KCET 2024 Chemistry Question Paper

1. Which of the following set of polymers are used as fibre?
(i) Teflon
(ii) Starch
(iii) Terylene
(iv) Orlon
(A) (i) and (ii)
(B) (ii) and (iii)
(C) (iii) and (iv)
(D) (i) and (iv)

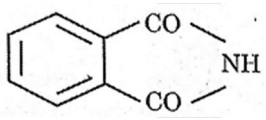
Ans. **C**

Sol. Terylene and orlon are fibres

2. The biodegradable polymer obtained by polymerisation, of Glycine and Aminocaproic acid is
(A) Nylon 6
(B) PHBV
(C) Nylon 2 – Nylon 6
(D) Nylon 6, 10

Ans. **C**

Sol. Nylon 2 – Nylon 6 is a biodegradable polymer

3. The compound  is

(A) Sucralose
(B) Aspartame
(C) Saccharin
(D) Alitame

Ans. **C**

Sol. Saccharin structure

4. Which one of the following is a cationic detergent?
(A) Cetyltrimethylammonium bromide
(B) Sodium dodecylbenzene sulphonate
(C) Dodecylbenzene sulphonic acid
(D) Dodecylbenzene

Ans. **A**

Sol. Cetyltrimethylammonium bromide is a cationic detergent

5. The type of linkage present between nucleotides is
(A) Phosphoester linkage
(B) Phosphodiester linkage
(C) Amide linkage
(D) Glycosidic linkage

Ans. **B**

Sol. Nucleotides are joined by Phosphodiester linkage

6. $\alpha-D-(+)-$ glucose and $\beta-D-(+)-$ glucose are
(A) Enantiomers
(B) Conformers
(C) Epimers
(D) Anomers

Ans. **D**

Sol. $\alpha-D-(+)-$ glucose and $\beta-D-(+)-$ glucose are anomeric at first carbon so called anomers

7. Propanone and Propanal are
(A) Position isomers
(B) Functional isomers
(C) Chain isomers
(D) Geometrical isomers

Ans. **B**

Sol. Propanone and Propanal are functional isomers

8. Sodium ethanoate on heating with soda lime gives 'X'. Electrolysis of aqueous solution of sodium ethanoate gives 'Y'. 'X' and 'Y' respectively are
(A) Methane and Ethane
(B) Methane and Methane
(C) Ethane and Methane
(D) Ethane and Ethane

Ans. **A**

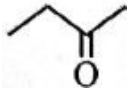
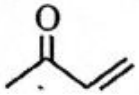
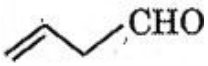
Sol. $CH_3COONa + NaOH \xrightarrow[\Delta]{CaO} \underset{X}{CH_4} + Na_2CO_3$

$2CH_3COONa + 2H_2O \xrightarrow{\Delta} \underset{Y}{C_2H_6} + 2NaOH + 2CO_2 + H_2$

$X = CH_4$

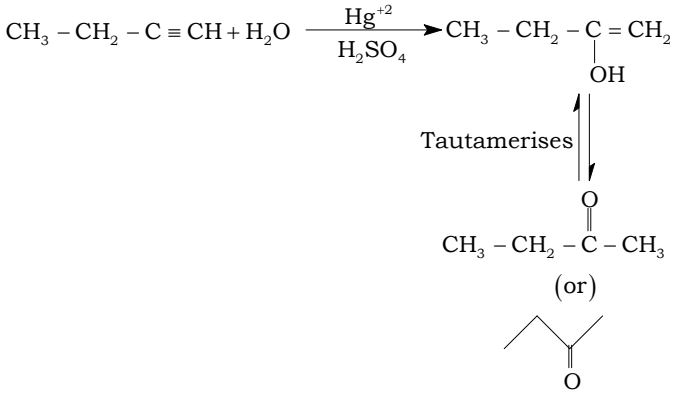
$Y = C_2H_6$

9. But-1-yne on reaction with dil.H_2SO_4 in presence of Hg^{2+} ions at 333K gives

(A) 
(B) 
(C) 
(D) 

Ans. **A**

Sol.



