CHEMISTRY

BOOKS - CENGAGE CHEMISTRY (ENGLISH)

P-BLOCK GROUP 14 - CARBON FAMILY

Illustration

1. Select the member s of group 14 that (i) forms the most acidic dioxide (ii) is commonly found in $+2$ oxidation state and (iii) used as semiconductor

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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 on 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 :

First ionisation enthalpy : Mg, Al, Si, Na

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6. What are silicones ?

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7. a. Predict the products formed when Pb_3O_4 reacts with concentrated hydrochloric acid .

b. In which of the acid lead (II)oxide will dissolve : H_2SO_4 ro HNO_3. Give reason .

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

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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. Which is more efficient fuel : water gas or producer gas ?

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10. Indicate the principle ingrediensts of the following

A. Coal gas

b. Producer gas

c. Water gas

d. Natural gas

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11. Give reasons for the following ,

Alkances are more stable than silances .

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12. Give reaasons : The of lead pencil is not lead but greaphite

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

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

b. The salt when heated gives acetone and a yellow colored residue which is used in paints

. c. The solution of the salt gives a white precipitate with dil HCi which is soluble in hot water .

Explain the above observations with chemical reactions involved .

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14. Give a balanced chemical reaaction for the following :

a. Tin is treated with conc HNO_3

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15. Give reason for the following in one or two sentences :

"Solid carbon dioxide is known as dry ice."

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Solved Examples

1. Identify(A) based on following 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) give white ppt, with $NaOH$ soluble in excess of $NaOH$.

d. (A) gives yellow dirty ppt. on passing H_2S gas , soluble in

yellow ammonium sulphjde (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 aqueous solution of salt (A) gives a give a white precipitate (B) with sodium chloride solution . Compound (

B) dissolves in hot water and the solution on treatment with sodium iodide give a yellow precipitate (D) ,. and on passing H_2S through solution (B) gives a black ppt . (C) . Compound (A) does not give any gas with dil HCl, but liberates a reddish brown gas on heating identify compounds (A), (B), (C) , and (D) .

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

a. Silicon (1)

b. Linear silicone containing methyl groups only (4)

c. $Na_2SiO_3(3)$.

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5. An element of group 14 form a red coloured mixed oxide (A) which on treatment with conc HNO_3 gives compound (B) , (B) reacts with HCl to produce a choloride (C) , which is insoluble in cold water but soluble in hot water . (A) on reaction with conc HCl produces (C) . Identify (A), (B) and (C) .

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6. $CaCO_3$ on heating gives a white solid (A) and a gas (B), (A) on heating with carbon gives a solid (C) and a gas (D), (C) on hydrolysis glves a gas (E) and a solid (F) Identify (A), (B), (C), (D) , (E) and (F) .

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7. Chooser the correct option : Lead oxide PbO can be dissoveld in

i. HNO_3, ii. H_2SO_4

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8. What is $Na_2C_2O_6$

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9. $HgCl_2$ and $SnCl_2$ cannot exist together in an aqeous solution . Explain.

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Ex Subjective

1. Explain giving reasons the following:

CCl_4 is not hydrolysed with water but $SiCl_4$ is easily hydrolysed.

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2. Why does elemental silicon not form a graphite-like structure, whereas carbon does?

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3. Which of the following elements forms predominantly covalent compounds as compared to other elements which form ionic compounds?

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4. Cetenation i.e., linking of similar atoms depends on size and electronic configuration of atoms. The tendency of catenation in group 14 elements follows the order

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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. Explain, why is CO_2 a gas at room temperature but SiO_2 is a high melting solid.

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

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8. Account for the following:

C and Si show tetravalency in most of their compounds but Ge, Sn and Pb show bivalency.

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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 basic character . Explain .

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12. Explain the stability order of CO & SiO & give reason for same .

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13. PbX_2 is more stable than PbX_4 (X = CI, Br, I). Account for it.

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14. Account for the following observations

(a) $AlCl_3$ is a Lewis acid

(b) Though fluorine is more electronegative than chlorine yet BF_3 is a weaker Lewis acid than BCI_3

(c) PbO_2 is a stronger oxidising agent than SnO_2

(d) The +1 oxidation state of thallium is more stable than its +3 state.

