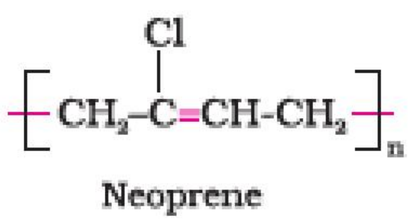
CBSE Class 12 Chemistry Compartment Answer Key 2020 (September 24, Set 2 - 56/C/2)

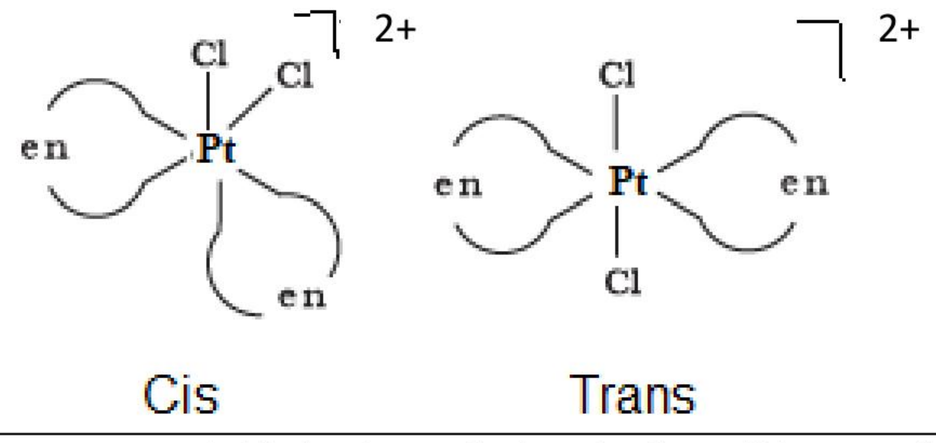
Marking scheme – 2020

CHEMISTRY (043) / CLASS XII

56/C/2

Q.No	Expected Answer / Value Points	Marks
	SECTION A	
1	PHBV / Nylon-2-nylon-6 / any natural polymer (or any other suitable example).	1
2	Starch/ cellulose/ proteins / nucleic acids / natural rubber (or any other suitable example).	1
3	Teflon / PTFE	1
4	 Neoprene	1
5	Homoplolymer	1
6	Kraft Temperature	1
7	Molar conductivity decreases.	1
8	Nucleoside	1
9	Smoke/dust (or any other suitable example)	1
10	Alitame	1
11	(D)	1
12	(A)	1
13	(D)	1
14	(C) or (D)	1
15	(C)	1
16	(iv)	1
17	(iii)	1
18	(i)	1

