

Marks –100

Time – 2 hrs

(1) Elements of which group cannot form saline hydrides?

- (a) Group 1 (b) Group 2
(c) Both (a) and (b) (d) none

Ans: (d)

(2) Select the polymeric hydride

- (a) BeH_2 (b) LiH (c) NaH
(d) TiH

Ans: (a)

Hint: BeH_2 & MgH_2 are polymeric hydrides.

NiH , PdH etc.

(3) Which of the following is a non-stoichiometric hydride?

- (a) Ionic (b) Metallic
(c) Molecular (d) all the three

Ans: (b)

(4) Which of the following is an electron deficient molecular hydride?

- (a) LiH (b) VH
(c) CH_4 (d) B_2H_6

Ans: (d)

Hint: $\text{VH} \rightarrow$ metallic hydrides

$\text{CH}_4 \rightarrow$ Electron precise hydrides

$\text{B}_2\text{H}_6 \rightarrow$ Electron deficient hydrides

(5) Elements of s-block forms which type of hydrides?

- (a) Saline
(b) Metallic
(c) Interstitial
(d) Molecular

Ans: (a)

(6) What hydrides are formed by the elements of p-block?

- (a) Saline (b) Metallic
(c) Interstitial (d) Molecular

Ans: (d)

Hint: Saline \rightarrow s-block

Metallic \rightarrow d-block as well as p-block

(7) M Which element of 6th group can form hydrides?

- (a) Cr (b) Mo
(c) W (d) Sg

Ans: (a)

Molecular \rightarrow Metallic & non-metallic elements of p-block

(8) What is the hybridization of oxygen atom in water molecule?

- (a) sp (b) sp^2
(c) sp^3 (d) None

Ans: (c)

(9) What type of geometry is observed in ice, as per the X-ray analysis?

- (a) Three dimensional
(b) Trigonal pyramidal
(c) Tetrahedral
(d) Octahedral

Ans: (c)

Hint: By X-ray analysis, it is observed that in crystal structure of ice around each oxygen atom tetrahedral structure is formed.

(10) What is the concentration of water at 25 °C?

- (a) 1 mol/lit (b) 5.55 mol/lit (c) 55.55 mol/lit (d) 0 mol/lit

Ans: (c)

(11) Water reduces fluorine to _____

- (a) F_2 (b) F
(c) F^+ (d) F^-

Ans: (d)

Hint: $2\text{F}_2 + 2\text{H}_2\text{O} \rightarrow 4\text{H}^+_{(\text{aq})} + 4\text{F}^-_{(\text{aq})} + \text{O}_{2(\text{g})}$

Reducing agent reduces fluorine to F^-

(12) BaCl_2 is _____ type of salt.

- (a) Ionic (b) Metallic
(c) Complex (d) Molecular

Ans: (a) Ionic

(13) Temporary hardness is caused due to;

- (a) CaSO_4 (b) CaCl_2
(c) CaCO_3 (d)

$\text{Ca}(\text{HCO}_3)_2$

Ans: (d)

(14) The temporary hardness of water due to calcium bicarbonate can be removed by adding:

- (a) CaCO_3 (b) CaCl_2
(c) HCl (d) $\text{Ca}(\text{OH})_2$

Ans: (d)

(15) Which of the following is responsible for hardness?

- (a) CaSO_4 (b) $\text{Al}_2(\text{SO}_4)_3$
(c) CuSO_4 (d) FeSO_4

Ans: (a)

(16) What type of hardness of water cannot be easily removed by boiling of water?

- (a) Temporary (b) Permanent (c) Saturated (d) Insoluble

Ans: (b)

Hint: In temporary hardness, the salt of Ca and Mg dissolved in water are Ca & Mg hydrogen carbonates. This type of hardness can be removed by boiling water.

- (17) What is obtained when $\text{Mg}(\text{HCO}_3)_2$ is thermally decomposed?
(a) CO and dissolved carbonate (b) CO_2 and insoluble carbonate
(c) C and metal hydride (d) None

None

Ans: (b)

- (18) D_2SO_4 is obtained on reaction of:
(a) $\text{SO}_2 + \text{H}_2\text{O}$ (b) $\text{SO}_3 + \text{H}_2\text{O}$ (c) $\text{SO}_2 + \text{D}_2\text{O}$
(d) $\text{SO}_3 + \text{D}_2\text{O}$

Ans: (d)

- (19) What percentage of dihydrogen is mixed with CNG in cars?
(a) 1% (b) 2%
(c) 5% (d) 8%

Ans: (c)

- (20) The name hydrogen was proposed by:
(a) Lavoisier (b) Rutherford
(c) Henry Cavendish (d) Scheele

Ans: (a)

Hint: Lavoisier proposed the name hydrogen

- (21) Which of the following will give a violet colour flame?
(a) Na (b) K
(c) Cs (d) Fr

Ans: (b)

- (22) Alkali metals are used in making photo cells because:
(a) of high electronegativity
(b) high electron affinity
(c) very high ionization energy (d) very low ionization energy

low ionization energy

Ans: (d)

Hint: Due to low ionization energy, they can lose electrons easily.