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15. Give reason : CO is readily absorbed by ammoniacal cuprous

chloride, but not CO_2 .

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16. Silanes are few in number whereas alkanes are large in number . Explain .

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17. Predict whether the following molecules are isostructural or not Justify your answer

$N(Me)_3$ and $N(SiH_3)_3$.

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18. For a mineral . $LiAl(SiO_3)_2$, what is the charge on SiO_3 unit ?

What is the arrangement of oxygen atoms around the silicon atom ?

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

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20. An inorganic compound (X) made up of two most occurring

elements in the earth`s crust and used in building construction.

When (X) reacts with carbon . It forms a poisonous gas (Y) which is most stable diatomic molecule . Identify 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 lead .

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Ex Objective

1. $SiCl_4 \xrightarrow{H_2O} (X) \xrightarrow{heat} (Y)$

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. $AlCl_3$ 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:

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4. $PbCl_4$ 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:

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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. The stability of dihalides 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 oxidatioin 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 hybrid state of carbon atoms in C_{60} molecule is :

A. sp

B. sp^2

C. sp^3

D. dsp^2

Answer:

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11. Hydrolysis of $(CH_2)_2SiCl_4$ 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. 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. Among the following the INCORRECT statement is :

A. Diamond and graphite are two allotropes 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. Silicon shows diagonal relationship with .

A. Al

B. Be

C. B

D. Li

Answer:

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17. a. $Sn + HCl$ gives

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18. Bucky ball Buckministerfulleren is

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19. What happens when steam is passed over red hot coke .

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Exercises Linked Comprehension

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

a. High calorific value .

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

combustion .

c. They can flow through pipes and can be ignite at a moment's notice at any place . No special devices are required for their combustion .

i. Coal gas is a good gaseous fuel as it contains 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 endothermic .

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

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

v. oil gas , which is used in labs , is obtained by cracking of kerosene . It is a mixture of hydrocarbon (saturated and

unsaturated) mainly lower hydrocarbons .

iv. LPG, which contains C_3 and C_4 hydrocarbon of the alkane and alkene series , supplied in cylinders for domestic uses is very popular these days .

Which gas 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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5. Which one of following is a cracking 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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LPG stands for :

A. Liquefied pertoleum gas

B. LiQuefied producer gas

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 silicates of sodium and calcium is formed. On cooling . Liquid become viscous and eventually ceases to flow . It becomes solid and is known as glass. 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 Al_2O_3, B_2O_3 or P_2O_5. Coloured glasses are obtained by adding certain metallic

oxides or salts in the fused mass, Glass is attached by HF and this property is used to make marking on the glass , This is known as etching . The glass on rapid cooling becomes brittle and fragile . The articles of glass are cooled neither slowly nor very rapidly . The process of gradual cooling of glass is called annealing .

Glass is .

A. Solid

B. Liquid

C. Supercooled liquid

D. Colloidal solution

Answer: C

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Ordinary glass is .

A. Sodium silicate and silica

B. Calcium silicate and silica

C. Potassium silicate and silica

D. Mixture of sodium and calcium silicates with silica

Answer: D

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The acid that cannot be stored in glass is .

A. HF

B. HCl

C. HBr`

D. HI`

Answer: A

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Annealing is .

A. Slow and gradual cooling

B. Rapid cooling

C. Cooling by water

D. Slow cooling

Answer: A

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12. 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

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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

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Blue collour can be imparted to the glass by.

A. CoO

B. Fe_2O_3

C. NiO

D. Cu_2O

Answer: A

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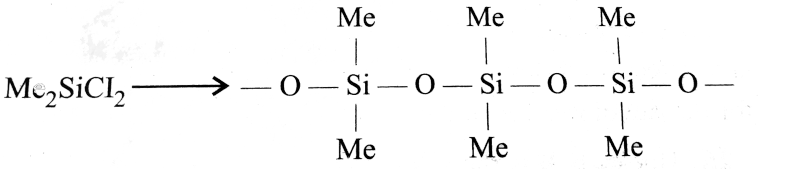
14. Silicones are sunthetic polyners conitainging repeated R_2SiO units . Since the empirical formula is that of a ketone (R_2CO), the name Silicone has eeen given to these materils . Siliconse can be makde intio oils , rubbery eleastomers and

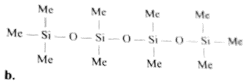
resins . They find a varely of appoications because of their chemical inctness , water repelling nature m heat resistance and good electical insulationg property .

