^{12-}\right)$

Answer: B

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73. When a lead salt is heated with sodium carbonate in charcoal cavity it . Give .

A. yellow incrustation

B. brown

C. black

D. blue

Answer: A

Watch Video Solution

74. The plague ro tin pest ro the disease refes to .

A. Conversion of Sn^{2+} salts to Sn^{4+} salts

B. Conversion of white tin to grey tin`

C. Conversion fo grey tin to white tin

D. Emission of sound while bending a tin

Answer: B

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75. The substance used as a smoke sereen in warfre is .

A. $SiCl_4$

B. $SnCl_4$

C. $PbCl_4$

D. $GECl_4$

Answer: A

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76. Carbobly phosgene , COCl_2)` is prepared by .

A. the combination of CO with Cl_2 sunlight

B. the action of $80\ \%$ fuming H_2SO_4 boiling in $\mathbb{C}l_4$

C. oxidising $CHCl_3$ with $k_2Cr_2O_7$ and H_2SO_4

D. all of the above

Answer: D

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77. Lead solution may be titrated with satndard $EDTA$ at $ph = 6$ using which indicator ?

A. Methylnthymol blue

B. Eriochrome Bloack T

C. Methyl orange

D. Eosion

Answer: A

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78. Fusible alloys of lead with Bi and Si used for making soft solder , electric fuses , safety plug for bilers and automatic water sprinkes to prevent fire . They melt at low temperature .

A. Wood's metal

B. Lipowietx alloy

C. Rose's metal

D. all of the above

Answer: D

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79. Which of the following reaction does not take place ?

A. $2HgCl_2 + Sn^{2+} \rightarrow Hg_2Ckl_2 + Sn^{4+} + 2Cl^{O+}$

B. $2Fe^{3+} + Sn^{2+} \rightarrow Sn^{4+} + 2Fe^{2+}$

C. $2Fe^{2+} + Sn^{2+} \rightarrow 2Fe^{3+} + Sn$

D. $Hg_2Cl_2 + Sn^{2+} \rightarrow 2Hg + Sn^{4+} + 2Cl^{\oplus}$

Answer: C

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80. Island structure is possessed bu .

A. orthosilicate

B. pyro-silicte

C. chains silicate

D. sheet silicate

Answer:

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81. Which of the following structure is similar to graphite e?

A. B_4C

B. B_2H_6

C. BN

D. B

Answer: C

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82. Which of these is not a monomer for a high moleculat mass silcome polumet ?

A. Me_3SiCl

B. $PhSiCl_3$

C. $MeSiCl_3$

D. Me_2SiCl_2

Answer: A

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83. The basic structural unit of silicates is

A. SiO_3^{2-}

B. SiO_4^{2-}

C. SiO^{O+}

D. SiO_4^{4-}

Answer: D

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Exercises Assertion Reasoning

1. Assertion (A) :Pb^{+4} compounds are stronger oxidiising agents than Sn^{3+} compounds .

Reason (R): The higher oxition states for grouup 14 eelments are more stable for the heavier members of the frop due to inert pair effect .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: C

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2. Assertion (A) : CO_2 is a gas but SiO_2 had a three - dimenstional network structurte .

Reason (R): CO_2 bonds nut SiO_2 has a three-dimensional network structure .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: A

 Watch Video Solution

3. Assertion (A) : Carbon forms covalent compounds buyt lead dorms ionic compounds

Reason (R) : crabon can les foure electrons to forem C^{4+} ion but lead connot .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: C

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4. Assertion (A) : $N(SiH_3)_3$ is a weaker based than $N(CH_3)_3$

Reason (R) : Due to $p\pi - d\pi$ back bonding imn $N(SiH_3)_3$ the availvbaility of electrons on the (B) atom in $(SiH_3)N$ decrease .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is NOT correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: A

Watch Video Solution

5. Assertion (A) : Diamond in the haredst possible substance and is a networek covalent sokid .

Reason (R) : All the C atoms in diamond are sp^3 hybrdised .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incrorect byt (R) is incroroect .

