SOLVED PAPER	NEET (UG) (Re-Examination) 4th September 2022	Code U6

Important Instructions :

1. *The test is of **3 hours 20 minutes** duration and Test Booklet contains **200** multiple choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **50** in each subject are divided into two **Section (A and B)** as per details given below:*
   - *(a) **Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Question Nos- 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory.*
   - *(b) **Section B** shall consist of **15 (Fifteen)** Questions in each subject (Question Nos- 36 to 50, 86 to 100, 136 to 150 and 80 to 200). In Section B, a candidate needs to **attempt any 10 (Ten)** questions out of **15 (Fifteen)** in each subject.*

   Candidates are advised to read all 15 questions in each subject of Section B** before they start attempting the question paper. In the event of a candidate attempting more than ten questions, **the first ten questions answered by the candidate shall be evaluated.
2. *Each question carries **4** marks. For each correct response, the candidate will get **4** marks. For each incorrect response, one mark will be deducted from the total scores. **The maximum marks are 720.***
3. *Use **Blue/Black Ball Point Pen only** for writing particulars on this page/marking responses on Answer Sheet.*
4. *Use of Electronic/Manual Calculator is prohibited.*
5. ***No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.***
6. *The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.*
7. *Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of scribe or not.*

CHEMISTRY

Section A

Q. 51. The correct order of bond angles in the following compounds/species is :+

(1) $H_2O < NH_3 < NH_4^+ < CO_2$

(2) $H_2O < NH_4^+ < NH_3 < CO_2$

(3) $H_2O < NH_4^+ = NH_3 < CO_2$

(4) $CO_2 < NH_3 < H_2O < NH_4^+$

Q. 52. K_H value for some gases at the same temperature 'T' are given:

gas	K_H/k bar
Ar	40.3
CO_2	1.67
HCHO	1.83×10^{-5}
CH_4	0.413

where K_H is Henry's Law constant in water. The order of their solubility in water is :

(1) $Ar < CO_4 < CH_4 < HCHO$

(2) $Ar < CH_4 < CO_2 < HCHO$

(3) $HCHO < CO_2 < CH_4 < Ar$

(4) $HCHO < CH_4 < CO_2 < Ar$

Q. 53. Which of the following reactions is a part of the large scale industrial preparation of nitric acid ?

(1) $NaNO_3 + H_2SO_4 \xrightarrow[500K,\ 9\ bar]{Pt} NaHSO_4 + HNO_3$

(2) $4NH_3 + 5O_2$ (from air) $\xrightarrow[500K,\ 9\ bar]{Pt} 4NO + 6H_2O$

(3) $4HPO_3 + 2N_2O_5 \xrightarrow[500K,\ 9\ bar]{Pt} 4HNO_3 + P_4O_{10}$

(4) $Cu(NO_3)_2 + 2NO_2 + 2H_2O \xrightarrow[500K,\ 9\ bar]{Pt} 4HNO_3 + Cu$

Q. 54. $CaCl_2$ and $Ca(OCl)_2$ are components of :

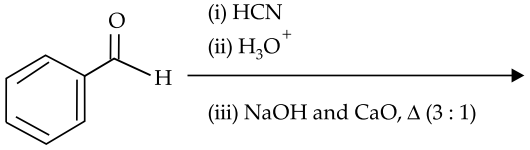
(1) gypsum

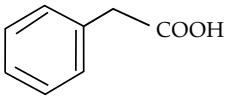
(2) Portland cement

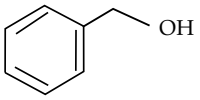
(3) bleaching powder

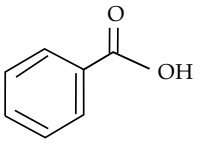
(4) lime water

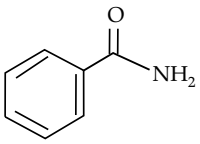
Q. 55. The product formed from the following reaction sequence is :



(1) 

(2) 

(3) 

(4) 

Q. 56. Match List-I with List-II :

List-I (Reaction)	**List-II (Product formed)**
(a) Gabriel synthesis	**(i)** Benzaldehyde
(b) Kolbe synthesis	**(ii)** Ethers
(c) Williamson synthesis	**(iii)** Primary amines
(d) Etard synthesis	**(iv)** Salicyclic acid

Choose the correct answer from the options given below :

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

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

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

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

Q. 57. Match List-I with List-II

List-I	**List-II**
(a) Sodium laurylsulphate	**(i)** Toilet soap
(b) Cetyltrimethyl ammonium chloride	**(ii)** Non-ionic detergent
(c) Sodium stearate	**(iii)** Anionic detergent
(d) Polyethyleneglycyl stearate	**(iv)** Cationic detergent

Choose the correct answer from the options given below :

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

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

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

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

Q. 58. Which of the following reactions is a decomposition redox reaction ?

(1) $2Pb(NO_3)_2(s) \rightarrow 2PbO(s) + 4NO_2(g) + O_2(g)$

(2) $N_2(g) + O_2(g) \rightarrow 2NO(g)$

(3) $Cl_2(g) + 2OH(aq) \rightarrow ClO^-(aq) + Cl^-(aq) + 4H_2O(l)$

(4) $P_4(s) + 3OH(aq) + 3H_2O(l) \rightarrow PH_3(g) + 3H_2PO^-_2(aq)$

Q. 59. If first ionization enthalpies of element X and Y are 419 kJ mol^{-1} and 590 kJ mol^{-1}, respectively and second ionization enthalpies of X and Y are 3069 kJ mol^{-1} and 1145 kJ mol^{-1}, respectively.

Then **correct** statement is :

(1) X is an alkali metal and Y is an alkaline earth metal.

(2) X is an alkaline earth metal and Y is an alkali metal.

(3) Both X and Y are alkali metals.

(4) Both X and Y are alkaline earth metals.

Q. 60. Predict the order of reactivity of the following four isomers towards S_N2 reaction.

(I) $CH_3CH_2CH_2CH_2Cl$

(II) $CH_3CH_2CH(Cl)CH_3$

(III) $(CH_3)_2CHCH_2Cl$

(IV) $(CH_3)_3CCl$

(1) (IV) > (III) > (II) > (I)

(2) (I) > (II) > (III) > (IV)

(3) (I) > (III) > (II) > (IV)

(4) (IV) > (II) > (III) > (I)

Q. 61. Match List-I with List-II :

List-I (Molecules)	**List-II (Shape)**
(a) NH_3	**(i)** Square pyramidal
(b) ClF_3	**(ii)** Trigonal bipyramidal
(c) PCl_5	**(iii)** Trigonal pyramidal
(d) BrF_5	**(iv)** T-shape

Choose the correct answer from the options given below :

(1) (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)
(2) (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)
(3) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)
(4) (a) - (iii), (b) - (iv), (c) - (i), (d) - (ii)

Q. 62. Which among the following is a thermoplastic polymer ?

(1) Bakelite
(2) Polythene
(3) Urea-formaldehyde resin
(4) Melamine polymer

Q. 63. Match List-I with List-II :

List-I (Compounds)	List-II (Molecular formula)
(a) Borax	(i) $NaBO_2$
(b) Kernite	(ii) $Na_2B_4O_7.4H_2O$
(c) Orthoboric acid	(iii) H_3BO_3
(d) Borax bead	(iv) $Na_2B_4O_7.10H_2O$

Choose the **correct answer** from the options given below :

(1) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)
(2) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)
(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)
(4) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

Q. 64. Two half cell reactions are given below :
$Co^{3+} + e^- \rightarrow Co^{2+}$, $E^o_{Co^{2+}/Co^{3+}} = -1.81$ V
$2Al^{3+} + 6e^- \rightarrow 2Al(s)$, $E^o_{Al/Al^{3+}} = +1.66$ V
The standard EMF of a cell with feasible redox reaction will be :