- (23) What colour of flame test does cesium give?
(a) Golden (b) Violet
(c) Crimson red (d) Blue

Ans: (d)

- (24) NaCl forms an ionic compound because of:
(a) very small volume
(b) very high electronegativity
(c) very high electropositivity
(d) very high ionization energy

Ans: (c)

- (25) M_2O type oxides of alkali metal react with water and gives _____ solution.
(a) Weak acidic (b) weak basic (c) Strong acidic (d) strong basic

Ans: (d)

- (26) Which of the following oxide is unstable?
(a) Na_2O_2 (b) K_2O_2
(c) Li_2O_2 (d) KO_2

Ans: (c)

Hint: Lithium can form only stable monoxides. Higher oxides of lithium are unstable.

- (27) Which of the following is insoluble in water?
(a) LiF (b) Li_2CO_3
(c) $\text{Li}_3(\text{PO}_4)$ (d) All of above

Ans: (d)

- (28) Which of the following is electrolysed at 500°C temperature for extraction of Li metal?
(a) 55% LiCl + 45% KCl (b) 45% LiCl + 55% KCl
(c) 60% LiCl + 40% KCl (d) 90% LiCl + 10% KCl

Ans: (a)

- (29) _____ is the molecular formula of potash magnesia.

- (a) $\text{K}_2\text{SO}_4 \cdot \text{MgSO}_4 \cdot 2\text{H}_2\text{O}$
(b) $\text{K}_2\text{SO}_4 \cdot \text{MgSO}_4 \cdot 6\text{H}_2\text{O}$
(c) $\text{CaSO}_4 \cdot \text{K}_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
(d) $\text{K}_2\text{SO}_4 \cdot \text{MgSO}_4 \cdot 10\text{H}_2\text{O}$

Ans: (b)

- (30) How can the setting time of plaster of paris be increased?
(a) by adding sugar
(b) by adding salt
(c) by adding Epsom salt
(d) By adding more water

Ans: (b)

- (31) Select the component of Portland cement
(a) Ca_2SiO_4 (b) Ca_3SiO_5
(c) $\text{Ca}_3\text{Al}_2\text{O}_6$ (d) All of above

Ans: (d)

- (32) State the molecular formula of chile salt petre.
(a) Na_2SO_4 (b) NaHSO_4
(c) NaNO_3 (d) $\text{Na}_2\text{S}_2\text{O}_5$

Ans: (c)

Hint: Chile salt petre is NaNO_3 .

- (33) What is produced on passing CO_2 gas through an aqueous solution of Na_2CO_3 ?
(a) NaOH (b) NaHCO_3
(c) OH (d) H_2O

Ans: (b)

Hint: $\text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2 \rightarrow 2\text{NaHCO}_3$

- (34) Why do alkali metals give coloured flame in flame test?
(a) Due to their low melting point
(b) They have only one electron in valence shell
(c) Due to their softness
(d) As they have low ionization energy

Ans: (d)

- (35) Which of the following is the smallest in size?
(a) Mg (b) Be
(c) Li (d) Na

Ans: (b)

- (36) Which of the following reacts directly with nitrogen to form nitride?

- (a) Na (b) Li
(c) K (d) Rb

Ans: (b)

Hint: $6\text{Li} + \text{N}_2 \rightarrow 2\text{Li}_3\text{N}$

(37) Which is the correct configuration of excited atom of carbon?

- (a) $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^0$
 (b) $1s^2 2s^1 2p_x^1 2p_y^1 2p_z^1$
 (c) $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$
 (d) $1s^2 2s^2 2p_x^1 2p_y^0 2p_z^0$

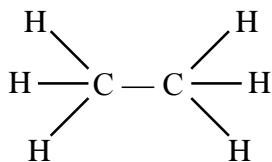
Hint: In excited state, carbon has 4 unpaired electrons one each is $2s, 2p_x, 2p_y, 2p_z$ orbitals.

(38) How many σ -bonds are present in a molecule of ethane?