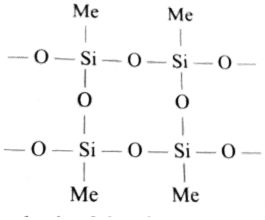
Commerical silicon polumers are usuallly metghly synthesised by the hudroluysis of

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



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

A. 

B. 

C. both of the above

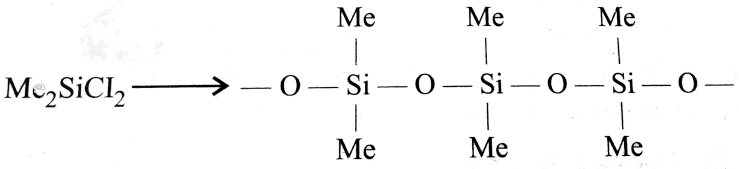
D. none fo the above

Answer: A

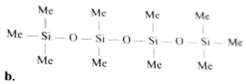
Watch Video Solution

15. Silicones are synthetic polymers containing repeated R_2SiO units . Since the empirical formula is that of a ketone (R_2CO), the name Silicone has been given to these materials . Silicone can be made into oils , rubbery elastomers and resins . They find a variety of applications because of their chemical inertness , water repelling nature, heat resistance and good electrical insulating property . Commerically silicon polymers are usually synthesised by the hudrolysis of

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



If we start 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

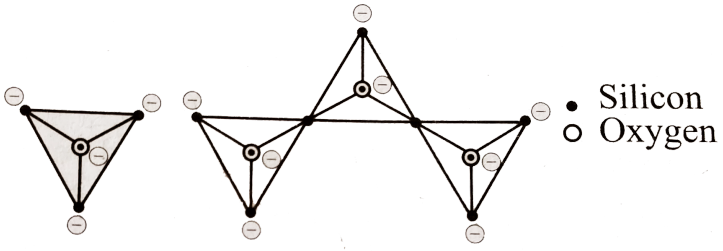
16. The name 'silica' covers an entire group of minerals which have the

general formula SiO_2 the most tetrahedra arranged 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-} $Si_3O_7^{8-}$

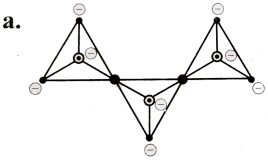
Answer: B

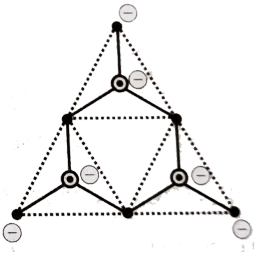
Watch Video Solution

17. The name 'silica' covers an entire group of minerals which have the general formula SiO_2 the most tetrahedra arranged 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. 

B. 

C. both

D. none

Answer: B

Watch Video Solution

18. The silicate anion in the mineral kinoite is a chain of three SiO_4 tetrahedral that share corners with adjacent tetrahedral. The mineral also contains Ca^{2+}, ions, Cu^{2+}

ions, and water molecules in a $1:1:1$ ratio. 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 fire extinguishers, the reactants are $Al_2(SO_4)_3$ (aq) and $NaHCO_3$ (aq). 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 form extinguishes the fire . 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 fire extinguishers, the reactants are $Al_2(SO_4)_3$ (aq) and $NaHCO_3$ (aq). When the extinguisher is activated, these reactants are allowed to mix producing $Al(OH)_{3(s)}$ and $CO_{2(g)}$.

The $Al(OH)_3 - CO_2$ foam extinguishes the fire .

Net ionic reaction of the above chemical change 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 fire extinguishers, the reactants are $Al_2(SO_4)_3$ (aq) and $NaHCO_3$ (aq). When the extinguisher is activated, these reactants are allowed to mix producing $Al(OH)_{3(s)}$ and $CO_{2(g)}$.