10. Biologically active adrenaline and ephedrine used to increase blood pressure contain
(A) Primary amino group
(B) Secondary amino group
(C) Tertiary amino group
(D) Quaternary ammonium salt

Ans. **B**

Sol. Adrenaline and ephedrine contains secondary amino group

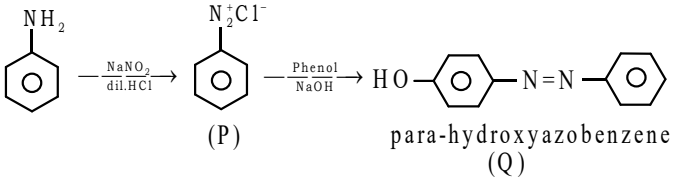
11. In the reaction

Aniline $\xrightarrow[\text{dil.HCl}]{NaNO_2}$ P $\xrightarrow[NaOH]{\text{Phenol}}$ Q .

(A) $C_6H_5N_2Cl$
(B) ortho-hydroxyazobenzene
(C) para-hydroxyazobenzene
(D) meta-hydroxyazobenzene

Ans. **C**

Sol.

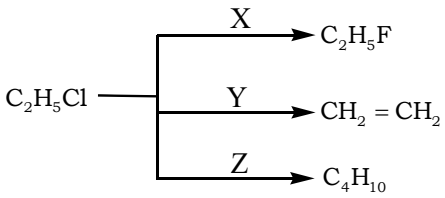


12. The female sex hormone which is responsible for the development of secondary female characteristics and participates in the control of menstrual cycle is
(A) Testosterone (B) Estradiol
(C) Insulin (D) Thyroxine

Ans. **B**

Sol. Conceptual

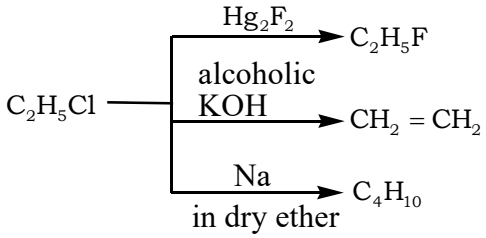
13. In the following scheme of reaction.



X, Y and Z respectively are:
(A) AgF, alcoholic KOH and benzene
(B) HF, aqueous KOH and Na in dry ether
(C) Hg_2F_2, alcoholic KOH and Na in dry ether
(D) CoF_2, aqueous KOH and benzene

Ans. **C**

Sol.



14. 8.8 g of monohydric alcohol added to ethyl magnesium iodide in ether liberates 2240 cm^3 of ethane at STP. This monohydric alcohol when oxidised using pyridinium-chloromate, forms a carbonyl compound that answers silver mirror test (Tollen's test). The monohydric alcohol is
(A) butan-2-ol
(B) 2, 2-dimethyl propan-1-ol
(C) pentan-2-ol
(D) 2, 2-dimethyl ethan-1-ol

Ans. **B**

Sol. 8.8 g of monohydric alcohol $\leftarrow$ 2240 cm^3

88 g $\leftarrow$ 22400 cm^3

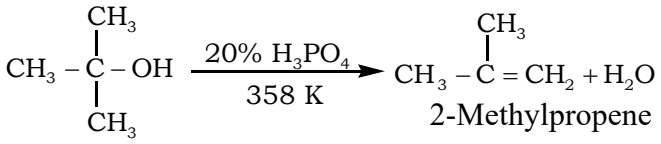
The carbonyl compound that can oxidise tollens reagent i.e., **Aldehyde** and which is oxidising product of Primary alcohol.

15. When a tertiary alcohol 'A' ($C_4H_{10}O$) reacts with 20% H_3PO_4 at 358 K, it gives a compound 'B' (C_4H_8) as a major product. The IUPAC name of the compound 'B' is

(A) But-1-ene
(B) But-2-ene
(C) Cyclobutane
(D) 2-Methylpropene

Ans. D

Sol.