- (a) 1 (b) 4
(c) 6 (d) 7

Ans: (d)

Hint:



possess 1[C-C] σ bond and 6[C-H] σ bonds i.e. total 7 σ bonds.

(39) How many σ -bonds are present in a molecule of ethyne?

- (a) 1 (b) 2
(c) 3 (d) 4

Ans: (c)

Hint: $\text{H}-\text{C}\equiv\text{C}-\text{H}$, has 2[C-C] π bonds
and 1 [C-C] σ bonds
and 2[C-H] σ bonds.

(40) The orbitals formed by sp^2 hybridization are arranged in what shape?

- (a) Linear
(b) Planar trigonal
(c) Square planar
(d) Trigonal bipyramidal

Ans: (b)

Hint: $sp^2 \rightarrow$ Planar trigonal geometry.

(41) What is the bond angle observed in a molecule having sp hybridization?

- (a) 90° (b) 120°
(c) $109^\circ 28'$ (d) 180°

Ans: (d)

Hint: sp hybridization \rightarrow Linear geometry $\rightarrow 180^\circ$

(42) Which of the following orbital is not involved in sp^2 hybridization?

- (a) P_x (b) P_y
(c) P_z (d) S

Ans: (c)

(43) How many σ and π bonds are present in a molecule of ethyne?

- (a) 3, 3 (b) 3, 1
(c) 2, 1 (d) 3, 2

Ans: (d)

(44) Which functional group is present in a molecule of methoxy ethane?

- (a) Ester (b) amide
(c) Ether (d) alcohol

Ans: (c)

Hint: Oxy group is for ethers.

(45) N, N Dimethyl ethanamine is what type of amine?

- (a) 1° (b) 2°
(c) 3° (d) 4°

Ans: (c)

Hint: Here Nitrogen atom is linked with 3 carbon atoms.

(46) The presence of a ketone group in the organic molecule can be determined by:

- (a) -CHO (b) -COOH
(c) -O- (d) -CO-

Ans: (d)

(47) Pentane-1-ol and pentane-3-ol are:

- (a) Chain isomers
(b) Position isomers
(c) Functional group isomers
(d) Metamers

Ans: (b)

(48) IUPAC name of $\text{CH}_3\text{COOCH}_2\text{CH}_3$ is:

- (a) Ethyl ethanoate
(b) Methyl ethanoate
(c) Ethyl acetate
(d) Methyl acetate

Ans: (a)

(49) Which of the following will act as Lewis acid?

- (a) SO_3H^+ (b) X^- (c)
: NH_2 (d) None

Ans: (a)

Hint: SO_3H^+ being an electrophile is a Lewis acid.

(50) Which of the following will produce maximum inductive effect in an organic compound?

- (a) Cl (b) Br
(c) F (d) I

Ans: (c)

Hint: More electronegativity, high inductive effect.

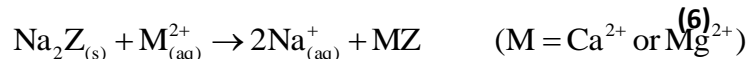
PART – B 2 markers

(1) When zeolite is treated with hard water, sodium ions of zeolite get exchanged with?

- (a) H^+, SO_4^{2+} (b) Ca^{2+}, Mg^{2+} (c) H^+, Ca^{2+} (d) Only Mg^{2+}

Ans: (b)

(2) Hint:



30 volume hydrogen peroxide means:

- (a) 30% H_2O_2 by volume
(b) 30 g of H_2O_2 solution contains 1 g of H_2O_2
(c) 1 cm^3 of solution liberates 30 cm^3 of dioxygen
(d) 30 cm^3 of solution contains 1 mole of H_2O_2

Ans: (b)

Hint: This is as per the definition of volume strength of hydrogen peroxide.

(3) As compared to potassium; Sodium has

- (a) less electronegativity
(b) more ionisation potential
(c) larger atomic radius (d)

lower melting point

Ans: (b)

Hint: Ionization energy decreases down the group

(4) Which of the following carbonates decomposes readily?

- (a) Li_2CO_3 (b) Na_2CO_3
(c) K_2CO_3 (d) Rb_2CO_3

Hint: Li_2CO_3 is highly unstable. It is not known in solid state.

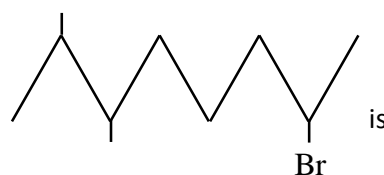
(5) Which of the following is false for alkali metal halides?

- (a) they are crystalline
(b) they are stable ionic compounds
(c) they are coloured
(d) they possess high melting points

Ans: (c)

Hint: Alkali metal halides are colourless.

