CHEMISTRY

NEET-UG - Chemistry

CHEMISTRY (Section-A)

1.

   (d) 270 mg/dL

   Explanation:

   Molar mass of blood sugar (Glucose)

   = 180 g/mol

   1 mol = 180 g

   1 mmol = 180 mg or 1 mmol L^{-1} = 18 mg/dL

   15 mmol L^{-1} = 15 $\times$ 18 mg/dL

   = 270 mg/dL

   So, the person is diabetic.

2. **(a)** 40

   Explanation:

   $^{70}_{30}Zn$;

   $\therefore$ no. of neutrons in Zn or Zn^{2+} = 40

3.

   (d) 5, 50

   Explanation:

   5, 50

4.

   (b) B > A > C

   Explanation:

   Ice > Liquid water > Impure water

   Due to impurity extent of H-Bonding decreases.

5. **(a)** $s + p_x + p_y + d_{x^2-y^2}$

   Explanation:

   $dsp^2 \rightarrow$ square planar

6.

   (c) i and ii only

   Explanation:

   $\mu \neq 0$ for CH_2=CHCl and cis-ClHC=CHCl

7.

   (c) -3RT

   Explanation:

   $\Delta H = \Delta E + \Delta n_g RT$

   Δn_g = 3 - (1 + 5) = -3

   $\Rightarrow \Delta H = \Delta E + $ -3RT

   $\Delta H - \Delta E$ = -3RT

8.

(c) OH⁻ < H₂O < NH_4^+ < HF < H₃O⁺

Explanation:

OH⁻ is base and H₂O is neutral.

9.

(b) +5

Explanation:

Peroxophosphoric acid (H₃PO₅)
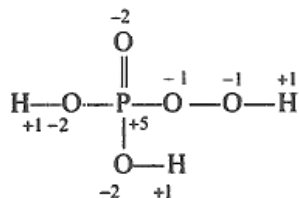
10.

(d) ii and iv

Explanation:

(ii) $\underset{Reductant}{(O^{-1})_2} \rightarrow (O^0)_2 + 2r$

(iv) $\underset{Reductant}{(O^{-1})_2} \rightarrow (O^0)_2 + 2r$
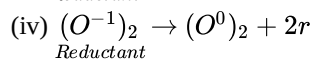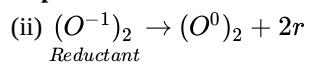
11.

(b) anionic part

Explanation:

anionic part

12.

(d) [Cu(NH₃)₄]²⁺

Explanation:

$NH_2CONH_2 + H_2O \rightarrow \underset{(A)}{(NH_4)_2CO_3} \rightleftharpoons \underset{(B)}{2NH_3} + H_2O + CO_2$

$\underset{(B)}{4NH_3} + \overset{2+}{Cu}(aq) \rightarrow \underset{(deep\ blue\ (C))}{[Cu(NH_3)_4]_{(Aq)}^{2+}}$
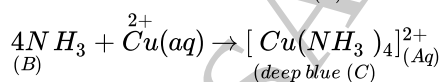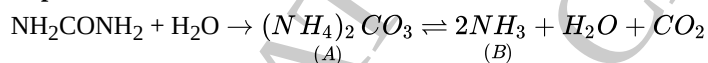
13.
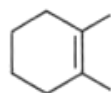
(b) i < iii < ii

Explanation:

As the number of α-H increases stability increases.
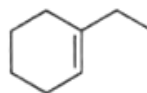
4α-H   10α-H   6α-H

14.

(c) H₃C - C≡C - CH₃

Explanation:

H₃CC≡CCH₃ is linear and symmetrical and hence has lowest (or zero) dipole moment

15.