2-Methylpropene

16. PCC is

(A) $K_2Cr_2O_7 + \text{Pyridine}$
(B) $CrO_3 + CHCl_3$
(C) $CrO_3 + H_2SO_4$
(D) A complex of chromium trioxide with pyridine + HCl

Ans. D

Sol. PCC is pyridinium chlorochromate

$C_5H_5\overset{\oplus}{N}HCrO_3Cl^-$

17. On treating 100 mL of 0.1 M aqueous solution of the complex $CrCl_3.6H_2O$ with excess of $AgNO_3$, 2.86 g of AgCl was obtained. The complex is

(A) $[Cr(H_2O)_3Cl_3].3H_2O$
(B) $[Cr(H_2O)_4Cl_2]Cl.2H_2O$
(C) $[Cr(H_2O)_5Cl]Cl_2.H_2O$
(D) $[Cr(H_2O)_6Cl_3]$

Ans. C

Sol. 0.01 moles of an aqueous solution of $CrCl_3.6H_2O$

given 2.86 g AgCl means,

1 mole of aqueous solution = 2 moles of AgCl

$143.5 \times 2 = 286\text{g of AgCl}$

So, $[Cr(H_2O)_5Cl]Cl_2.H_2O$

18. The complex compounds $[Co(NH_3)_5SO_4]Br$ and $[Co(NH_3)_5Br]SO_4$ are

(A) Coordination isomers
(B) Geometrical isomers
(C) Optical isomers
(D) Ionisation isomers

Ans. D

Sol. $[Co(NH_3)_5SO_4]Br$ and $[Co(NH_3)_5Br]SO_4$ are Ionisation isomers.

19. When of the following statements are true about $[CoF_6]^{3-}$ ion?

I) The complex has octahedral geometry.
II) Coordination number of Co is 3 and oxidation state is +6.
(III) The complex is sp^3d^2 hybridised
(IV) It is a high spin complex

(A) I, II and IV
(B) I, III and IV
(C) II and IV
(D) II, III and IV

Ans. B

Sol. I, III and IV statements are true.

20. A haloalkane undergoes S_{N^2} or S_{N^1} reaction depending on

(A) Solvent used in the reaction
(B) Low temperature
(C) The type of halogen atom
(D) Stability of the haloalkane

Ans. A

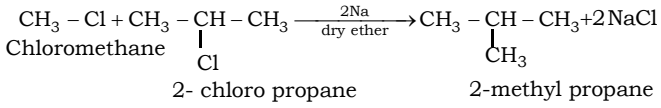
Sol. S_{N^2} or S_{N^1} reaction depends on solvent used in the reaction.

21. 2-Methyl propane can be prepared by Wurtz reaction. The haloalkanes taken along with metallic sodium and dry ether are :

(A) chloromethane and 2-chloropropane
(B) chloroethane and chloromethane
(C) chloroethane and 1-chloropropane
(D) chloromethane and 1-chloropropane

Ans. A

Sol.



Chloromethane — 2- chloro propane — 2-methyl propane

22. In the analysis of III group basic radicals of salts, the purpose of adding $NH_4Cl_{(s)}$ to NH_4OH is :

(A) to increase the concentration of OH^- ions.
(B) to precipitate the radicals of group IV and V.
(C) to suppress the dissociation of NH_4OH.
(D) to introduce Cl^- ions.

Ans. C

Sol. To suppress the dissociation of NH_4OH due to the common ion effect

23. Solubility product of CaC_2O_4 at a given temperature in pure water is $4\times10^{-9}\left(molL^{-1}\right)^2$ Solubility of CaC_2O_4 at the same temperature is

(A) 6.3×10^{-5} mol L^{-1} (B) 2×10^{-5} mol L^{-1}
(C) 2×10^{-4} mol L^{-1} (D) 6.3×10^{-4} mol L^{-1}