(6) The IUPAC nomenclature of



- (a) 2, 3-dimethyl 7-bromo octane
(b) 2-bromo 5, 6 dimethyl octane
(c) 2-bromo 6, 7-dimethyl octane
(d) 1-bromo 5,6 dimethyl heptane

Ans: (c)

Hint: As per the rules of IUPAC nomenclature, bromine is more reactive group than methyl.

(7) Which of the following acts as a Lewis acid?

- (a) Electrophile (b) Nucleophile
(c) Neutrophile (d) None of the above

Ans. (a)

Hint: Substance which accepts an electron pair is Lewis acid. Electrophiles also accepts electron pair.

(8) The most stable carbonium ion is:

- (a) Methyl carbonium ion
(b) Primary carbonium ion
(c) Secondary carbonium ion
(d) Tertiary carbonium ion

Ans. (a)

(9) An isomers of ethanol is:

- (a) Methanol
- (b) Dimethyl ether
- (c) Diethyl ether
- (d) Ethylene glycol

Ans. (b)

Hint: Alcohols and ethers are functional isomers.

(10) 1, 3-butadiene has:

- (a) sp and sp^2 hybridised C-atoms
- (b) sp , sp^2 and sp^3 hybridised C-atoms
- (c) Only sp^2 hybridised C-atoms
- (d) Only sp hybridised C-atoms

Ans. (c)

Part – c 3 markers

(1) Match list-I with list-II and select the correct answers using the codes given below the list.

	List – I		List – II
1.	Electron rich hydrides	a.	HF
2.	Metallic hydride	b.	CH_4
3.	Salin hydride	c.	MgH_2
4.	Electron deficient hydride	d.	NbH_2
5.	Electron precise hydride	e.	B_2H_6

(a) $1 \rightarrow a, 2 \rightarrow d, 3 \rightarrow c, 4 \rightarrow e, 5 \rightarrow b$

(b) $1 \rightarrow e, 2 \rightarrow d, 3 \rightarrow c, 4 \rightarrow a, 5 \rightarrow b$

(c) $1 \rightarrow a, 2 \rightarrow d, 3 \rightarrow c, 4 \rightarrow b, 5 \rightarrow e$

(d) $1 \rightarrow b, 2 \rightarrow d, 3 \rightarrow c, 4 \rightarrow e, 5 \rightarrow a$

Ans. (a)

(2) Match list-I with list-II and select the correct

answers using the codes given below the list.

	List – I		List – II
1.	Protium	a.	Electron configuration of 2_1H
2.	Heavy hydrogen	b.	Electron configuration of ${}^1_1H^-$
3.	Tritium	c.	Electron configuration of ${}^3_1H^+$
4.	$1s^1$	d.	Emits low energy β -particles
5.	$1s^0$	e.	Highest proportion in nature
6.	$1s^2$	f.	It has one neutron

(a) $1 \rightarrow e, 2 \rightarrow f, 3 \rightarrow d, 4 \rightarrow a, 5 \rightarrow b, 6 \rightarrow c$

(b) $1 \rightarrow e, 2 \rightarrow f, 3 \rightarrow d, 4 \rightarrow c, 5 \rightarrow a, 6 \rightarrow b$

(c) $1 \rightarrow e, 2 \rightarrow e, 3 \rightarrow d, 4 \rightarrow a, 5 \rightarrow c, 6 \rightarrow b$

(d) $1 \rightarrow f, 2 \rightarrow f, 3 \rightarrow d, 4 \rightarrow a, 5 \rightarrow c, 6 \rightarrow b$

Ans. (c)

(3) The correct order of thermal stability of alkalie earth metal carbonates is

(a) $BaCO_3 > SrCO_3 > MgCO_3 > CaCO_3$

(b) $BaCO_3 > SrCO_3 > CaCO_3 > MgCO_3$

(c) $MgCO_3 > CaCO_3 > SrCO_3 > BaCO_3$

(d) $CaCO_3 > SrCO_3 > MgCO_3 > BaCO_3$

Ans. (c)

Hint: The thermal stability of alkaline earth metals decreases as we move down the group.

(4) Which of the following statements regarding

alkali metals is not correct?

- (a) Alkali metals tarnish in air
- (b) They are kept under kerosene
- (c) All alkali metals form oxide on burning in air.
- (d) The reaction of alkali metals with water increases in violence of descending the group.