(1) +7.09 V **(2)** +0.15 V
(3) +3.47 V **(4)** –3.47 V

Q. 65. The element used for welding metals with high melting points is :

(1) Cl_2 **(2)** H_2
(3) Ne **(4)** He

Q. 66. $Na_2B_4O_7 \xrightarrow{\text{heat}} X + NaBO_2$
in the above reaction the product "X" is :

(1) H_3BO_3 **(2)** B_2O_3
(3) $Na_2B_2O_5$ **(4)** NaB_3O_5

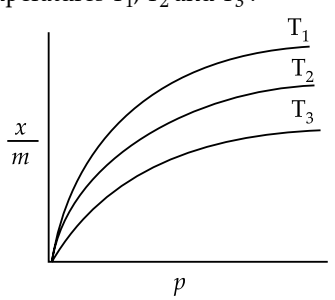
Q. 67. The correct order of first ionization enthalpy for the given four element is :

(1) C < N < F < O **(2)** C < N < O < F
(3) C < O < N < F **(4)** C < F < N < O

Q. 68. 0.01 M acetic acid solution is 1% ionised, then pH of this acetic acid solution is :

(1) 3 **(2)** 2
(3) 4 **(4)** 1

Q. 69. Shown below are adsorption isotherms for a gas 'X' at temperatures T_1, T_2 and T_3 :



p and $\frac{x}{m}$ represent pressure and extent of adsorption, respectively. The correct order of temperatures for the given adsorption is:

(1) $T_1 > T_2 > T_3$ **(2)** $T_3 > T_2 > T_1$
(3) $T_1 = T_2 = T_3$ **(4)** $T_1 = T_2 > T_3$

Q. 70. The half life of a first order reaction is 2000 years. If the concentration after 8000 years is 0.02 M, then the initial concentration was :

(1) 0.16 M **(2)** 0.32 M
(3) 0.08 M **(4)** 0.04 M

Q. 71. One mole of an ideal gas at 300 K is expanded isothermally from 1 L to 10 L volume. ΔU for this process is

(Use R = 8.314 J K^{-1} mol^{-1})

(1) 1260 J **(2)** 2520 J
(3) 5040 J **(4)** 0 J

Q. 72. What is the hybridization shown by C_1 and C_2 carbons, respectively in the given compound ?

$OHC–CH=CH–CH_2COOCH_3$

(1) sp^2 and sp^3 **(2)** sp^2 and sp^2
(3) sp^3 and sp^2 **(4)** sp^3 and sp^3

Q. 73. The density of the solution is 2.15 g mL^{-1}, then mass of 2.5 mL solution in correct significant figures is

(1) 5375×10^{-3} g **(2)** 5.4 g
(3) 5.38 g **(4)** 53.75 g

Q. 74. Flourine is a stronger oxidising agent than chlorine because :

(1) F-F bond has a low enthalpy of dissociation.
(2) Flouride ion (F^-) has high hydration enthalpy
(3) Electron gain enthalpy of flourine is less negative than chlorine.
(4) Flourine has a very small size.

Choose the most appropriate answer from the options given :

(1) (a) and (b) only **(2)** (a) and (c) only
(3) (a) and (d) only **(4)** (b) and (c) only

Q. 75. Match List-I with List-II :

List-I (Complexes)	List-II (Types)
(a) $[CO(NH_3)_5NO_2]Cl_2$ and $[Co(NH_3)_5ONO]Cl_2$	**(i)** ionisation isomerism
(b) $[Cr(NH_3)_6][CO(CN)_6]$ and $[Cr(CN)_6][CO(NH_3)_6]$	**(ii)** coordination isomerism
(c) $[CO(NH_3)_5(SO_4)]Br$ and $[Co(NH_3)_5Br]SO_4$	**(iii)** linkage isomerism
(d) $[Cr(H_2O)_6]Cl_3$ and $[Cr(H_2O)_5Cl]Cl_2.H_2O$	**(iv)** solvate isomerism

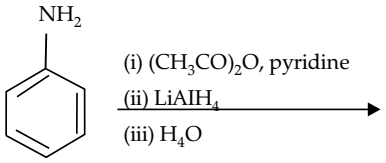
Choose the **correct answer** from the options given below :

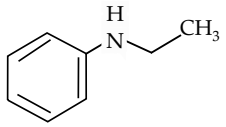
(1) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)
(2) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
(3) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
(4) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

Q. 76. The incorrect statement about denaturation of proteins is

(1) It results due to change of temperature and/ or pH
(2) It results in loss of biological activity of proteins.
(3) A protein is formed from amino acids linked by peptide bonds.
(4) Uncoiling of the helical structure takes place.

Q. 77. The product formed from the following reaction sequence is



(1)


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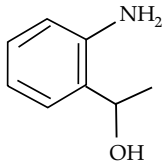

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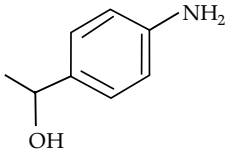

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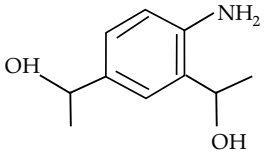


Q. 78. Match List-I with List-II :

List-I (Defects)	List-II (Shown by)
(a) Frenkel defect	**(i)** non-ionic solids and density of the solid decreases
(b) Schottky defect	**(ii)** non-ionic solids and density of the solid increases
(c) Vacancy defect	**(iii)** ionic solids and density of the solid decreases
(d) Interstitial defect	**(iv)** ionic solids and density of the solid remains constant.

Choose the **correct answer** from the options given below :

(1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(2) (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)
(3) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)
(4) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

Q. 79. Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R).**

Assertion (A) : Chlorine is an electron withdrawing group but it is ortho, para directing in electrophilic aromatic substitution.

Reason (R) : Inductive effect of chlorine destabilises the intermediate carbocation formed during the electrophilic substitution, however due to the more pronounced resonance effect, the halogen stabilises the carbocation at ortho and para positions.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**
(2) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**
(3) **(A)** is correct but **(R)** is not correct
(4) **(A)** is not correct but **(R)** is correct

Q. 80. Which of the following reactions is not an example for nucleophilic addition-elimination reaction?

(1) $CH_3CHO + NaHSO_3$

$$\rightleftharpoons CH_3-\underset{\displaystyle H}{\overset{\displaystyle OH}{\overset{|}{\underset{|}{C}}}}-OSO_2Na$$

(2) $CH_3CHO + NH_2OH$

$$\rightleftharpoons CH_3CH = N—OH + H_2O$$

(3) $CH_3CHO + C_6H_5NHNH_2$

$$\rightleftharpoons CH_3CH = N — NHC_6H_5 + H_2O$$

(4) $CH_3CHO + NH_3 \rightleftharpoons CH_3CH = NH + H_2O$

Q. 81. Four gas cylinders containing He, N_2, CO_2 and NH_3 gases separately are graudally cooled from a temperature of 500 K. Which gas will liquify first ?

(Given T_C in K – He : 5.3, N_2 : 126, CO_2 : 304.1 and NH_3 : 405.5)

(1) He **(2)** N_2

(3) CO_2 **(4)** NH_3

Q. 82. Decrease in size from left to right in actinoid series is greater and gradual than that in lanthanoid series due to:

(1) 4 *f* orbitals are penultimate

(2) 4 *f* orbitals have greater shielding effect

(3) 5 *f* orbitals have poor shielding effect

(4) 5 *f* orbitals have greater shielding effect

Q. 83. The decreasing order of boiling points of the following alkanes is:

(a) Heptane

(b) butane

(c) 2-methylbutane

(d) 2-methylpropane

(e) hexane

Choose the **correct answer** from the options given below:

(1) (a) > (c) > (e) > (d) > (b)

(2) (c) > (d) > (a) > (e) > (b)

(3) (a) > (e) > (b) > (c) > (d)

(4) (a) > (e) > (c) > (b) > (d)

Q. 84. Match the regents **(List-I)** with the product **(List-II)** obtained from phenol.

	List-I		List-II
(a)	(i) NaOH (ii) CO_2 (iii) H^+	**(i)**	Benzoquinone
(b)	(i) Aqueous NaOH + $CHCl_3$ (ii) H^+	**(ii)**	Benzene
(c)	Zn duct, Δ	**(iii)**	Salicyl aldehyde
(d)	$Na_2Cr_2O_7$, H_2SO_4	**(iv)**	Salicylic acid

Choose the **correct answer** from the options given below :

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

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

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

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

Q. 85. Match List-I with List-II:

	List-I (quantum number)		List-II (Orbital)
(a)	$n = 2, l = 1$	**(i)**	2*s*
(b)	$n = 3, l = 2$	**(ii)**	3*s*
(c)	$n = 3, l = 0$	**(iii)**	2*p*
(d)	$n = 2, l = 0$	**(iv)**	3*d*

Choose the **correct answer** from the options given below :

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

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

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

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

Section B

Q. 86. Which one of the following is not a calcination reaction?

(1) $ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$

(2) $Fe_2O_3.xH_2O \xrightarrow{\Delta} Fe_2O_3 + xH_2O$

(3) $CaCO_3.MgCO_3 \xrightarrow{\Delta} CaO + MgO + 2CO_2$

(4) $CaCO_3.2HCl \xrightarrow{\Delta} CaCl_2 + H_2O + CO_2$

Q. 87. When electromagnetic radiation of wavelength 300 nm falls on the surface of a metal, electrons are emitted with the kinetic energy of 1.68×10^5 J mol^{-1}. What is the minimum energy needed to remove an electron from the metal?