Ans. A

Sol. $CaC_2O_4 \rightarrow Ca^{2+} + C_2O_4^{2-}$

S S

$K_{sp} = (S)(S)$

$4\times10^{-9} = S^2$

$S = \sqrt{40\times10^{-10}} = 6.3\times10^{-5}$ mol / L

24. In the reaction between moist SO_2 and acidified permanganate solution :

(A) SO_2 is oxidised to SO_4^{2-}
MnO_4^- is reduced to Mn^{2+}
(B) SO_2 is reduced to S
MnO_4^- is oxidised to MnO_4
(C) SO_2 is oxidised to SO_3^{2-}
MnO_4^- is reduced to MnO_2
(D) SO_2 is reduced to H_2S
MnO_4^- is oxidised to MnO_4

Ans. A

Sol. $2MnO_4^- + 3SO_2 + 4H^+ \rightarrow 2Mn^{2+} + 3SO_4^{2-} + 2H_2O$

25. Which one of the following properties is generally ***not*** applicable to ionic hydrides?

(A) Non-volatile
(B) Non-conducting in solid state
(C) Crystalline
(D) Volatile

Ans. D

Sol. Ionic hydrides exhibit high Mpt i.e, Non - volatile

26. Which one of the following nitrate will decompose to give NO_2 on heating?

(A) $NaNO_3$
(B) KNO_3
(C) $RbNO_3$
(D) $LiNO_3$

Ans. D

Sol. $4LiNO_3 \xrightarrow{\Delta} 2Li_2O + 4NO_2 + O_2$

27. Which of the following halides ***cannot*** be hydrolysed?

(A) CCl_4
(B) $SiCl_4$
(C) $GeCl_4$
(D) $SnCl_4$

Ans. A

Sol. Due to the absence of d – orbitals.

28. 0.48g of an organic compound on complete combustion produced 0.22 g of CO_2. The percentage of C in the given organic compound is :

(A) 25
(B) 50
(C) 12.5
(D) $87\cdot5$

Ans. C

Sol. $\%C = \frac{12}{44}\times\frac{\text{wt. of } CO_2}{\text{wt. of O.C}}\times100$

$\%C = \frac{12}{44}\times\frac{0.22}{0.48}\times100 = \frac{600}{48} = 12.5\%$

29. In the given sequence of reactions, identify 'P', 'Q' and 'S' respectively.

$$CH_2=CH_2 \xrightarrow{P} \underset{Br}{\overset{|}{CH_2}}-\underset{Br}{\overset{|}{CH_2}} \xrightarrow{Q}$$

$$CH_2=CH-Br \xrightarrow{R} CH\equiv CH \xrightarrow{S} C_6H_6$$

(A) $Br_2, Alc, KOH, NaOH, Al_2O_3$

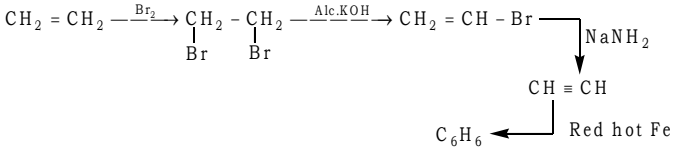
(B) $HBr, Alc, KOH, CaC_2, KMnO_4$

(C) $HBr, Alc, KOH, NaNH_2$, Red hot iron tube

(D) $Br_2, Alc, KOH, NaNH_2$, Red hot iron tube

Ans. D

Sol



30. The first chlorinated organic insecticide proparod is :

(A)Gammaxene

(B)Chloroform

(C) $COCl_2$

(D)DDT

Ans. D

Sol. Dichloro Diphenyl Trichloro ethane (D.D.T)

31. Which of the following crystals has the unit cell such that $a=b\neq c$ and $\alpha=\beta=90^\circ$, $\gamma=120^\circ$?