Answer: A

Watch Video Solution

6. Assertion (A) : Diamond does bnot reflect light .

Reason (R) : Diamond has low refractive index.

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: C

Watch Video Solution

7. Assertion (A) : C_{60} fullerence is an allotrope if carbon.

Reason (R) :In C_{60} fullerene , five -menmebrd rings are isolated forem each other .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: B

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8. Assertion: Pb^{4+} can be reduced easily to Pb^{2+}.

Reason: Pb^{2+} is paramagnetic.

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incrorect byt (R) is incroroect .

Answer: C

Watch Video Solution

9. Assertion (A) : Pbl_4 is astable compound .

Reason (R) : Iodide ion statbilised higher oxidation state ,

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: D

Watch Video Solution

10. Assertion: SiF_6^{2-} is known but $SiCl_6^{2-}$ is not.

Reason: Size of fluorine is small and its lone pair of electrons intersects with d-orbitals of Si strongly.

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incrorect byt (R) is incroroect .

Answer: A

Watch Video Solution

11. Assertion (A) : Silicones are hdyreopbhobic in nature .

Reason (R) : $Si - O - Si$ likages are moisture sensitive .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: C

Watch Video Solution

12. Assertion (A) : SnI_4 is an orange solid .

Reason (R) : The colur arses due to cahrge transfer .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct.

Answer: A

Watch Video Solution

13. Assertion (A) : Graphite si a good conductore of heat and electriciy .

Reason (R) : Frre electron are sjperaldout in the structrue of graphite .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: A

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14. Assertion (A) : Carbon monoxide is a posonous gas .

Reason (R) : Caron monoxide combines with haemoglobin of blood to form carboxy-haemoglonbin whith is not capable of asorbing oxygen .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: A

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15. Assertion (A) : Carbon forms a large number of compounds .

Reason (R) :Carbon has smallised and is tertavelent.

Reason (R) : Carbon ha small size and is teravalent .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: A

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16. Assertion (A) : Both CO_2 snd SiO_2 have same strucitrue .

Reason (R) : CO_2 is a gas , whereas SiO_2 is a solide .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct.

Answer: B

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17. Assertion (A) : Lead leaves a black amrek on paore

Reason (R) : Lead is used for making lead pencils .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: C

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18. Assertion (A) : CO_2 is lindare

Reason (R) : C is not in $sp-$ hybridsed state .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: C

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19. Assertion (A) : Maximum covalency of carbon si foure .

Reason (R) : Carnon ahs no d-orbitals in its valence shell .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: A

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20. Assertion (A) : Graphite is soft while diamond is very hard .

Reason (R) : Graphite has a hree -dimensional structure while diamond has planer struture .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct

Answer: C

Watch Video Solution

21. Assertion (A) : Silica is soluyble in HF.

Reason (R) : $SiO_2 4HF \rightarrow SiF_4 + 2H_2O$

$SiF_4 2HF \rightarrow H_2SiF_6$.

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: A

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22. Assertion (A) : Graphite is chemically more reactive than diamond .

Reason (R) : Diamond is very hard but fraphite si soof .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: B

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23. Assertion (A) : The compound $(CF_3)_3N$ shows almost no hasic character eve though $(CH_3)_3N$ does .

Reason (R) : Theer is no hydrogen bonding in $(CF_3)_3N$.

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: B

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24. Assertion (A) : When CO_2 is passed through lime water the soluting turns miky but with an excess of CO_2 the solution ehcomes calear agnin .

Reason (R) : Excess CO_2 changes the seupension to a colloidal solution .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: C

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25. Assertion (A) : $SnCl_2$ has high meling point , whereas $snCl_4$ has low melting point .