($h = 6.626 \times 10^{-34}$ Js, c = 3×10^8 ms^{-1}, $N_A = 6.022 \times 10^{23}$ mol^{-1}

(1) 2.31×10^6 J mol^{-1}

(2) 3.84×10^4 J mol^{-1}

(3) 3.84×10^{-19} J mol^{-1}

(4) 2.31×10^5 J mol^{-1}

Q. 88. For a chemical reaction

$4A + 3B \rightarrow 6C + 9D$

rate of formation of C is 6×10^{-2} mol L^{-1} s^{-1} and rate of disappearance of A is 4×10^{-2} mol L^{-1} s^{-1}. The rate of reaction and amount of B consumed in interval of 10 seconds, respectively will be:

(1) 1×10^{-2} mol L^{-1} s^{-1} and 30×10^{-2} mol L^{-1}

(2) 10×10^{-2} mol L^{-1} s^{-1} and 10×10^{-2} mol L^{-1}

(3) 1×10^{-2} mol L^{-1} s^{-1} and 10×10^{-2} mol L^{-1}

(4) 10×10^{-2} mol L^{-1} s^{-1} and 30×10^{-2} mol L^{-1}

Q. 89. The incorrect method for the synthesis of alkenes is:

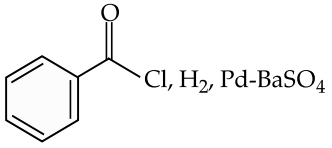
(1) treatment of alkynes with Na in liquid NH_3

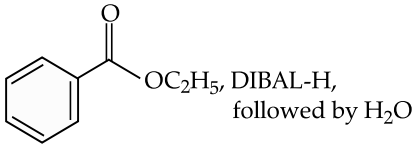
(2) heating alkyl halides with alcoholic KOH

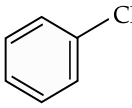
(3) treating alkyl halides in aqueous KOH solution

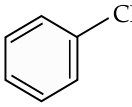
(4) treating vicinal dihalides with Zn metal

Q. 90. The incorrect method to synthesize benzaldehyde is:

(1) 

(2) 

(3)  , CrO_2Cl_2, followed by H_3O^+ in CS_2

(4)  , CH_3MgBr, followed by H_3O^+

Q. 91. What fraction of Fe exists as Fe(III) in $Fe_{0.96}O$?

(Consider $Fe_{0.96}$ to be made up of Fe(II) and Fe(III) only)

(1) $\frac{1}{12}$ **(2)** 0.08

(3) $\frac{1}{16}$ **(4)** $\frac{1}{20}$

Q. 92. Given below are two statements: one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A):

The metal carbon bond in metal carbonyls possesses both σ and π character.

Reason (R):

The ligand to metal bond is a π bond and metal to ligand bond is a σ bond.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A)

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

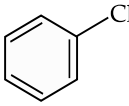
(3) (A) is correct but (R) is not correct.

(4) (A) is not correct but (R) is correct.

Q. 93. Which one of the following reaction sequence is incorrect method to prepare phenol?

(1) Aniline, $NaNO_2 + HCl$, H_2O, heating

(2) Cumene, O_2, H_3O^+

(3)  , NaOH, STP condition

(4)  , oleum, NaOH, H_3O^+

Q. 94. A vessel contains 3.2 g of dioxygen gas at STP (273.15 K and 1 atm pressure). The gas is now transferred to another vessel at constant temperature, where pressure becomes one third of the original pressure. The volume of new vessel in L is :

(Given - molar volume at STP is 22.4 L)

(1) 6.72 **(2)** 2.24

(3) 22.4 **(4)** 67.2

Q. 95. Match List-I with List-II:

	List-I		List-II
(a)	Biochemical oxygen demand	**(i)**	Oxidising mixture
(b)	Photochemical smog	**(ii)**	Polar stratospheric cloud
(c)	Classical smog	**(iii)**	organic matter in water
(d)	Ozone depletion	**(iv)**	reducing mixture

Choose the **correct answer** from the options given below:

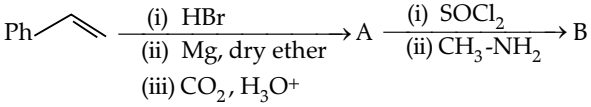
(1) (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

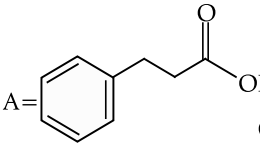
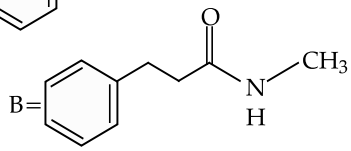
(2) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

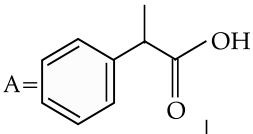
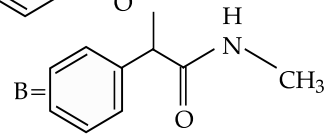
(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

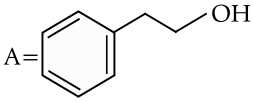
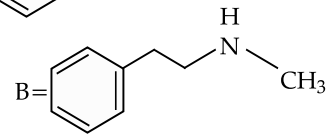
(4) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

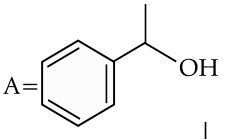
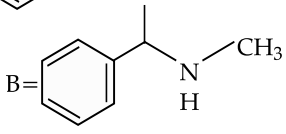
Q. 96. The products A and B in the following reaction sequence are :



(1) A=  ;
B= 

(2) A=  ;
B= 

(3) A=  ;
B= 

(4) A=  ;
B= 

Q. 97. Given below are two statements:

Statement I:

Cr^{2+} is oxidising and Mn^{3+} is reducing in nature.

Statement II:

Sc^{3+} compounds are repelled by the applied magnetic field.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both Statement I and Statement II are correct

(2) Both Statement I and Statement II are incorrect

(3) Statement I is correct but Statement II is incorrect

(4) Statement I is incorrect but Statement II is correct

Q. 98. K_P for the following reaction is 3.0 at 1000 K.

$CO_2(g) + C(s) \rightleftharpoons 2CO(g)$

What will be the value of K_C for the reaction at the same temperature?

(Given: R = 0.083 L bar K^{-1} mol^{-1})

(1) 0.36 **(2)** 3.6×10^{-2}

(3) 3.6×10^{-3} **(4)** 3.6

Q. 99. Standard electrode potential for the cell with cell reaction

$Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$

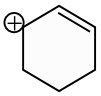
is 1.1 V. Calculate the standard gibbs energy change for the cell reaction.