(A) Zinc blende

(B) Graphite

(C) Cinnabar

(D) Potassium dichromate

Ans. B

Sol. Conceptual

32. MnO exhibits:

(A) Ferrimagnetism

(B) Antiferromagnetism

(C) Ferromagnetism

(D) Paramagnetism

Ans. B

Sol. Conceptual

33. The number of atoms in 4.5g of a face-centred cubic crystal with edge length 300pm is: (Given density $=10\ g\ cm^{-3}$ and $N_A=6.022\times10^{23}$)

(A) 6.6×10^{20}

(B) 6.6×10^{23}

(C) 6.6×10^{19}

(D) 6.6×10^{22}

Ans. D

Sol. $d=\dfrac{Z\times M}{N_A\times a^3}$

$$\Rightarrow M=\frac{10\times6.022\times10^{23}\times\left(300\times10^{-10}\right)^3}{4}$$

$M=40.5\,gm$

Therefore 40.5 gm $\rightarrow 6.022\times10^{23}$ atoms

$4.5gm\rightarrow x$

$x=6.6\times10^{22}$ atoms

34. Vapour pressure of a solution containing 18 g of glucose and 178.2 g of water at $100^\circ C$ is: (Vapour pressure of pure water at $100^\circ C = 760$ torr)

(A) 76.0 torr

(B) 752.0 torr

(C) 7.6 torr

(D) 3207.6 torr

Ans. B

Sol. $n_{H_2O}=\dfrac{178.2}{18}=9.9$; $n_{C_6H_{12}O_6}=\dfrac{18}{180}=0.1$

$$\chi_{C_6H_{12}O_6}=\frac{0.1}{10}=0.01$$

$$\frac{P_0-P_s}{P_0}=\chi_{C_6H_{12}O_6}$$

$$\frac{760-P_s}{760}=0.01$$

$$760-P_s=7.6$$

$$P_s=752.4\,torr$$

35. A mixture of phenol and aniline shows negative deviation from Raoult's law. This is due to the formation of:

(A) Polar covalent bond

(B) Non-polar covalent bond

(C) Intermolecular Hydrogen bond

(D) Intramolecular Hydrogen bond

Ans. C

Sol. Due to intermolecular hydrogen bond

36. Which one of the following pairs will show positive deviation from Raoult's Law?
(A) Water - HCl
(B) Benzene-Methanol
(C) Water $-HNO_3$
(D) Acetone – Chloroform

Ans. **B**

Sol. Conceptual

37. How many Coulombs are required to oxidise 0.1 mole of H_2O to oxygen?
(A) 1.93×10^5C
(B) 1.93×10^4C
(C) 3.86×10^4C
(D) 9.65×10^3C

Ans. **B**

Sol. $H_2O \rightarrow H_2 + \frac{1}{2}O_2$

1 mole $H_2O \rightarrow 2$ Faradays $= 2\times96500$C

0.1 mole $H_2O \rightarrow x$C

$$x = \frac{2\times96500\times0.1}{1} = 19300\text{C} = 1.93\times10^4\text{C}$$

38. A current of 3A is passed through a molten calcium salt for 1hr 47 min 13sec. The mass of calcium deposited is:
(Molar mass of Ca = 40 g mol^{-1})
(A) 6.0 g
(B) 2.0 g
(C) 8.0 g
(D) 4.0 g

Ans. **D**

Sol. $$w = \frac{Eit}{96500}$$
$$= \frac{20\times3\times6432}{96500}$$
$$= 3.99 \approx 4$$

39. The value of 'A' in the equation $\lambda_m = \lambda_m^0 - A\sqrt{C}$ is same for the pair
(A) NaCl and $CaCl_2$
(B) $CaCl_2$ and $MgSO_4$
(C) NaCl and KBr
(D) $MgCl_2$ and NaCl

Ans. **C**

Sol. Conceptual

40. For the reaction, $A \rightleftharpoons B, E_a = 50$ kJ mol^{-1} and $\Delta H = -20$ kJ mol^{-1}. When a catalyst is added, E_a decreases by 10 kJ mol^{-1}. What is the E_a for the backward reaction in the presence of catalyst?
(A) 60 kJ mol^{-1}
(B) 40 kJ mol^{-1}
(C) 70 kJ mol^{-1}
(D) 20 kJ mol^{-1}