The $Al(OH)_3 - CO_2$ foam extinguishes the fires .

Addition of Na_2CO_3 to a solution of an oxide in ester produces

CO_2. This experiment indicates 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. As a result of greenhouse effect , there can be :

A: an increase in rate of evaporation of water thus, untimely more rain , flooding .

B: tropical storms in certain parts of the world

C: a decrease in pH of the soil

D: an increase in pH of the soil

select correct altenate :

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 region and its

presence in the atmosphere decreases the loss of heat from the

earth by radiation . This global warming is called the greenhouse

effect (other gases , including the oxides of nitrogen

from car exhaust freons from aerosols and refrigerators and methane from bacteria in the soil and in the rumen cows , also add

to the greenhouse effect). The concentration of atmospheric CO_2

has increased by $10\,\%$. The is resulting in the increase in the mean temperature of the earth by $2.5^\circ C$, varying form $2^\circ C$ the equator

to $4^\circ C$ at the poles . This could have dramatic effects on the

climate.

Which of the following is growing at a faster 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 called the greenhouse effect (other gases , including the

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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 Francisco 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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drugs .

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 with localised molecular orbital .

C. sp^3 – hybridised element with delocalised molecular orbital .

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

Answer: A

Watch Video Solution

29. 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

Consider following statements about bucky ball :

A , It is also called fullerene

B: It is also called Buckminster fullerene

C: Bucky tubes (made of fullerenes) are several times stronger than steel wires

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 forms are crystalline -diamond ,graphite and the recently discovered fullerene (bucky ball) - while more than 40 others including coke and carbon black are amorphous . Now there seems to be set as fourth crystalline allotrope of carbon. reported in 1995 by ` Lagow at the University of Texas .

Newly discovered allotrope of 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 which readily undergo hydrolysis are :

A. $\mathbb{C}l_4$

B. BCl_3

C. $SiCl_4$

D. CF_4

Answer: B::C

Watch Video Solution

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^(-)'ions

Answer: A::D

Watch Video Solution

3. Which are not correct ?

A. $Ge(OH)_2$ is amphoteric

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

C. Trisilylamine is 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. CO_2 is isostrucrtural with .

A. $HgCl_2$

B. $SnCl_2$

C. C_2H_2

D. NO_2

Answer: A::C

Watch Video Solution

7. CO_2 is isostrucrtural 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 silicones ?

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 can be 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 flame

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 statement (s) given below is/are correct.

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

Watch Video Solution

Exercises Single Correct

1. A : Heavier elements of 14th group do not form $p\pi - p\pi$ bonds .

R : Atomic orbital of heavier elements are too large and do not have effective overlapping .

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

Watch Video Solution

2. The interlayer distance in graphite is

A. Very small the layers being tightly packed

B. Many times larger than the covalent radius of carbon

more than twice the covalent radius of carbon the

C. More than twice he covalent radius of carbon

D. The same than the covalent radius of carbon

Answer: C

Watch Video Solution

3. There is a large number of carbon compounds due to

A. Tertravalency

B. Variable valency

C. Large chemical affinity

D. Property of catention

Answer: D

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

7. Assertion : Among the carbon allotropes, diamond is an insulater, wherea, graphite is a good conductor of electricity.

Reason : Hybridization of carbon in diamond and graphite are sp^3 and sp^2, respectively.