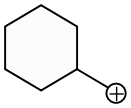
(Given F = 96487 C mol^{-1})

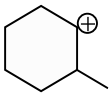
(1) –200.27 kJ mol^{-1} **(2)** –212.27 kJ mol^{-1}

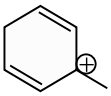
(3) –212.27 J mol^{-1} **(4)** –200.27 J mol^{-1}

Q. 100. Which of the following is the most stable carbocation?

(1) 

(2) 

(3) 

(4) 

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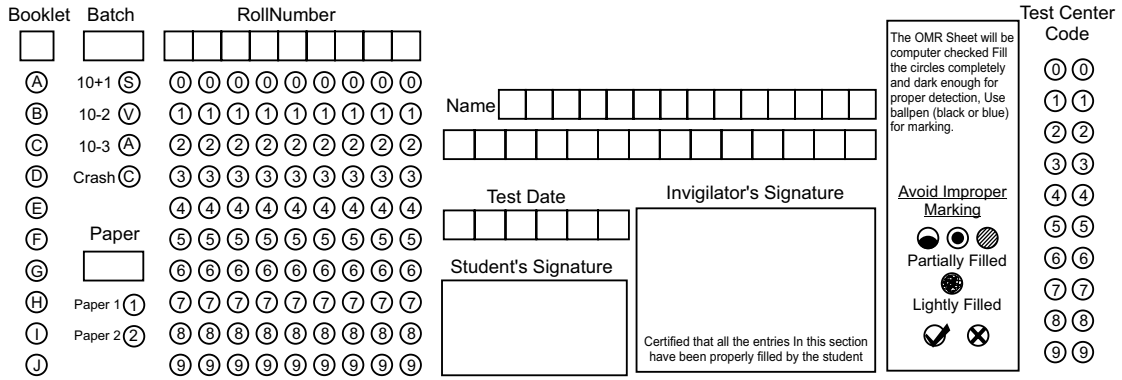


51	①	②	③	④
52	①	②	③	④
53	①	②	③	④
54	①	②	③	④
55	①	②	③	④

56	①	②	③	④
57	①	②	③	④
58	①	②	③	④
59	①	②	③	④
60	①	②	③	④

61	①	②	③	④
62	①	②	③	④
63	①	②	③	④
64	①	②	③	④
65	①	②	③	④

66	①	②	③	④
67	①	②	③	④
68	①	②	③	④
69	①	②	③	④
70	①	②	③	④

71	①	②	③	④
72	①	②	③	④
73	①	②	③	④
74	①	②	③	④
75	①	②	③	④

76	①	②	③	④
77	①	②	③	④
78	①	②	③	④
79	①	②	③	④
80	①	②	③	④

81	①	②	③	④
82	①	②	③	④
83	①	②	③	④
84	①	②	③	④
85	①	②	③	④

86	①	②	③	④
87	①	②	③	④
88	①	②	③	④
89	①	②	③	④
90	①	②	③	④

91	①	②	③	④
92	①	②	③	④
93	①	②	③	④
94	①	②	③	④
95	①	②	③	④

96	①	②	③	④
97	①	②	③	④
98	①	②	③	④
99	①	②	③	④
100	①	②	③	④

Q. No.	Answer Key	Topic name	Chapter name
51.	1	Bond angles	Chemical bonding and molecular structure
52.	1	Henry's law	Solutions
53.	2	Preparations of nitric acid	*p*-Block Elements
54.	3	Properties of alkaline earth metals	*s*-Block Elements (Alkali and Alkaline Earth Metals)
55.	2	Chemical reactions of aldehydes	Aldehydes, Ketones and Carboxylic Acids
56.	4	Chemical reactions of functonal groups	Alcohols, Phenols and Ethers & Organic Compounds Containing Nitrogen
57.	3	Soaps & Detergents	Chemistry in Everyday Life
58.	1	Redox reactions	Redox reactions
59.	1	Properties of *s*-Block elements	*s*-Block Elements (Alkali and Alkaline Earth Metals)
60.	3	Nucleophilic substitution reactions	Haloalkanes and Haloarenes
61.	2	VSEPR Theory	Chemical bonding and molecular structure
62.	2	Thermoplastic polymers	Polymers
63.	1	Compounds of Boron	Some *p*-Block Elements Principles and Process
64.	3	Electrochemistry	Electrochemistry
65.	2	Applications of hydrogen	Hydrogen
66.	2	Compounds of Boron	Some *p*-Block Elements Principles and Process
67.	3	Properties of *p*-block elements	Some *p*-Block Elements Principles and Process
68.	3	pH	Equilibrium
69.	2	Adsorption isotherm	Surface Chemistry
70.	2	Chemical Kinetics	Chemical Kinetics
71.	4	Thermodynamics	Thermodynamics
72.	1	Hybridisation of organic compounds	Organic Chemistry: Some Basic Principles and Techniques
73.	2	Significant figures	Some Basic Concepts of Chemistry
74.	1	Properties of group-17 elements	Some *p*-Block Elements Principles and Process
75.	3	Isomerism in coordination compounds	Coordination Compounds
76.	3	Proteins	Biomolecules
77.	1	Chemical reactions of amines	Amines
78.	4	Defects in solids	Solid state
79.	1	Inductive effect	Organic Chemistry Some Basic Principles and Techniques
80.	1	Chemical reactions of aldehydes	Aldehydes, Ketones and Carboxylic Acids
81.	4	Critical temperature	States of Matter: Gases and Liquids
82.	3	Properties of actinoides	*d* and *f*-Block Elements
83.	4	Physical properties of alkanes	Hydrocarbons
84.	3	Phenols	Alcohols, Phenols and Ethers
85.	4	Quantum numbers	Structure of Atom
86.	4	General Principles and Processes of Isolation of Elements	General Principles and Processes of Isolation of Elements
87.	4	Structure of Atom	Structure of Atom
88.	1	Rate of Chemical Reaction	Chemical Kinetics
89.	3	Synthesis of alkenes	Hydrocarbons

Q. No.	Answer Key	Topic name	Chapter name
90.	4	Synthesis of benzaldehyde	Aldehydes, Ketones and Carboxylic Acids
91.	1	Solid State	Solid State
92.	3	Metal carbonyls	Coordination Compounds
93.	3	Preparation of phenol	Alcohols, Phenols and Ethers
94.	1	Boyle's law	States of Matter : Gases and Liquids
95.	3	Environmental Chemistry	Environmental Chemistry
96.	2	Chemical reactions of functonal groups	Haloalkanes and Haloarenes & Aldehydes, ketones & carboxylic acids
97.	4	First transition series	*d* and *f*-Block Elements
98.	2	Equilibrium	Equilibrium
99.	2	Electrochemistry	Electrochemistry
100.	4	Reaction Intermediates	Organic Chemistry: Some Basic Principles and Techniques

NEET (UG)
Re-Examination
4th September 2022

ANSWERS WITH EXPLANATION

CHEMISTRY

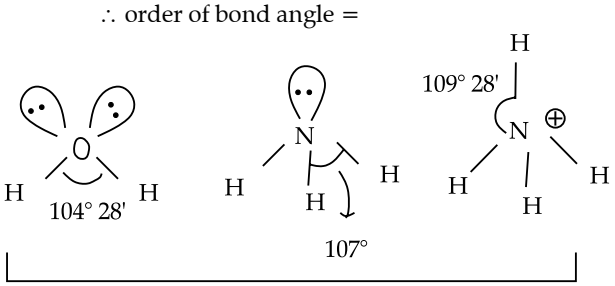
Section A

51. Option (1) is correct.

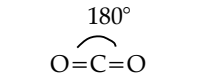
Explanation: According to VSEPR theory, bond angle decreases with increase in lone pair, for molecules of same hybridisation.

With increase in *s*-character, bond angle increase.

$\therefore$ order of bond angle =



sp^3 hybridisation



sp hybridisation

52. Option (1) is correct.

Explanation: K_H = Henry Law constant of gas in water, released to solubility as:

$$\text{Solubility of a gas} \propto \frac{1}{K_H \text{ Value}}$$

This means higher is the value of K_H, lower will be the solubility of gas in water.

$\therefore$ Solubility order of given gas in water

$= HCHO > CH_4 > CO_2 > Ar$

53. Option (2) is correct.

Explanation: This is the Ostwald process of preparing nitric acid on industrial scale.

$$4NH_3(g) + 5O_2(g) \xrightarrow[500\ K,\ a\ bar]{Pt/Rh\ gauze\ catalyst} 4NO(g) + 6H_2O$$

NO(g) combines with oxygen to give NO_2 (g).