Ans. **A**

Sol. $\Delta H = (E_a)_f - (E_a)_b$

$-20 = 40 - (E_a)_b$

$(E_a)_b = 60$

41. For the reaction $PCl_5 \rightarrow PCl_3 + Cl_2$, rate and rate constant are 1.02×10^{-4} mol $L^{-1}S^{-1}$ and $3.4\times10^{-5}s^{-1}$ respectively at a given instant. The molar concentration of PCl_5 at that instant is:
(A) 8.0 mol L^{-1}
(B) 3.0 mol L^{-1}
(C) 0.2 mol L^{-1}
(D) 2.0 mol L^{-1}

Ans. **B**

Sol. Rate $= k[PCl_5]$

$$\frac{1.02\times10^{-4}}{3.4\times10^{-5}} = [PCl_5]$$
$$\therefore [PCl_5] = 3.0 \text{ mol / lit}$$

42. Which one of the following does not represent Arrhenius equation?
(A) $\log k = \log A - \frac{Ea}{2.303RT}$
(B) $k = Ae^{-Ea/RT}$
(C) $\ln k = -\frac{Ea}{RT} + \ln A$
(D) $k = Ae^{Ea/RT}$

Ans. **D**

Sol. Conceptual

43. Identify the ***incorrect*** statement:
(A) Values of colligative properties of colloidal solution are of small order compared to values of true solution
(B) Tyndall effect is observed only when diameter of the dispersed particles is not much smaller than wavelength of incident light
(C) Colour of colloidal solution depends on the wavelength of light scattered by the dispersed particles
(D) Brownian movement is due to balanced bombardment of molecules of dispersion medium on colloidal particles

Ans. **D**

Sol. Brownian movement is due to **unbalanced** bombardment of molecules of dispersion medium on colloidal particles

44. For the coagulations of positively charged hydrated ferric – oxide sol, the flocculating power of the ions is in the order:
(A) $PO_4^{3-} > SO_4^{2-} > Cl^- > \left[Fe(CN)_6\right]^{4-}$
(B) $Cl^- > SO_4^{2-} > PO_4^{3-} > \left[Fe(CN)_6\right]^{4-}$
(C) $SO_4^{2-} = Cl^- = PO_4^{3-} = \left[Fe(CN)_6\right]^{4-}$
(D) $\left[Fe(CN)_6\right]^{4-} > PO_4^{3-} > SO_4^{2-} > Cl^-$

Ans. **D**

Sol. flocculating power α charge on the ion

45. Gold sol is not a :
(A) Macromolecular colloid
(B) Lyophobic colloid
(C) Multimolecular colloid
(D) Negatively charged colloid

Ans. **A**

Sol. Conceptual

46. The ***incorrect*** statement about Hall -Heroult process is :
(A) Carbon anode is oxidised to CO and CO_2
(B) Na_3AlF_6 helps to decrease the melting point of the electrolyte
(C) CaF_2 helps to increase the conductivity of the electrolyte
(D) Oxidation state of oxygen changes in the overall cell reaction

Ans. **D**

Sol. Conceptual

47. Select the correct statement :
(A) Roasting involves heating the ore in the absence of air
(B) Calcination involves heating the ore above its melting point
(C) Smelting involves heating the ore with suitable reducing agent and flux below it melting point
(D) Calcination of calcium carbonate is endothermic

Ans. **D**

Sol. Conceptual

48. NO_2 gas is :
(A) Colourless, neutral
(B) Colourless, acidic
(C) Brown, acidic
(D) Brown neutral

Ans. **C**

Sol. Conceptual

49. Identify the incorrect statement from the following:
(A) Oxides of nitrogen in the atmosphere can cause depletion of the ozone layer
(B) Ozone absorbs the intense ultraviolet radiation of Sun
(C) Depletion of ozone layer is because of its chemical reactions with chlorofluoro alkanes
(D) Ozone absorbs infrared radiation

Ans. **D**

Sol. Ozone absorbs U.V radiation

50. The correct decreasing order of boiling point of hydrogen halides is:
(A) HF > HCl > HBr > HI
(B) HI > HBr > HCl > HF
(C) HF > HI > HBr > HCl
(D) HI > HF > HBr > HCl