A. sp^2, sp^3

B. sp^3, sp^2

C. sp^2, sp^2

D. sp^3, sp^3

Answer: B

Watch Video Solution

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

Watch Video Solution

9. Which statement is not true about CO?

A. It is a colurless gas.

B. It is an odourless gas .

C. it is highly soluble in water .

D. It is a poisonous gas .

Answer: C

Watch Video Solution

10. Which of 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. CCl_4

D. $SolidCO_2$

Answer: C

Watch Video Solution

12. Which of the following oxide will produce hydrogen peroxide on treatment with water ?

A. $KClO_3$

B. Na_2O_2

C. CaO

D. SO_3

Answer: D

Watch Video Solution

13. A fire extinguisher contains H_2SO_4 and

A. $CaCO_3$

B. Na_2O_2

C. Na_2O_2

D. Any carbonate

Answer: C

Watch Video Solution

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

Watch Video Solution

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

A. (a) hardness

B. (b) high refractive index

C. (c) purest form of carbon

D. (d) chemical inertness

Answer: B

Watch Video Solution

16. Which of the following is chemically inactive allotropic form of carbon ?

A. (a) Coal

B. (b) Diamond

C. (c) Charcoal

D. (d) Animal charcoal

Answer: B

Watch Video Solution

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

A. (a) 1

B. (b) 2

C. (c) 3

D. (d) 4

Answer: D

Watch Video Solution

18. Generally, non-metals are not conductors of electricity. Which of the following is a good conductor of electricity?

A. Diamond

B. Graphite

C. Coal

D. None fo these

Answer: B

Watch Video Solution

19. Carbon shows tetravalency due to .

A. sp^3 hybridisation

B. dsp^2 hybridsation

C. sp^2 hybridisation

D. All of these

Answer: A

Watch Video Solution

20. The specties 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

Watch Video Solution

21. The element which forms only one hydride is :

A. C

B. Si

C. Ge

D. Pb

Answer: D

Watch Video Solution

22. In the grouns state carbon atom has how many unpaired electron ?

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

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

Watch Video Solution

24. Among the following substituted silanes the one which will give rise to cross linked silicone polymer on hydrolysis is :

A. R_3SiCl

B. R_4Si

C. $RSiCl_3$

D. R_2SiCl_2

Answer: C

Watch Video Solution

25. The corrrect order of C-O bond length among CO, CO_3^{2-}, 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. $CO < CO_2 CO_3^{2-}$

Answer: D

Watch Video Solution

26. Which of the following has least tendency to undergo catenation ?

A. C

B. Si

C. Ge

D. Sn`

Answer: D

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

31. In the manufacture fo glass , the addition fo MnO_2 gives

,

A. Yellow color

B. Red colour

C. Violet colout

D. Pink colour

Answer: D

Watch Video Solution

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

Watch Video Solution

33. Solid carbon dioxide 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

Watch Video Solution

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 incombustible 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

Watch Video Solution

38. Which of the following metals in an important ingredient fo transistors ?

A. Osmium

B. Germanium

C. Gold

D. Sodium

Answer: B

Watch Video Solution

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 basic ?

A. CO

B. GeO

C. SnO

D. PbO

Answer: D

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41. The material used in solar cells contains

A. (a) Si

B. (b) Sn

C. (c) Ti

D. (d) Cs

Answer: A

Watch Video Solution

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:

Watch Video Solution

43. Bond energy is highest for :

A. $Sn - Sn$

B. $C - C$

C. $Si - Si$

D. $Ge - Ge$

Answer: B

Watch Video Solution

44. Graphite is a soft solid lubricant extremely difficult 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

Watch Video Solution

45. Beryllium and aluminium carbides contain

A. C^{4-}

B. C_2^{2-}

C. C_3^{2-}

D. C^{4+}

Answer: A

Watch Video Solution

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

Watch Video Solution

48. CO is absorbed by:

A. (a) Alcohols

B. (b) Plants

C. An ammonical solution OF cuprous chloride

D. Nickel teracarbonYL

Answer: C

Watch Video Solution

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. In SiO_4^{4-} the tetrahedral molecule two oxygen atoms are shared in

A. Linear polymeric strciture

B. Three-dimesional structure

C. pyrosilicate structure

D. Two-dimensional sheet structure

Answer: D

Watch Video Solution

51. The structure and hybridisation of $Si(CH_3)_4$ is

A. Bent . Sp

B. Trigonal sp^2

C. Octahedral sp^3d^2

D. Tetrahedral sp^3

Answer: D

Watch Video Solution

52. Structural units of 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

Watch Video Solution

53. A fuel will have a large fuel value when one gram of it on heating 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

Watch Video Solution

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

Watch Video Solution

56. The number and type of bonds between two carbon atoms in calcium carbide 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