$2NO(g) + O_2(g) \longrightarrow 2NO_2(g)$

Nitrogen dioxide formed, dissolves in water to give HNO_3

$3NO_2 + H_2O \longrightarrow 2HNO_3(aq) + NO(g)$

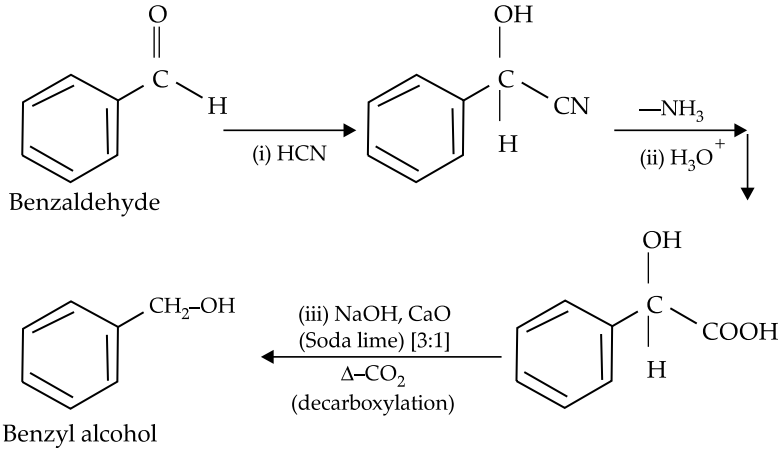
54. Option (3) is correct.

Explanation: Bleaching powder is prepared by passing Cl_2 gas through dry slaked lime.

$$2Ca(HO)_2 + 2Cl_2 \longrightarrow \underbrace{Ca(OCl)_2 + CaCl_2 + 2H_2O}_{\text{Bleaching Powder}}$$

55. Option (2) is correct.

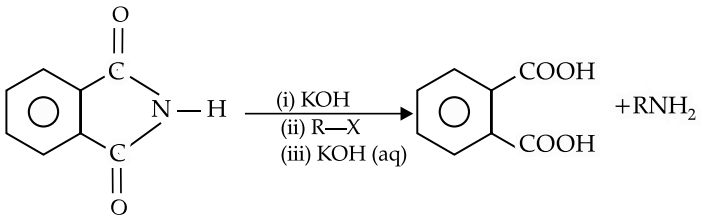
Explanation:



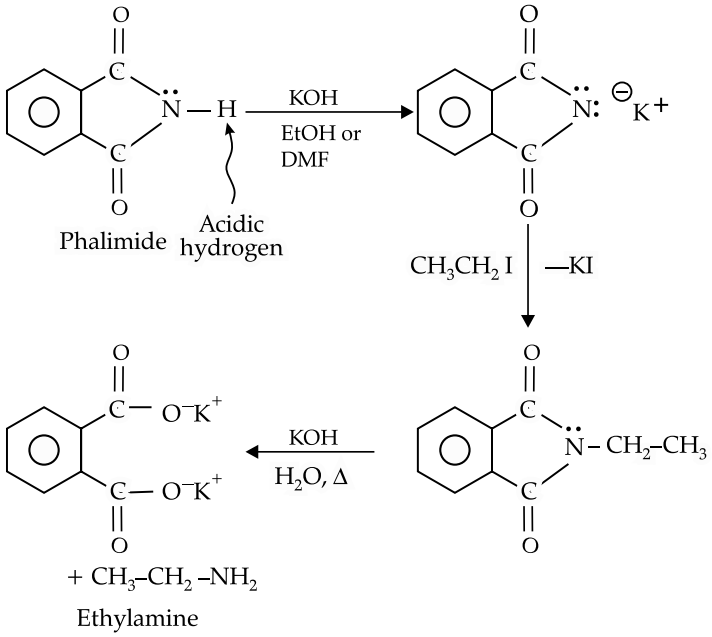
56. Option (4) is correct.

Explanation:

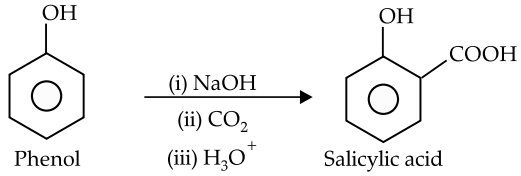
(a) Gabriel synthesis ⟶ (iii) Primary amines



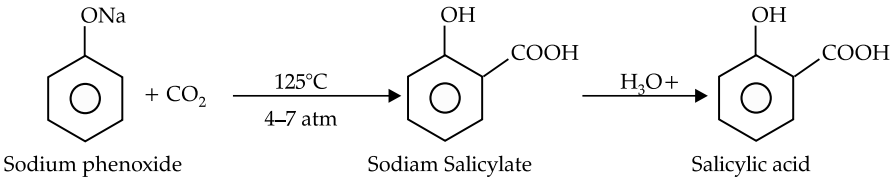
Pthalimide is alkylated with primary or unbranched secondary alkyl halides or sulphonate. The product thus obtained is hydrolysed to give primary amines.



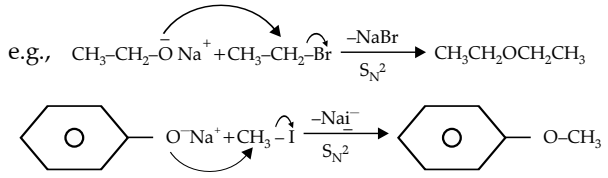
(b) Kolbe's synthesis ⟶ (iv) Salicylic acid.



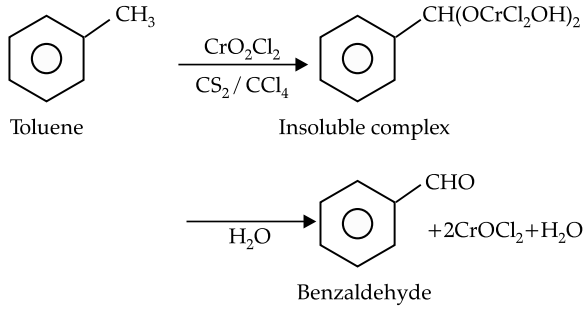
Heating of sodium phenoxide with CO_2 gas under pressure produces sodium salicylate as the major product, which on further acidification gives salicylic acid.



(c) Williamson synthesis ⟶ **(ii)** Ethers



(d) Etard Reaction ⟶ **(i)** Benzaldehyde



Treatment of toluene with chromyl chloride in an inert solvent like CS_2 or CCl_4 forms an insoluble complex $C_6H_5CH(OCrCl_2OH)_2$ which further on hydrolysis produces benzaldehyde.

57. Option (3) is correct.

Explanation:

Sodium lauryl sulphate : $\underbrace{CH_3(CH_2)_{11}SO_4^-Na^+}_{\text{anionic}}$

Cetyltrimethyl ammonium chloride :

$$\underbrace{CH_3(CH_2)_{15}N^+(CH_3)_3Cl^-}_{\text{cationic}}$$

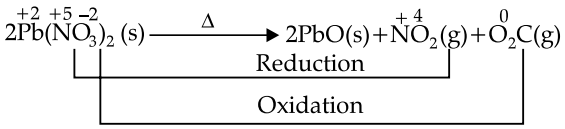
Sodium Stearate : $\underbrace{C_{17}H_{35}COO^-Na^+}_{\text{anionic}}$

(Component of bath soap or toilet soap)

Polyethyleneglycyl stearate – Non ionic reagent.

58. Option (1) is correct.

Explanation: Redox decomposition reaction is associated with breakdown of a large molecule into smaller molecule with change in oxidation state.



59. Option (1) is correct.

Explanation: The highest jump ion successive ionisation energy indicates a stable noble gas configuration.

$$X(g) \xrightarrow[+419\ kJ\ mol^{-1}]{IE_1} X^+(g) \xrightarrow[+3069\ kJ\ mol^{-1}]{IE_2} X^{2+}(g)$$

The highest jump is observed in the IE_1 & IE_2. It shows the attainment of stable noble gas configuration of X after losing one electron. Hence, X is an alkali metal.

The IE_1 of Y is $+590\ kJ\ mol^{-1}$ which is greater than IE_1 of X due to ns^2 configuration.