(b)

COOH (benzoic acid structure)
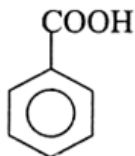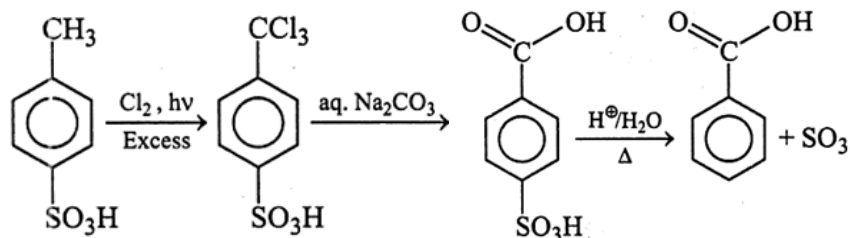
Explanation:

16. **(a)** from both sides of the semipermeable membrane with unequal flow rates
Explanation:
Osmosis is a bilateral movement of solvent particles through a semipermeable membrane and only net flow (more from dilute solution to concentrate solution) is noticed.

17.

(d) 150 g
Explanation:
Molar mass of octane =114 g/mol
From the lowering of vapour pressure we have,

$$\frac{\Delta P}{P} = \frac{\frac{W_2}{M_2}}{\frac{W_2}{M_2} + \frac{W_1}{M_1}}; \quad \frac{75}{100} = \frac{\frac{W_2}{50 \text{ g/mol}}}{\frac{W_2}{50 \text{ g/mol}} + \frac{114 \text{ g}}{114 \text{ g/mol}}}$$

$\Rightarrow W_2 = 150$ g

18.

(c) 128 S cm^2 mol^{-1}
Explanation:

The limiting molar conductivities of NaCl, KBr, and KCl are 126, 152, and 150 S cm^2 mol^{-1} respectively.
The limiting molar conductivity Λ° for NaBr is calculated by the following expression.

$\lambda^\infty_{NaBr} = \lambda^\infty_{NaCl} + \lambda^\infty_{KBr} - \lambda^\infty_{KCl}$

λ^∞_{NaBr} = 126 + 152 - 150 = 128 S cm^2 mol^{-1}

19. **(a)** 30 minute
Explanation:
The reactant concentration drop from 0.8 to 0.4 M, i.e., 50% takes place in 15 minute.

K = $\frac{2.303}{15}\log\frac{0.8}{0.4} = \frac{0.693}{15}$ = 0.0462 min^{-1}
Also, t = $\frac{2.303}{K}\log\frac{0.1}{0.025} = \frac{2.303}{0.0462}\log\frac{0.1}{0.025}$ = 30 min

20. **(a)** t$_{1/2}$
Explanation:
The inter-section point indicate that half of the reactant X is converted into Y.

21. **(a)** Manganese (Z = 25)
Explanation:
V^{2+} (21) [Ar]^{18} 3d^3 4s^0
Cr^{2+} (22) [Ar]^{18} 3d^4 4s^0

Mn^{2+} (23) $[Ar]^{18} 3d^5 4s^0$

Fe^{2+} (24) $[Ar]^{18} 3d^5 4s^1$

- To find ionization enthalpy we first see electronic configuration.
- Then we see shell.
- If shell are same then see charge.
- Then see extra stability (Half-filled and fullyfilled).

$\Rightarrow$ I. E_3 (Mn) > I. E_3 (Fe) > I. E_3 (Cr) > I. E_3 (V)
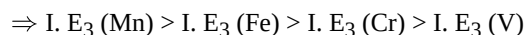
22.

(d) -3

Explanation:

With metals, group 15 elements form binary compounds such as Li_3N, Mg_3N_2, Mg_3P_2, Ca_3P_2, etc. In these compounds, the oxidation state of group 15 elements is -3.

23.

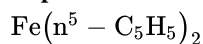**(d)** availability of d-orbitals for bonding.

Explanation:

availability of d-orbitals for bonding.

24.

(b) $Fe\left(n^5 - C_5H_5\right)_2$
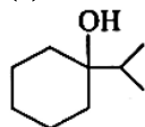
Explanation:

$Fe\left(n^5 - C_5H_5\right)_2$

25. **(a)** carbon

Explanation:
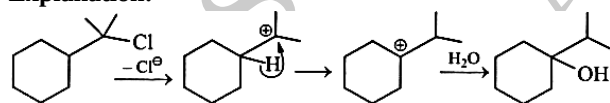
In $M(CO)_4$ metal is bonded to the ligands via carbon atoms with both σ and π-bond character. Both metal to ligand and ligand to metal bonding are possible.