Reason (R) : $SnCl_4$ has ionic nature whereas $SnCl_4$ is covalent compound invloving sp^3 hyvdridsation .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: A

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26. Assertion (A) : $\mathbb{C}l_4$ is inert towares hydrolusis but $SiCl_4$ is readily hyrolyde .

Reason (R) : Carbon cannot expland its octet but silicon can expand its cotet .

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: A

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27. Assertion (A) : Aluminum is passive towares conc HNO_2

Reason (R) : Due to formation of layer of nitrate on aluminium

A. If both (A) and (R) are correct and (R) is correct explanation of (A)

B. If both (A) and (R) are correct and (R) is not correct explanation of (A)

C. If (A) is correct , but (R) is incorrect

D. If (A) is incorrect but (R) is correct .

Answer: C

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Exercises Integer

1. Carbogen is a mixtrue of O_2 and CO_2 . It and CO_2 . It is used for artificial respireation . What is the precenttage CO_2 in this mixture ?

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2. what is the bond order of carbon momoxide ?

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3. In the structure of silica , each silicon atom is vbonded to bow many oxygen atoms ?

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4. Pb_3O_4 is regrded as a compound oxide of PbO and PbO_2 . How many part of PbO_2 are present in it ?

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5. How many moles of methance are obntined by the hydrolsis of one mole of aluminum carbide ?

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6. How many moles of $PbCO_3$ are present in whitelead ?

What is the percentage fo lead in lead pencil ?

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7. What is the perecntge of lead in lead pencil ?

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Exercises Fill In The Blanks

1. Diamond and graphite are .....,

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2. Dry ice picec is compoused of .....

Watch Video Solution

3. Maximi, ahility of catenation is shown by ..... ,

Watch Video Solution

4. Producer gas is a mixture of ..... And .....,

Watch Video Solution

5. Water gas is amisture of ..... And ..... ,

Watch Video Solution

6. Coal gs is a mixture of ..... , ... And .....

Watch Video Solution

7. When CO_2 is passed through lime water , the milkines first formed is due to the formation of .....

Watch Video Solution

8. Th gas which if preesnt both in producer gas and in water gas is .....

Watch Video Solution

9. CCl_4 used as fire extinguisher because .....

Watch Video Solution

10. When PbO_2 reacts with cone HNO_3, ... gas is evolved .

Watch Video Solution

11. Marsh gas is .....

Watch Video Solution

12. Among group 14 elements , ... Has the least tendency to undergo catention .

Watch Video Solution

13. Lead pencil is made up of .....

Watch Video Solution

14. One carat = ... Mg.

Watch Video Solution

15. Graphite when heated with cone HNO_3 forms a yellow mass known as .....,

Watch Video Solution

16. One BTU (British thermal unit) represents the amount of heat required to raise the temperature of one pound of water to $1^\circ F$ (from $62^\circ F$ to $63^\circ F$) BTU = ... Cal.

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Exercises True False

1. SiO_2 is a covalent compound .

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2. H_2SO_4 is not used for the preparation of CO_2 from marble chipsm as the reaction is vigorrous .

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3. CO_2 is used for extinguisng fire because it is neither combustible not a supporter of combustion .

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4. Phosgene is the common namegiven to phosphine .

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5. The difference in the properties of CH_4 and SiH_4 is due to large difference in the electrongativty of carbon and silicon .

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6. Diamond is hard because all the four valence electrons are bonded to four carbon atoms by comvlent bonds .

Watch Video Solution

7. Carbon terachloride behaves as a Lewis acid .

Watch Video Solution

8. Germanium is transparent in infrared frgion .

Watch Video Solution

9. Carbon exhibits coordination number of six.

Watch Video Solution

10. CO_2 is a greanhouse gas .

Watch Video Solution

11. CO is used as a reducing agent .

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Exercises Archives Multiple Correct

1. When PbO_2 reacts with cone HNO_3, the gas (es) evolved is//are .

A. NO_2

B. O_2

C. N_2`

D. N_2O`

Answer: B

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2. With respect to graphite and diamond, which of the statements given below are correct?