$\therefore$ X = Alkali metal and Y = Alkaline Earth metal

60. Option (3) is correct.

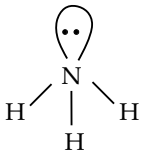
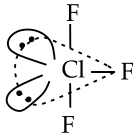
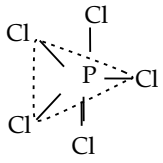
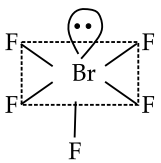
Explanation: The rate of reaction decreases with increase in stearu crowding around the substrate centre.

$\therefore$ Rate of $S_N^2 \propto \dfrac{1}{\text{Stearic crowding}}$

$\therefore$ Rate of reactivity order is : I > III > II > IV

61. Option (2) is correct.

Explanation:

NH_3	ClF_3	PCl_5	BrF_5
bp = 3, lp =1 Steric No. = 4 Hybrid -sp^3	bp = 3, lp =2 Steric No. = 5 Hybrid -sp^3d	bp = 5, lp =0 Steric No. = 5 Hybrid sp^3d	bp = 5, lp =1 Steric No. = 6 Hybrid sp^3d^2
			
Trigonal pyramidal	T-shaped	Trigonal Bipyramidal	Square Pyramidal

62. Option (2) is correct.

Explanation:

Thermoplastic polymer - Those plastics which can be remoulded again and again.

Thermosetting plastics - Those plastics which becomes hard on cooling and permanently sets into a solid.

(1) Bakelite - Thermosetting plastic polymer (A phenol - formaldehyde resin)

(2) Polythene - Thermoplastic polymer.

(3) Urea - formaldehyde resin - A thermosetting plastic polymer.

(4) Melamine polymer - Thermosetting plastic polymer.

63. Option (1) is correct.

Explanation: (a) Borax - $Na_2B_4O_7.10H_2O$ or $Na_2[B_4O_5(OH)_4].8H_2O$

(b) Kernite - $Na_2B_4O_7.4H_2O$

(c) Orthoboric acid - H_3BO_3

(d) Borax bead - $NaBO_2$

(obtained by heating of borax)

$$Na_2B_4O_7.10H_2O \xrightarrow[-10H_2O]{\Delta} Na_2B_4O_7 \xrightarrow{\Delta} 2NaBO_2 + B_2O_3$$

Sodium metaborate

64. Option (3) is correct.

Explanation: The cell reaction is written as :

$E^\circ_{Co^{2+}/Co^{3+}} = -1.81$ V (SOP)

$\therefore$ $E^\circ_{Co^{3+}/Co^{2+}} = +1.81$ V (SRP)

$E^\circ_{Al/Al^{3+}} = +1.66$ V (SOP)

$\therefore$ $E^\circ_{Al^{3+}/Al} = -1.66$ V (SRP)

Here E° is given in standard Reduction Potential

$E^\circ_{Co^{3+}/Co} > E^\circ_{Al^{3+}/al}$

$\therefore$ Co^{3+}/Co will undergo reduction acting as cathode and Al^{3+}/Al will undergo oxidation acting as anode.

$\therefore$ $E^\circ_{cell} = E^\circ_{cathode\ (Red.)} - E^\circ_{Anode\ (oxide)}$

$E^\circ_{cell} = 1.81 - (-1.66)$

$E^\circ_{cell} = +3.47$ V

65. Option (2) is correct.

Explanation: Oxy-hydrogen flame produces a very high temperature which is used for welding and melting of metals with high melting point.

66. Option (2) is correct.

Explanation: $Na_2B_4O_7.10H_2O \xrightarrow[-10H_2O]{\Delta} Na_2B_4O_7$

$$Na_2B_4O_7 \xrightarrow{\Delta} \underset{(X)}{2NaBO_2 + B_2O_3}$$

X = Boric anhydride

67. Option (3) is correct.

Explanation:

C	N	O	F
$2s^2 2p^2$	$2s^2 2p^3$	$2s^2 2p^4$	$2s^2 2p^5$
	(Half-filled)		

Across the period Z_{eff} increases but nitrogen has half-filled orbital which makes it more stable.

$\therefore$ Order of IE_1 = C < O < N < F

68. Option (3) is correct.

Explanation: $CH_3COOH \rightleftharpoons \underset{C\alpha}{CH_3COO^-} + \underset{C\alpha}{H^+}$

$C - \alpha$

Ionisation of CH_3COOH is 1% in aqueous solution.

So, $[H^+] = \frac{1}{100} \times$ concentration of CH_3COOH

$= \frac{1}{100} \times 10^{-2} = 10^{-4}$

$pH = -\log [H^+] = -\log (1 \times 10^{-4})$

$pH = 4$

69. Option (2) is correct.

Explanation: 'x' is mass of gas adsorbed on mass 'm' of the adsorbent at pressure 'p'. The curves in the given adsorption isotherm indicates that at a fixed pressure, there is decrease in physical adsorption with increase in temperature and vice versa.

So, the correct order of temperature is :

$$T_3 > T_2 > T_1$$

70. Option (2) is correct.

Explanation: Half life period ($t_{1/2}$) = 2000 years

$$k = \frac{0.693}{2000}$$

$$k = \frac{2.303}{t} \log \frac{[A]_o}{[A]_t}$$

$$\frac{0.693}{2000} = \frac{2.303}{8000} \log \frac{[A]_o}{0.02}$$

$\therefore$ $[A]_o = 0.32$ M

71. Option (4) is correct.

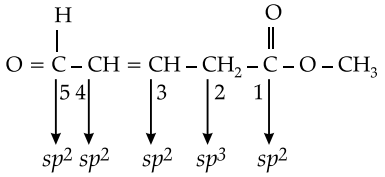
Explanation: In an isothermal expansion or compression process, the temperature of system remains constant throughout the process. Since, for an ideal gas, U depends only on temperature, it follows that

$$dU = 0$$

72. Option (1) is correct.

Explanation: Priority : $-\overset{\overset{O}{\|}}{C}-O-R > -\overset{\overset{O}{\|}}{C}-H$

$\therefore$ The priority of numbering goes to alkoxy carbonyl group.



73. Option (2) is correct.

Explanation: Density = $\frac{\text{Mass}}{\text{Volume}}$

Density = 2.15 g/mL, Volume of solution = 2.5 mL

$\therefore$ $2.15 = \frac{\text{Mass}}{2.5} \Rightarrow$ Mass = 5.375 g

The correct significant figure should have the same number of significant digits as the number with least number of significant digits.

$\therefore$ Mass = 5.4 g

74. Option (1) is correct.

Explanation: Even though fluorine has lower electron gain enthalpy than chlorine, it is a strong oxidising agent. The correct reason that can be attributed for this behaviour is:

(i) Small size of fluorine, makes it suitable for its high hydration enthalpy.

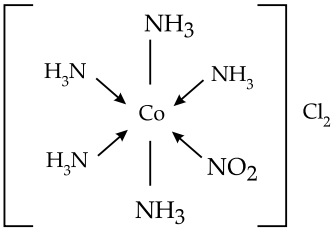
(ii) The bond dissociation enthalpy of fluorine is lower than chlorine due to high lone pair lone pair repulsion.

75. Option (3) is correct.

Explanation:

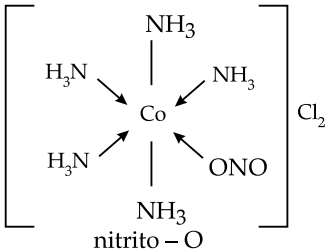
(a) $[Co(NH_3)_5NO_2]Cl_2$ and $[Co(NH_3)_5ONO]\ Cl_2$

– linkage Isomerism due to difference in binding site.



nitrito – N

and



nitrito – O

(b) $[Cr(NH_3)_6][Co(CN)_6]$ and $[Cr(CN)_6]\ [Co(NH_3)_6]$

– It is an example of coordination Isomerism due to exchange of ligands between the two coordination spheres.

(c) $[Co(NH_3)_5(SO_4)]Br$ and $[Co(NH_3)_5Br]SO_4$

– It is an example of Ionisation Iosmerism arising due to formation of different ions due to ionisation. The case arises due to exchange of ions between the coordination sphere and ionisation sphere.

(d) $[Cr(H_2O)_6]\ Cl_3$ and $[Cr(H_2O)_5Cl]\ Cl_2.H_2O$

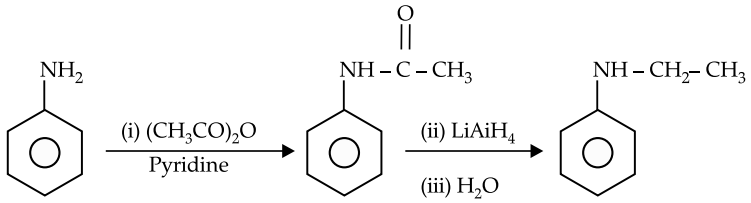
– It is an example of solvate isomerism arising due to difference in H_2O molecules acting as potential ligand and as water of crystallisation.

76. Option (3) is correct.

Explanation: Enzymes act at of optimum temperature and pH. Tertiary structure is responsible for biological activities of proteins. With increase in temperature weather H-bond breaks and denaturation occurs resulting in uncoiling of helical structure.

77. Option (1) is correct.

Explanation:



78. Option (4) is correct.

Explanation: (a) Frenkel Defect—formed in ionic compounds where an ion is missing from its lattice site and occupies interstitial site. Compounds suffering from such defects does not have any change in their density.

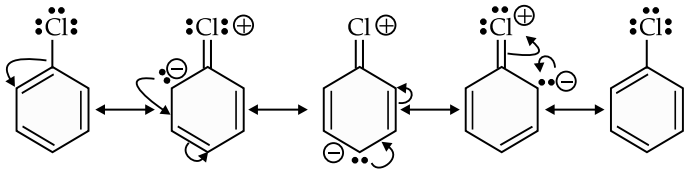
(b) Schottky defect—Observed in ionic compounds where equal number of ions are found missing from their lattice site. Such compounds have lower density.

(c) Vacancy defect—Observed in non-ionic solids where either an anion or cation is missing from their sites. Density of such solids are lower.

(d) Interstitial defects—Observed in non-ionic solids where an extra cation may get into interstitial site, increasing the density of solid.

79. Option (1) is correct.

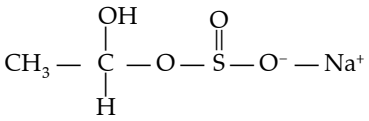
Explanation: Chlorine is *ortho* directing in electrophilic aromatic substitution instead of its electron withdrawing nature because inductive effect of chlorine destabilises the intermediate carbocation which is formed during the electrophilic substitution. But because of more strong resonance effect, the halogen stabilies the carbocation at *ortho*- and *para*- position.



80. Option (1) is correct.

Explanation: Nucleophilic addition – elimination reaction is associated with elimination of H_2O.

$CH_3CHO + NaHSO_3 \rightleftharpoons$



Here the above reaction is an addition reaction.

81. Option (4) is correct.

Explanation: Higher is the critical temperature, easier is the liquefaction of gas.

The order of liquefaction of gases will be:

$NH_3 > CO_2 > N_2 > He$

Hence, among the given gases NH_3 has the highest critical temperature. Therefore, it will be liquefied first.

82. Option (3) is correct.

Explanation: More is the number of poor shielders, greater will be Z_{eff} and hence, smaller is the size.

Actinoids consists of more no. of poor shielders ($3d$, $4d$, $5d$, $4f$). Therefore, size continuously decreases left to right.

83. Option (4) is correct.

Explanation: With increase in molecular mass, van Der Waal force increases and hence boiling point also increases.

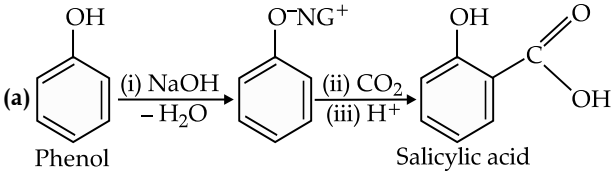
$\therefore$ BP : Heptane > Hexone > 2- Methyl butane

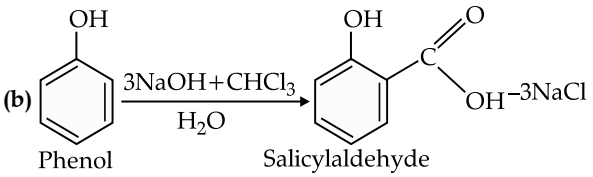
with the increase in branching, surface area decreases of molecules of same molecular mass which results in decrease in boiling point.

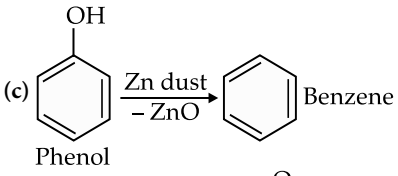
$\therefore$ BP : butane > α - methyl propane.

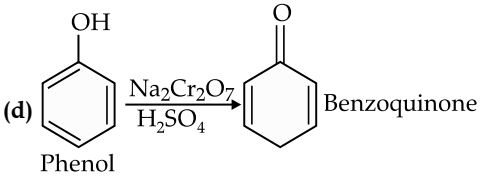
84. Option (3) is correct.

Explanation:









85. Option (4) is correct.

Explanation:

$n = 1$	$l = 0$ (s)	$n = 4$	$l = 0$ (s)	
$n = 2$	$l = 0$ (s)		1 (p)	
	1 (p)		2 (d)	
$n = 3$	$l = 0$ (s)		3 (f)	
	1 (p)			
	2 (d)			

Principle QN (n)	Azimuthal QN (l)	Possible values ($n-1$)	Subshell
$n = 1$	0		s
$n = 2$	0		s
	1		p
$n = 3$	0		s
	1		p
	2		d
$n = 4$	0		s
	1		p
	2		d
	3		f

So, for $n = 2, l = 1$, orbital is $2p$

for $n = 3, l = 2$, orbital is $3d$

for $n = 3, l = 0$, orbital is $3s$

for $n = 2, l = 0$, orbital is $2s$

86. Option (4) is correct.

Explanation: Calcination process involves heating of ore in absence of air below melting point. But here reaction taking place is a displacement reaction.

87. Option (4) is correct.

Explanation: Since, the striking photon has energy equal to $h\nu$ and the minimum energy required to eject the electron is $h\nu_0$ (work function W_0), the difference in energy ($h\nu - h\nu_0$) is transferred as the kinetic energy of the photoelectron.

$h\nu = h\nu_0 + KE$

$h\nu_0$ = minimum energy required to remove electron)

Energy of a 300 nm photon is given by

$$\Rightarrow E = \frac{hc}{\lambda}$$

$$= \frac{6.626\times10^{-34}\ \text{Js}\times3\times10^{8}\ \text{ms}^{-1}}{300\times10^{-9}\ \text{m}}$$

$= 6.626 \times 10^{-19}$ J

Energy of one mole of photons

$= 6.626 \times 10^{-19}\ \text{J} \times 6.022 \times 10^{23}\ \text{mol}^{-1}$

$= 3.99 \times 10^{5}\ \text{J mol}^{-1}$

The minimum energy needed to remove one mole of electrons $= (3.99 - 1.68) \times 10^{5}\ \text{J mol}^{-1}$

$= 2.31 \times 10^{5}\ \text{J mol}^{-1}$

88. Option (1) is correct.

Explanation: $4A + 3B \longrightarrow 6C + 9D$

$$\text{Rate of reaction} = -\frac{1}{4}\frac{d[A]}{dt} = -\frac{1}{3}\frac{d[B]}{dt}$$

$$= \frac{1}{6}\frac{d[C]}{dt} = \frac{1}{9}\frac{d[D]}{dt}$$

Rate of reaction = Rate of formation of C.

$$\therefore \quad r = \frac{1}{6}\frac{d[C]}{dt} = \frac{1}{6} \times 6 \times 10^{-2}$$

$$= 1 \times 10^{-2}\ \text{mol L}^{-1}\ \text{s}^{-1}$$

Also, rate of reaction = Rate of disappearance of B

$$r = -\frac{1}{3}\frac{d[B]}{dt} = \frac{d[B]}{dt} = 3 \times r$$

$$= 3 \times 10^{-2}\ \text{mol L}^{-1}\ \text{s}^{-1}$$

Consumption of B in 10 seconds $= 3 \times 10^{-2} \times 10$

$$= 30 \times 10^{-2}\ \text{mol L}^{-1}$$

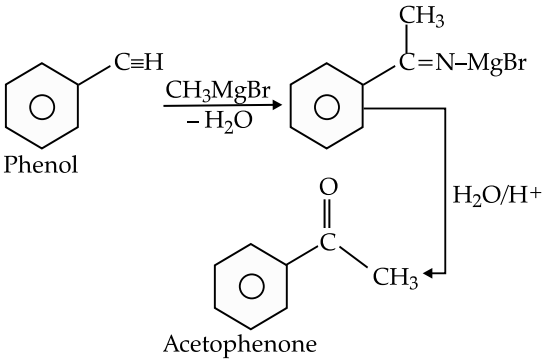
89. Option (3) is correct.

Explanation: Alkyl halide in aqueous KOH results in formation of alcohol.

$$R\text{—}X + KOH\ (aq) \longrightarrow \underset{\text{Alcohol}}{R\text{—}OH}$$

90. Option (4) is correct.

Explanation:



91. Option (1) is correct.

Explanation: Let's assume Fe in Fe^{2+} = x

Let's assume Fe in Fe^{3+} $(0.96 - x)$

Using the charge conservation formula for $Fe_{0.96}O_{1.00}$,

We get: $(x)(+2) + (0.96 - x)(+3) - 2 = 0$

$= 2x + 2.88 - 3x - 2 = 0$

$x = 0.88$

So, number of ions of $Fe^{3+} = 0.96 - x = 0.96 - 0.88$

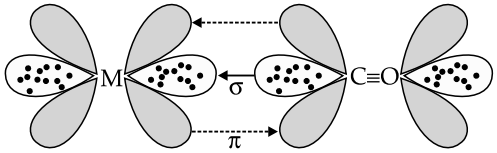
$= 0.08$

$$\text{Fraction of } Fe^{3+} \text{ ion} = \frac{0.08}{0.96}$$

$$= \frac{1}{12}$$

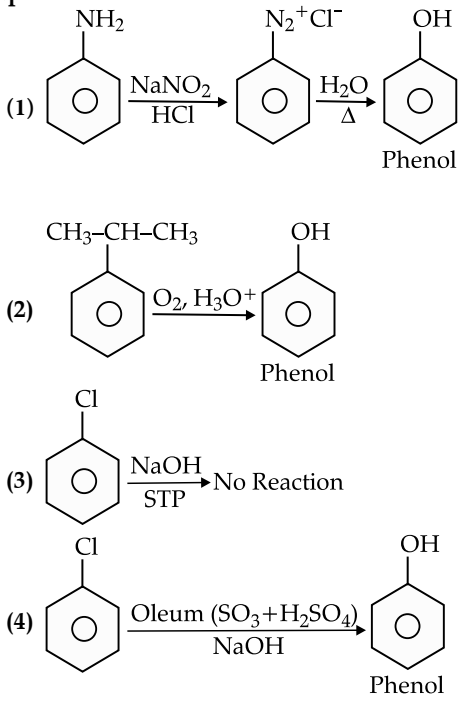
92. Option (3) is correct.

Explanation:



93. Option (3) is correct.

Explanation:



94. Option (1) is correct.

Explanation:

$$\text{No. of moles of } O_2 = \frac{\text{Given weight of } O_2}{\text{Mol. weight of } O_2}$$

$$= \frac{3.2}{32} = 0.1$$

Molar vol. at STP $= 0.1 \times 22.4 = 2.24$ L

$P_1 = 1$ atm, $V_1 = 2.24$ L, $P_2 = \frac{1}{3}$ atm, $V_2 = ?$

According to Boyle's law : $P_1V_1 = P_2V_2$

$$\therefore \quad 1 \times 2.24 = \frac{1}{3} \times V_2$$

$$V_2 = 2.24 \times 3$$

$$= 6.72 \text{ L}$$

95. Option (3) is correct.

Explanation:

(a) Biological oxygen demand (BOD) – Organic matter in water

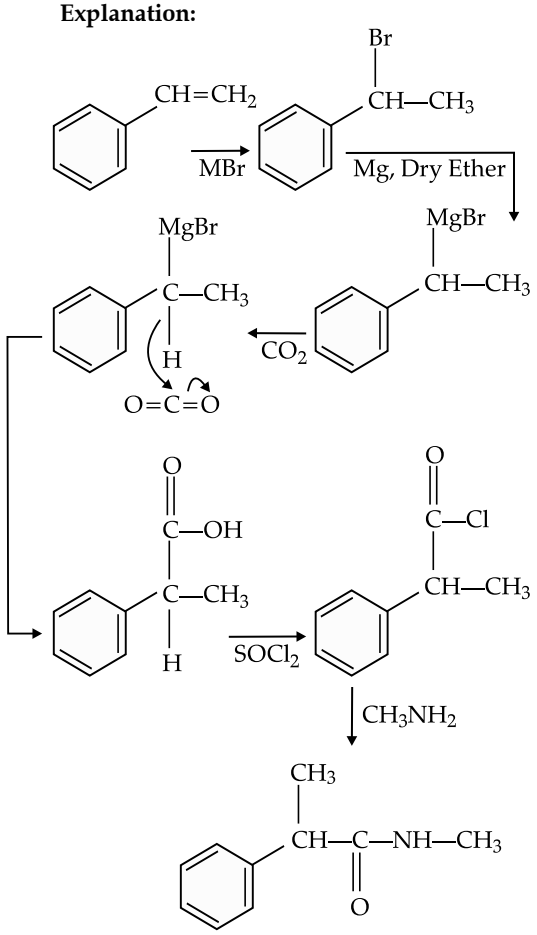
(b) Photochemical smog – Oxidising in nature (occurs in warm, dry and sunny climate)

(c) Classical smog – Reducing in nature (occurs in cool and humid climate)

(d) Ozone layer depletion – Polar stratospheric cloud

96. Option (2) is correct.

Explanation:

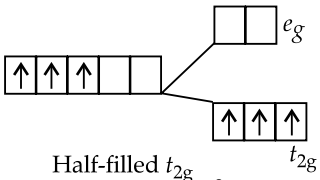


97. Option (4) is correct.

Explanation:

$$Cr^{2+} \xrightarrow{-e^-} Cr^{3+}$$

[Ar] $3d^4$ → [Ar] $3d^3$



Half-filled t_{2g} Orbital makes Cr^{3+} more stable

Therefore, Cr^{2+} acts as a reducing agent.

$$Mn^{3+} \xrightarrow{+e^-} Mn^{2+}$$

[Ar] $3d^4$ → [Ar] $3d^5$

Half filled *d*-orbital (more stable)

Therefore, Mn^{3+} acts as an oxidising agent.

Sc^{3+}— [Ar] All elements are paired making it diamagnetic. Hence Sc^{3+} compounds are repelled when placed in an external magnetic field.

98. Option (2) is correct.

Explanation: $CO_2(g) + C(s) \rightleftharpoons 2CO(g)$

$K_p = K_c.(RT)^{\Delta n}g$

$K_p = 3.0$. $R = 0.083$ L bar K^{-1} mol^{-1}

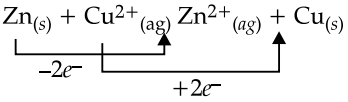
$$\Delta n_g = 2 - 1 = 1$$

$$\therefore \quad 3.0 = K_c\,(0.083 \times 1000)^1$$

$$K_c = \frac{3}{83} = 3.6 \times 10^{-2}$$

99. Option (2) is correct.

Explanation:



$E^\circ_{Cell} = 1.1$ V, $n = 2$, $f = 96487$ C mol^{-1}

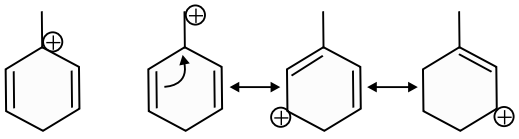
$\Delta G^\circ = -n\,FE^\circ_{Cell}$

$= -2 \times 96487 \times 1.1$ J

$= -212.27$ kJ

100. Option (4) is correct.

Explanation:



– No. of α-H = 3

– 3° carbocation

– Resonanse stabilised

❑❑