26.

(b)

Explanation:

27.

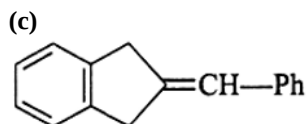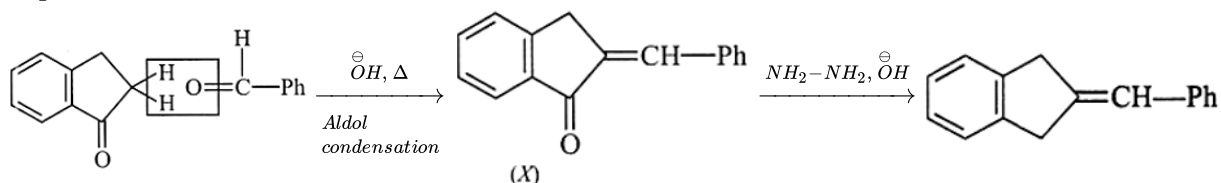**(b)** (iv) > (iii) > (i) > (ii)

Explanation:

In phenols, the presence of electrons releasing group decreases the acidity whereas the presence of electron withdrawing groups increases the acidity as compared to phenol.

Among meta and para nitrophenols the latter is more acidic due to presence of NO_2 group at para position stabilizes the phenoxide ion to a greater extent than at meta position. Thus, order of acidic strength is:

28.

(c)
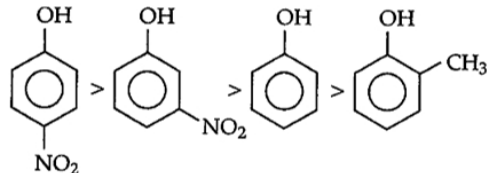
Explanation:

29.

(c) ii > i > iv > iii

Explanation:

The electron-withdrawing ability of the -OH group decreases the electron density on the nitrogen atom (reducing basicity) but the effect decreases as the distance between N and -OH group increases in a chain. Hence, the correct decreasing order of basicity is,

ii = $CH_3CH_2NH_2$

i = $HO(CH_2)_3NH_2$

iv = $HO(CH_2)_2NH_2$

iii = $HO(CH_2)NH_2$

30.

(c) hydrogen bonds

Explanation:

hydrogen bonds

31.

(c) i - d, ii - b, iii - c, iv - a

Explanation:

The D and L in sugar show the arrangements of -OH and -H at penultimate carbon. In D-sugar, the -OH group is on right side whereas in L-sugar, it is on left side. The (+) sign indicates dextrorotation and (-) sign indicates laevorotation.

32.

(c) both benzyl halide and allyl halide

Explanation:

Halides which can give S_N2 reaction are used in Gabriel phthalimide reaction.

33.

(a) $E = E_R - E_L$

Explanation:

$E_{cell} = E_{OP_L} + E_{RP_R} = -E_{RP_L} + E_{RP_R}$

34.

(d) Fractional distillation

Explanation:

Fractional distillation

35.

(a) Option (iii)

Explanation:

Nickel (II) reacts with dimethyl glyoxime and NH_4OH to give a stable red coloured complex.

36. **(a)** All of these

    Explanation:

    All of these

37.

    (d) 2, 2, 7

    Explanation:

    2, 2, 7

38.

    (c) Lead

    Explanation:

    Lead

39. **(a)** C only

    Explanation:

    Negative electron gain enthalpy decreases from fluorine to iodine in the group.

40. **(a)** 2

    Explanation:

    $E_1 = \frac{hc}{\lambda_1}$ and $E_2 = \frac{hc}{\lambda_2}$

    $\frac{E_1}{E_2} = \frac{hc}{\lambda_1} \times \frac{\lambda_2}{hc} = \frac{\lambda_2}{\lambda_1} = \frac{4000}{2000}$ = 2

41.