Watch Video Solution

57. The anhydride of carbonic acid is :

A. CO

B. CO_2

C. $C_3O + 2$

D. none of these

Answer: B

Watch Video Solution

58. Which of the following statements is not correet ?

A. Lead salts are slow poisons .

B. Lead metal is used in accumulators

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

D. Lead is a soft metal

Answer: B

Watch Video Solution

59. C_{60} an allotrope of carbon contains

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

Watch Video Solution

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

Watch Video Solution

61. Often a ground glass stopper gets stuck in the neck of a glass bottle containing $NaOH$ solution . This is due to ,

A. The presence of dirt particles in between

B. The formation of solid silicate in between by the reaction of SiO_2 of glass with $NaOH$.

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

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

Answer: B

Watch Video Solution

62. Me_2SiCl_2 on hydrolysis will produce :

A. $Me_2(OH)_2$

B. $Me_2Si = O$

C. 

D. $Me_2SiClOH$

Answer: C

Watch Video Solution

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

A. diamond

B. graphite

C. naphthalene

D. fullerene

Answer: A

Watch Video Solution

64. Silica is reacted with sodium carbonate . What is the gas liberated ?

A. CO

B. O_2

C. CO_2

D. O_3

Answer: C

Watch Video Solution

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

Watch Video Solution

66. $K_2C_6O_6$ is called .

A. Postassium per carbonte

B. Postassium permono carbonte

C. Potassium perdicarbonate

D. Potassiuym subacarbnonate

Answer: C

Watch Video Solution

67. Carbon suboxide $C_3O_2(O=C=C=C=O)$ 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

Watch Video Solution

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

A. Al_2O_3

B. CO

C. CO_2

D. CaO

Answer: C

Watch Video Solution

69. Which one of the following anions is present in the chain strucutre silicates ?

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

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

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

D. $\left(SiO_4^{4-}\right)_n$

Answer: A

Watch Video Solution

70. Double chain structures are present in asbestos . Which of the anion are present in them ?

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

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

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

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

Answer: B

Watch Video Solution

71. Different forms of silica such as quartz, tridymite and cristobalite

are as follows :

$\underset{(SiO_2)}{Quartz} \xrightarrow{870^\circ C} \underset{(SiO_2)}{Tridymite} \xrightleftharpoons{1470^\circ C} \underset{(SiO_2)}{Cristiobalite.}$ The

structure possessed is

A. Sheet silicate

B. Three-Dimensional silicate

C. Chain silicate

D. Cycilc or ring silicate

Answer: B

Watch Video Solution

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 gives

A. yellow incrustation

B. brown

C. black

D. blue

Answer: A

Watch Video Solution

74. The plague of tin is the :

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

Watch Video Solution

75. The substance used as a smoke screen in warfare is .

A. $SiCl_4$

B. $SnCl_4$

C. $PbCl_4$

D. $GECl_4$

Answer: A

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76. Carbon 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 CCl_4

C. oxidising $CHCl_3$ with $K_2Cr_2O_7$ and H_2SO_4

D. all of the above

Answer: D

Watch Video Solution

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

Watch Video Solution

78. Fusible alloys of lead with Bi and Si used for making soft solder , electric fuses, safety plug for boilers & automatic

water sprinkles to prevent fire They melt at low temperature

.

A. Wood's metal

B. Lipowitzs alloy

C. Rose's metal

D. all of the above

Answer: D

Watch Video Solution

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

A. $2HgCl_2 + Sn^{2+} \rightarrow Hg_2Cl_2 + Sn^{4+} + 2Cl^-$

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:

Watch Video Solution

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

A. B_4C

B. B_2H_6

C. BN

D. B

Answer: C

Watch Video Solution

82. Which of these is not a monomer for a high molecular mass silicon polymer

A. Me_3SiCl

B. $PhSiCl_3$

C. $MeSiCl_3$

D. Me_2SiCl_2

Answer: A

 Watch Video Solution

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

Watch Video Solution

Exercises Assertion Reasoning

1. Statement I: Pb^{4+} compounds are stronger oxidizing agents than Sn^{4+} compounds.

Statement II:The higher oxidation states for the group 14 elements are more stable for the heavier members of the group 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

Watch Video Solution

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

Reason (R): CO_2 bonds and 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 but lead dorms ionic compounds

Reason (R) : carbon can lose four electrons to four C^{4+} ion but lead cannot .

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

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 is the hardest possible substance and is a network covalent solid .

Reason (R) : All the C atoms in diamond are sp^2 hybridized .

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 not 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

Watch Video Solution

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) : PbI_4 is a stable compound .

Reason (R) : Iodide ion stablised by higher oxidation state

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

D. (d) If both (A) and (R) are incorrect

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 is a good conductor of heat and electricity .

Reason (R) : Free electron are spreadout in the structure 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

Watch Video Solution

14. Assertion : Carbon monoxide is a poisonous gas

Reason : Carbon monoxide combines with hameoglobin to form carboxy-haemoglobin which prevents absorption of oxygen by it.

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

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

Reason (R) : Carbon has small size and is tetravalent .

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

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

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

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

Watch Video Solution

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

Watch Video Solution

18. Assertion (A) : CO_2 is linear

Reason (R) : C is not in $sp-$ hybridised 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

Watch Video Solution

19. Assertion (A) : Maximum covalency of carbon is four .

Reason (R) : Carbon has 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

Watch Video Solution

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

Reason (R) : Graphite has a three -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 soluble 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

Watch Video Solution

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

Watch Video Solution

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

Reason (R) : There 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

Watch Video Solution

24. Assertion (A) : When CO_2 is passed through lime water the solution turns milky but with an excess of CO_2 the solution becomes clear again .

Reason (R) : Excess CO_2 changes the suspension 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

Watch Video Solution

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

Watch Video Solution

Watch Video Solution

26. Assertion (A) : CCl_4 is inert towards hydrolysis but $SiCl_4$ is readily hyrolyse .

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

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

27. Assertion (A) : Aluminum is passive towares conc HNO_3

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 monoxide ?

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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 methane 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 ?

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7. Percentage of lead in lead pencil is

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Exercises Fill In The Blanks

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

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2. is Dry ice solid?

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3. Maximum ability of catenation is shown by

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4. Producer gas is a mixture of

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5. Water gas is a mixture of ..... And ..... ,

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

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

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8. The gas which is present both in producer gas and in water gas is .....

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9. fire extinguisher is

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10. When PbO_2 reacts with conc HNO_3,

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11. Marsh gas is .....

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

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

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14. One carat = ... Mg.

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

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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 chips 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 .

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7. Carbon terachloride behaves as a Lewis acid .

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8. Germanium is transparent in infrared frgion .

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9. Carbon exhibits coordination number of six.

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10. CO_2 is a greanhouse gas .

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11. CO is used as a reducing agent .

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Exercises Archives Multiple Correct

1. When PbO_2 reacts with conc HNO_3,

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 statement (s) given below is/are correct.

A. Graphite is hareder 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 from 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 electrical 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 doubtful existence ?

A. CCl_4

B. Gel_4

C. SnI_4

D. Pbl_4

Answer: D

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3. Under hydrolytic conditions, the compounds used for preparation of linear 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. Statement I: Pb^{4+} compounds are stronger oxidizing agents than Sn^{4+} compounds.

Statement II:The higher oxidation states for the 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 hydrolysis of alkyl substituted chlorosilanes gives _____.

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2. The hydrolysis of trialkyl chlorosilane R_3SiCl, yields _____.

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3. The recently discovered allotrope of carbon (e. g C_{60} is commonly known as _____.

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4. A liquid which is permanently supercooled is frequently called a ..... .

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Exercises Archives True False

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

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2. Carbon tetrachloride burns in air when lighted to give phosgene gas.

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

True or false

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4. Diamond is harder than graphite.

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5. The tendency for catenation is much higher for C than for Si. (T/F)

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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 NaoH is added to hcl

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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."

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5. Write balanced equations for sodium hydroxide with Nitric acid

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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, $(SiO_3O_9)^{6-}$ with proper labeling

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8. Complete the reaction

$SnCl_4 + C_2H_5Cl + Na \rightarrow$

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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 silicone containing methyl groups only (4)

c. $Na_2SiO_3(3)$.