(1) Graphite is harder than diamond.

(2) Graphite has higher electrical conductivity than diamond.

(3) Graphite has higher thermal conductivity than diamond.

(4)Graphite has higher $C - C$ bond order than diamond.

A. Graphite is harеder than diamond.

B. graphite has higher electrical conductivity than diamond.

C. Graphite has higher thermal conductivity than diamond

D. Graphite has higher $C - C$ bodn ordr tha diamond .

Answer: B::D

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3. When O_2 is adsorbed on a metallic surface, electron transfer occurs form the metal to O_2. The true statement (s) regarding this adsorption is (are)

A. O_2 is physisorbed

B. heat is released

C. Occupency of π_{2p} of O_2 is increased

D. bond length of O_2 is increased

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

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Exercises Archives Single Correct

1. Moderate electrieal conductivity is shown by .

A. silica

B. graphite

C. diamond

D. carbonrudum

Answer: B

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2. Which of the following halides is least stable and has a doubtful existence ?

A. CCl_4

B. Gel_4

C. SnI_4

D. Pbl_4

Answer: D

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3. Under hydroglytic conditions , the compounds used for prepareation of linera polymer and for chain termination respectively are .

A. CH_3SiCl_3 and $Si(CH_3)_4$

B. $(CH_3)_2SiCl_2$ and $(CJ_3)_3SiCl$

C. $(CH_3)_2siCl_2$ and CH_3SiCl_3

D. $SiCl_4$ and $(CH_3)_3SiCl$

Answer: B

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Exercises Archives Assertion Reasoning

1. Assertion (A) :Pb^{+4} compounds are stronger oxidiising agents than Sn^{4+} compounds .

Reason (R): The higher oxidation states for group 14 elements are more stable for the heavier members of the group due to inert pair effect .

A. If bothe (A) and (R) are correct and (R) is correct eplanation of (A)

B. If bothe (A) and (R) are correct and (R) is correct eplanation of (A)

C. If (A) is correct , buyt (R) is incrorect .

D. If (A) is incrorect byt (R) is correct .

Answer: C

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Exercises Archives Fill In The Blanks

1. The hydroglysis of alkyl-substuted chlorosiblanes gives .....

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2. The hydroglysis of trialkychlorosilane , R_3SiCl, yields .....,

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3. One reacently discovered allotrope of carbon $(e.\ g.\ C_{60})$ is commonly known as ..... ,

Watch Video Solution

4. A liwuid ehich is permanently supercooled is farequently called a ..... ,

Watch Video Solution

Exercises Archives True False

1. When PbO_2 reacts with a dilute acid . It gives bydrogent peroxide .

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2. Carbon telratcloride burns in air when lighted to give phosgene .

Watch Video Solution

Watch Video Solution

3. Graphite is a better lubricant on the moon than on the carth .

Watch Video Solution

4. Diamond is harder than graphite.

Watch Video Solution

5. The tendency for catenation is much higher for C than for Si.

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Exercises Archives Subjective

1. Write the chemical equations involved in the extraction of lead from galena by self-reduction process.

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2. State with balanced equations , what happens when .

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3. Give reason for the following in one or two sentences : "Solid carbon dioxide is known as dry ice."

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4. Give reasons for the following in one or two sentences :

`"Graphite is used as a solid lubricant."

Watch Video Solution

5. Writebalanced equations for

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6. Complete the following reaction:

$Sn + 2KOH + 4H_2O \rightarrow$ .....+.....

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7. Draw the structure of a cyclic silicate, $(Si_3O_9)^{6-}$ with proper labelling.

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8. Complete the reaction ltbr. $SnCl_4 + C_2H_5Cl + Na \rightarrow$

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9. Starting from $SiCl_4$ prepare the following in steps not exceeding the number give in parantheses (give reaction only)

a. Silicon (1)

b. Linear silicon containing methyl groups only (4)

c. $Na_2SiO_3(3)$.

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