Ans. **C**

Sol. Conceptual

51. The synthetically produced radioactive noble gas by the collision of $^{249}_{98}Cf$ with $^{48}_{20}Ca$ is :
(A) Radon
(B) Radium
(C) Oganesson
(D) Xenon

Ans. **C**

Sol. Oganesson Z=118

$$^{249}_{98}Cf + ^{48}_{20}Ca \rightarrow ^{294}_{118}Og + 3\,^{1}_{0}n$$

52. The transition element $(\approx 5\%)$ present with lanthanoid metal in Misch metal is :
(A) Mg (B) Fe (C) Zn (D) Co

Ans. **B**

Sol. 95% lanthanoid metal and $\approx 5\%$ iron

53. Match the following :

I. Zn^{2+}	i. d^8 configuration
II. Cu^{2+}	ii. Colourless
III. Ni^{2+}	iii. $\mu = 1.73$ BM

Codes :

	I	II	III
(A)	i	ii	iii
(B)	ii	iii	i
(C)	ii	i	iii
(D)	i	iii	ii

Ans. **B**

Sol. Zn^{+2} – no unpaired electrons

Cu^{+2} – $\mu = 1.73$ BM

Ni^{+2} – d^8 configuration

54. Which of the following statements related to lanthanoids is ***incorrect*** ?
(A) Lanthanoids are silvery white soft metals.
(B) Samarium shows +2 oxidation state.
(C) Ce^{+4} solutions are widely used as oxidising agents in titrimetric analysis.
(D) Colour of Lanthanoid ion in solution is due to d-d transition .

Ans. **D**

Sol. Colour of Lanthanoid ion in solution is due to f-f transition

55. A metalloid is :
(A) Bi
(B) Sb
(C) P
(D) Se

Ans. **B and D**

Sol. Sb and Se are metalloids.
(According to NCERT of 15th and 16th group)

56. A pair of isoelectronic species having bond order of one is :
(A) N_2, CO
(B) N_2, NO^+
(C) O_2^{2-}, F_2
(D) CO, NO^+

Ans. **C**

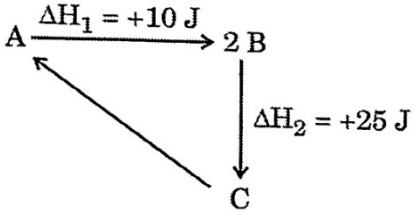
Sol. O_2^{2-}, F_2 =18 electrons each

57. Identify the ***wrong*** relation for real gases :
(A) $Z = \dfrac{V_{ideal}}{V_{real}}$
(B) $p_{ideal} = p_{real} + \dfrac{an^2}{V^2}$
(C) $V_{real} = V_{ideal} - nb$
(D) $\left(p + \dfrac{a}{V^2}\right)(V - b) = RT$

Ans. **A**

Sol. Compressibility factor $(Z) = \dfrac{V_{real}}{V_{ideal}}$

58. From the diagram



$\Delta_r H$ for the reaction C→A is :
(A) +35 J (B) -15 J
(C) -35 J (D) +15 J

Ans. **C**

Sol. $A \xrightarrow{\Delta H_1} 2B \xrightarrow{\Delta H_2} C$

$\Rightarrow A \to C \qquad \Delta H = \Delta H_1 + \Delta H_2 = 35J$

Then $C \to A \qquad \Delta H = -35J$

59. For which one of the following mixtures is composition uniform throughout ?
(A) Sand and water
(B) Grains and pulses with stone
(C) Mixture of oil and water
(D) Dilute aqueous solution of sugar

Ans. **D**

Sol. Dilute aqueous solution of sugar is a homogeneous solution.

60. The energy associated with first orbit of He^+ is:
(A) 0 J
(B) -8.72 x 10^{-18} J
(C) -4.58 x 10^{-18} J
(D) -0.545 x 10^{-18} J

Ans. **B**

Sol. $E_n = -2.18 \times 10^{-18} \times \dfrac{Z^2}{n^2}$

$Z = 2, n = 1$

$E = -2.18 \times 10^{-18} \times \dfrac{4}{1} = -8.72 \times 10^{-18} J$