    (d) $[SiCl_6]^{2-}$

    Explanation:

    Due to the presence of d-orbital in Si, Ge and Sn they form species like $[SiF_6]^{2-}$, $[GeCl_6]^{2-}$, $[Sn(OH)_6]^{2-}$ but $[SiCl_6]^{2-}$ does not

    exist because six large chloride ions cannot be accommodated around Si^{4+} due to limitation of its size.

42.

    (b) The oxidation number of S increases.

    Explanation:

    The oxidation number of S in $Na_2S_2O_3$ is +2 and in K_2SO_4, it is +6. The oxidation number of Mn in $KMnO_4$ is +7 and in

    MnO_2, it is +4. The oxidation number of H remains the same.
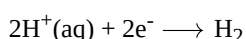
43.

    (d) lithium has the highest oxidation potential

    Explanation:

    This is the characteristic of lithium regarding its use in high electron density batteries.

44. **(a)** 10^{-14} atm

    Explanation:

    $2H^+(aq) + 2e^- \longrightarrow H_2$

    $E_{RP} = E_{RP}^\circ + \frac{0.059}{2}\log \frac{[H^+(aq)]^2}{P_{H_2}}$

    In pure water $[H^+] = 10^{-7}$ i.e., electrode is H_2/H^+ (H_2O) 10^{-7} having $E_{RP} = 0$

    $0 = 0 + \frac{0.059}{2}\log \frac{[10^{-7}]^2}{P_{H_2}}$

    or $\log \frac{[10^{-7}]^2}{P_{H_2}} = 0 = \log 1$

or $\frac{[10^{-7}]^2}{P_{H_2}} = 1$

or $P_{H_2} = (10^{-7})^2 = 10^{-14}$ atm

45. **(a)** $mol^{1-n} L^{n-1} s^{-1}$

    Explanation:

    Rate = k $[A]^n$ comparing units

    $\frac{(\frac{mol}{L})}{sec} = k\left(\frac{mol}{L}\right)^n \Rightarrow K = mol^{(1-n)} L^{(n-1)} s^{-1}$

46.

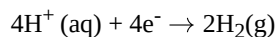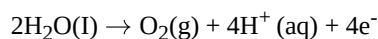   **(c)** oxygen gas

    Explanation:

    During the electrolysis of dil. sulphuric acid using Pt electrodes following reaction will take place.

    At cathode:

    $4H^+ (aq) + 4e^- \rightarrow 2H_2(g)$

    At anode:

    $2H_2O(I) \rightarrow O_2(g) + 4H^+ (aq) + 4e^-$

    At the anode, oxygen gas will be released.

47. **(a)** CoF_3

    Explanation:

    CoF_3

48. **(a)** f-block

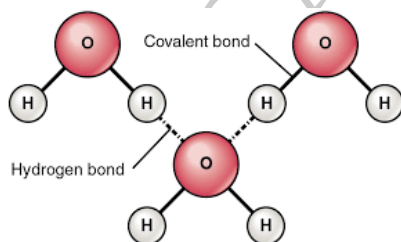   **Explanation:**

    f-block

49. **(a)** H-bonding

    Explanation:

    The higher values of specific heat of the water in comparison to other liquids are due to H-bonding. Water is a polar molecule because oxygen bears a partial negative charge and hydrogen bears a partial positive charge. This results in extensive hydrogen bonding in water molecules between slightly negative oxygen and slightly positive hydrogen. This is the case for water because any heat energy given to water will go towards breaking those hydrogen bonds. Because the heat is spent breaking hydrogen bonds, it doesn't increase the kinetic energy of the molecules themselves very easily.

    Thus, the temperature of the water doesn't increase as much as most other fluids - i.e. it has high specific heat. H-bonding in H_2O increases forces of attraction among molecules and develops abnormal properties.
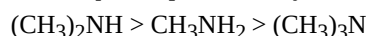

50.

    (b) iii < iv < v < ii < i

    Explanation:

    In the aqueous phase, methylamines follow the basicity order as follows:

    $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$

    This irregularity is due to the steric factor and solvation effect. Alkylamines are more basic than ammonia and arylamines are less basic than ammonia.