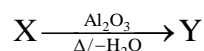
Ans. (c)

Hint: Li forms Li_2O

Na form Na_2O_2

higher alkali metal form super oxide

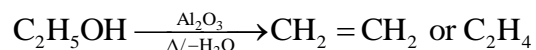
(5) Find X and Y in the following reactions



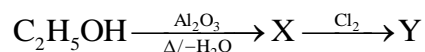
- (a) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{I}$
- (b) $\text{C}_2\text{H}_5\text{OH}$, C_2H_4
- (c) $\text{C}_2\text{H}_5\text{OH}$, C_2H_2
- (d) $\text{C}_2\text{H}_5\text{OH}$, C_2H_6

Ans. (b)

Hint: $\text{C}_2\text{H}_5\text{I} \xrightarrow{\text{KOH}} \text{C}_2\text{H}_5\text{OH} + \text{KI}$



(6) Find X and Y in the following reactions.



- (a) C_2H_4 , $\text{C}_2\text{H}_5\text{Cl}$
- (b) C_2H_4 , $\text{C}_2\text{H}_2\text{Cl}_2$
- (c) C_2H_4 , $\text{C}_2\text{H}_4\text{Cl}_2$
- (d) C_2H_2 , $\text{C}_2\text{H}_4\text{Cl}_2$

Ans. (c)

Hint:



Part – c 4 markers

(1) Match list-I with list-II and select the correct answers using the codes given below the list.

	List – I		List – II
1	$[\text{OH}^-]$ in H_2O	a.	Amphoteric
2	p^{OH} of H_2O	b.	$[\text{Ni}(\text{H}_2\text{O}_6)]^{2+} 2(\text{NO}_3)^-$
3	Concentration of H_2O	c.	$\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
4	Nature of H_2O	d.	Reaction with F_2
5	Metallic salt	e.	Reaction with Na
6	Complex salt	f.	7.0
7	H_2O as an oxidizing agent	g.	10×10^{-7} mole per litre.
8	H_2O as a reducing	h.	$55.55 \text{ mol. lit}^{-1}$

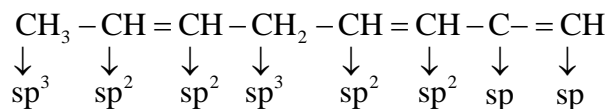
(a) $1 \rightarrow \text{g}$, $2 \rightarrow \text{f}$, $3 \rightarrow \text{h}$, $4 \rightarrow \text{a}$, $5 \rightarrow \text{b}$, $6 \rightarrow \text{e}$, $7 \rightarrow \text{e}$, $8 \rightarrow \text{d}$

(b) $1 \rightarrow \text{g}$, $2 \rightarrow \text{f}$, $3 \rightarrow \text{h}$, $4 \rightarrow \text{a}$, $5 \rightarrow \text{c}$, $6 \rightarrow \text{b}$, $7 \rightarrow \text{e}$, $8 \rightarrow \text{d}$

(c) $1 \rightarrow \text{h}$, $2 \rightarrow \text{f}$, $3 \rightarrow \text{g}$, $4 \rightarrow \text{a}$, $5 \rightarrow \text{c}$, $6 \rightarrow \text{b}$, $7 \rightarrow \text{e}$, $8 \rightarrow \text{d}$

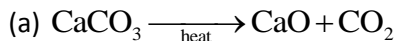
(d) $1 \rightarrow \text{g}$, $2 \rightarrow \text{f}$, $3 \rightarrow \text{h}$, $4 \rightarrow \text{a}$, $5 \rightarrow \text{c}$, $6 \rightarrow \text{b}$, 7

→ d, 8 → e



Ans. (b)

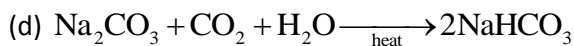
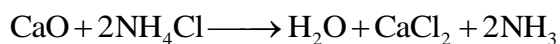
(2) Which of the following equation is not involved in the solvay process of manufacturing sodium bicarbonate?



(b)



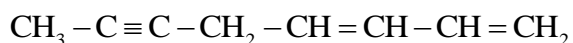
(c)



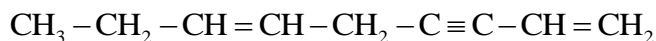
Ans. (d)

(3) A straight chain hydrocarbon has the molecular formula C_8H_{10} . The hybridization for the carbon atom from one end of the chain to the other are respectively $\text{sp}^3, \text{sp}^2, \text{sp}^2, \text{sp}^3, \text{sp}^2, \text{sp}^2, \text{sp}$ and sp . The structural formula of the hydrocarbon would be.....

(a)



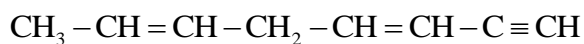
(b)



(c)



(d)



Ans. (d)

Hint: