Solution sem -1 full test -2 axay sir

1 (a) Molecular weight of $C_{60}H_{122} = 12\times60 + 122\times1$

$= 720 + 122 = 842$

$\because$ 6×10^{23} molecule $C_{60}H_{122}$ has mass = 842*gm*

$\therefore$ 1 molecule $C_{60}H_{122}$ has mass $\dfrac{842}{6\times10^{23}}$

$= 140.333\times10^{-23}\,gm = 1.4\times10^{-21}\,gm$.

2 (a) $16g\ O_2$ has no. of moles $= \dfrac{16}{32} = \dfrac{1}{2}$

$14g\ N_2$ has no. of moles $= \dfrac{14}{28} = \dfrac{1}{2}$

No. of moles are same, so no. of molecules are same

3 (b) $44g\ CO_2$ occupies 22.4*L* at STP

$4.4g\ CO_2$ occupies $= \dfrac{22.4}{44}\times4.4 = 2.24L.$

4 (c) Mass no. $\approx$ At. Wt.

Mass no. = no. of protons + no. of neutrons

At. no. = no. of protons.

5. (c) When $c = \nu\times\lambda$ than $\lambda = \dfrac{c}{\nu} = \dfrac{3\times10^8}{2\times10^6} = 1.5\times10^2 m$

6 (d) Bohr's radius of the hydrogen atom

$r = \dfrac{n^2\times0.529\mathring{A}}{z}$; where *z* = Atomic number,

n = Number of orbitals

7 zeeman effet

8 (d) $\lambda = \dfrac{h}{mv}$. For same velocity $\lambda \propto \dfrac{1}{m}$.

SO_2 molecule has least wavelength because their molecular mass is high.

9. (c) $\Delta x\times\Delta p = \dfrac{h}{4\pi}$ is not the correct relation. But correct Heisenberg's uncertainty equation is $\Delta x\times\Delta p \geq \dfrac{h}{4\pi}$.

10. (b) Each period consists of a series of elements whose atom have the same principal quantum no. (*n*) of the outer most shell i.e. In second period $n = 2$, this shell has four orbitals (one 2s and three $2p$) which can have eight electrons, hence second period contains 8 elements from atomic no. 3 to 10.

11 (b) $Na - Cl$. Both belongs to III period.

12 (d) $\underset{54}{I^-} > \underset{53}{I} > \underset{52}{I^+}$ atmoic number

13 (a) As effective nuclear charge on Na^+ is maximum. It has smallest size.

14. (c) During the conversion of neutral atom to cation size decreases because after removal one e^- or more

(i) Nuclear charge per electron increases.

(ii) Outermost shell is completely removed.

15. (b) Atomic radius increases as no. of shells increases

16 (d) Alkali metals, lower the no. of valence e^-, lower is the value of ionization potential.

17) (b) In the given reaction oxidation state of *Mg* is changing from 0 to +2 while in nitrogen it is changing from 0 to –3. So oxidation of *Mg* and reduction of nitrogen takes place.

18) (b) $\overset{2+}{Zn}_{(aq)} + 2e^- \rightarrow \overset{0}{Zn}_{(s)}$ reduction

19)

(a) $\overset{\text{Reduction}}{\overset{+6}{Cr_2O_7^{2-}} + 14H^+ + 6I^- \rightarrow 2Cr^{3+} + 3H_2O + 3I_2}$

20) (a) In this reaction oxidation occur.

21)

(c) $\overset{\text{Reduction}}{\overset{0}{P} + NaOH \longrightarrow \overset{-3}{PH_3} + NaH_2\overset{+1}{P}O_2}$ (Oxidation)

22. (b) $[\overset{*}{Cr}(H_2O)_4Cl_2]^+$

$x + 0 + 2(-1) = +1$; $x - 2 = +1$

$x = +3$ for *Cr* in complex.

23. (c) $\overset{0}{Br_2} \rightarrow \overset{+5}{BrO_3^-}$, in this reaction oxidation state change from 0 to + 5.

24 C

25. (b) By boiling temporary hardness of water can be removed.

$Ca(HCO_3)_2 \xrightarrow{\text{Boil}} \underset{\text{(insoluble)}}{CaCO_3} + H_2O + CO_2$

26 (c) $\underset{\text{Zeolite}}{Na_2Al_2Si_2O_8}.xH_2O + Ca^{+2} \rightarrow$

$CaAl_2Si_2O_8.xH_2O + 2Na^+$

27 (a) Heavy water *i.e.*, D_2O slows down the speed of neutrons in nuclear reactors..

28 (d) The density of water is $1\ g\ cm^{-3}$ at 4°*C*

so molarity $= \dfrac{1000}{18} = 55.5\ M$.

29 (b)

Element	*Na*	*K*
IE_1	496	419
IE_2	4562	3051

Sodium has higher I.E. because of smaller atomic size.

30 (c) Alkali metals are highly reactive metals. They react with

Alcohol – $2C_2H_5OH + 2K \rightarrow 2C_2H_5OK + H_2$

Water – $2K + 2H_2O \rightarrow 2KOH + H_2$

Ammonia – $K + (x+y)NH_3 \rightarrow \underset{\text{Ammoniated cation}}{[K(NH_3)_x]^+} + \underset{\text{Ammoniated electron}}{[e(NH_3)_y]^-}$

But they do not react with kerosene.

31 (a) Carnellite – $KCl.\ MgCl_2.\ 6H_2O$

Cryolite – Na_3AlF_6

Bauxite – ($Al_2O_3.2H_2O$)

Dolomite – $MgCO_3.\ CaCO_3$

32 b

33 c

34 na2co3

35. (d) When Na is heated in presence of air or oxygen, Na burns to form sodium oxide and sodium peroxide.

36) a

37 a

38 d

39 a

40 c

2 markers

41) (a) $\because$ $1L$ of gas at S.T.P. weight $1.16g$

$\therefore$ $22.4\ L$ of gas at S.T.P. weight $= 22.4 \times 1.16$

$= 25.984 \approx 26$

This molecular weight indicates that given compound is C_2H_2.

42) (b) $\because$ $2gm$ of hydrogen $= 6.02 \times 10^{23}$ molecules

$\therefore$ $1gm$ of hydrogen

$= \dfrac{6.02 \times 10^{23}}{2} = 3.01 \times 10^{23}$ molecule.

43. (c) m can't be greater than l.

44 **a**

45. (b) $n = 1$ and $m = 1$ not possible for s-orbitals.

46. (a) $Fe_{26} = [Ar]3d^6 4s^2$

$Fe^{3+} = [Ar]3d^5 4s^0$.

47. (a) ${}_{25}Mn - 3d^5 4s^2$.

48 (c) Element belongs to d-block is unnilhexium $(Unh)_{106}$.

49 b

50 a

51

(d) Heavy water is D_2O $(1-c)$

Temporary hard water contains bicarbonates of Ca^{2+} and Mg^{2+} $(2-a)$

Soft water may have no foreign ions $(3-b)$.

Permanent hard water contains sulphates and chlorides of Ca^{+2} and Mg^{2+} $(4-d)$

52. (a) $6Li + N_2 \rightarrow 2Li_3N$ Lithium nitride.

53 (a) $H_3\overset{1}{C}-\overset{2}{\underset{\underset{Cl}{|}}{C}}=\overset{3}{CH}-\overset{4}{\underset{\underset{CH_3}{|}}{CH}}-\overset{5}{CH_3}$

2-chloro-4-methyl-2-pentene

54 (b) ${}^1CH_3 - {}^2\underset{\underset{\underset{6}{CH_3}}{|}}{\overset{\overset{5}{CH_3}}{|}}{C} - {}^3CH_2 - {}^4CH_3$

$C-2$ is quaternary carbon because it is attached to 4 other carbon atoms.

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55. (c) [$\because$ Molecular weight of $CuSO_4.5H_2O$

$= 63.5 + 32 + 64 + 90 = 249.5$]

6×10^{23} molecules has weight $= 249.5gm$

1×10^{22} molecules has weight $= \dfrac{249.5 \times 1 \times 10^{22}}{6 \times 10^{23}}$

$= 41.58 \times 10^{-1} = 4.158$

56 b

57. (a) $\nu = \dfrac{c}{\lambda} = \dfrac{3 \times 10^8\ ms^{-1}}{600 \times 10^{-9} m} = 5.0 \times 10^{14}\ Hz$.

58. (d) ${}^2_1D_2$ = (2 neutrons + 2 protons) = 4 nucleons

59 (b) $Cs > Rb > K > Na > Li$

Metallic character decreasing order

60 (c)

Element	No. of moles	Simple ratio
C = 40%	40/12	3.33 1
H = 13.33%	13.33/1	13.33 4
N = 46.67%	46.67/14	3.33 1

Thus formula CH_4N

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61 c

62. (b) (a) $2gm$ atom of nitrogen = $28gm$

(b) 6×10^{23} atoms of C has mass $= 12gm$

3×10^{23} atoms of C has mass $= \dfrac{12 \times 3 \times 10^{23}}{6 \times 10^{23}} = 6gm$

(c) 1mole of S has mass = $32gm$

(d) $7.0gm$ of Ag

So, lowest mass = $6gm$ of C.

63 (a) (I) 1 molecule of oxygen

$\because$ 6×10^{23} molecule has mass $= 32gm$

$\therefore$ 1 molecule of O_2 has mass $= \dfrac{32}{6 \times 10^{23}}$

$= 5.3 \times 10^{-23}\ gm$

(II) 1 atom of nitrogen

$\because$ $2 \times 6 \times 10^{23}$ atoms of N_2 has mass = $28gm$

$\therefore$ 1 atom of N_2 has mass $= \dfrac{28}{2 \times 6 \times 10^{23}}$

$= 2.3 \times 10^{-23}\ gm$

(III) $1 \times 10^{-10}\ g$ molecular weight of oxygen

g atomic weight $= 2 \times 1 \times 10^{-10} = 2 \times 10^{-10}\ g$

(IV) $1 \times 10^{-10}\ g$ atomic weight of copper

So, order of increasing masses II < I < III < IV.

64 c d block

Best of luck for final exam form axay sir