*These answers are meant to be used by evaluators

19	(i)	1
20	(iii)	1
	SECTION B	
21		1+ 1
22.	(a) Zone refining- Impurities are more soluble in the melt than in the solid state of the metal. (b) Electrolytic refining - The more basic metal remains in the solution and the less basic ones go to the anode mud. / Anode is impure metal and pure metal strip is cathode while aqueous solution of the metal salt acts as the electrolyte. / Distillation- Impure metals with low boiling point can be easily heated and condensed back as distillate leaving the impurities behind.	1 1
23	$_{Ti}^{3+}$ = 1 unpaired electron. Cr^{3+} = 3 unpaired electrons Cr^{3+} is more stable due to half-filled t_{2g}^3 configuration	½ ½ ½+½
24.	a) At Anode: $2H_2O_{(l)} \longrightarrow 4H^+_{(aq)} + 4e^- + O_2$ At Cathode: $Cu^{2+}_{(aq)} + 2e^- \longrightarrow Cu_{(s)}$. / Copper is deposited at cathode and Oxygen gas is liberated at anode. b) At Anode: $2H_2O_{(l)} \longrightarrow 4H^+_{(aq)} + 4e^- + O_2$ At Cathode: $Ag^+_{(aq)} + e^- \longrightarrow Ag_{(s)}$. / Silver is deposited at cathode and oxygen gas is liberated at anode. **OR** $Fe^{3+} + e^- \longrightarrow Fe^{2+}$, so 1 mol of Fe^{3+} requires 1 F 3 moles of Fe^{3+} require 3 F Q = I x t t = 3 x 96500 / 2 t = 144750 sec	½ +½ ½ +½ ½ ½ ½ ½
25.	Antiseptics the chemicals which either kill or prevent the growth of microorganisms but are applied to the living tissues such as wounds, cuts, ulcers and diseased skin surfaces. Examples are furacine, soframicine, etc. Disinfectants are also the chemicals which either kill or prevent the growth of microorganisms but applied to inanimate objects such as floors, drainage system, instruments, etc. e.g. Concentrated acids, Phenol (above 1% conc.) **(OR any other suitable point of difference and example)**	1 1
26.	It is the rate of reaction when concentration of each reactant is taken as unity. / It is the proportionality constant in the rate law expression or in differential rate equation or in the rate of reaction. $K = 0.693 / t_{1/2}$	1 1
27.	Vitamins are certain organic compounds, required in small amounts in our diet but their deficiency causes specific diseases / organic compounds required in the diet in small amounts to perform specific biological functions for normal maintenance of optimum growth and health of the organism. Vitamins are classified into two groups depending upon their solubility in water or fat. (i) Fat soluble vitamins (ii) Water soluble vitamins. **OR** Proteins are polymers of α-amino acids. **(or any other suitable definition)** They are classified as Fibrous and Globular proteins on the basis of their shape.	1 ½+½ 1 ½+½
	SECTION C	

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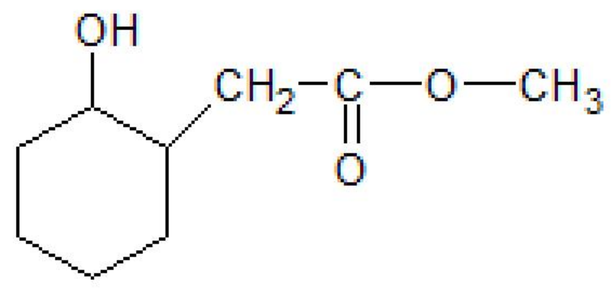
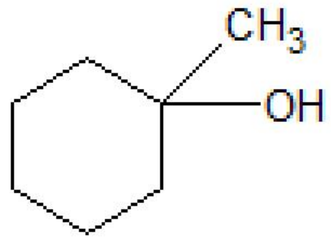
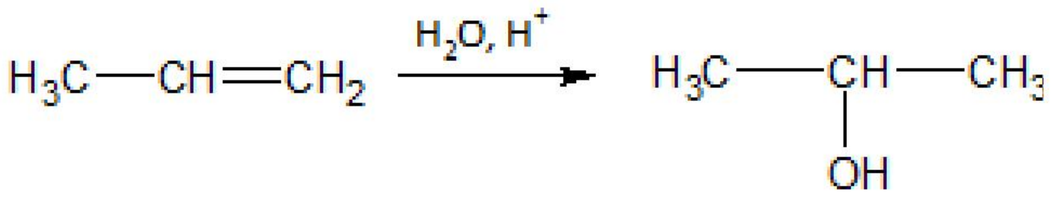
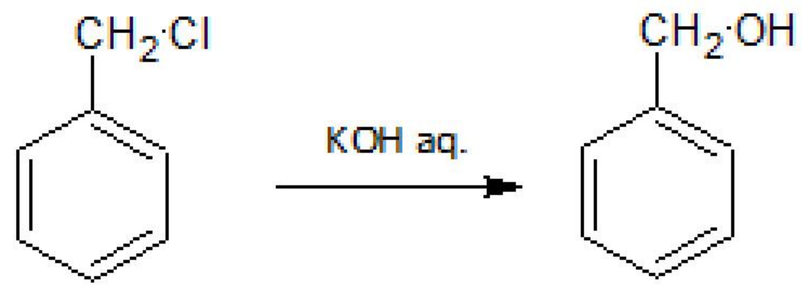
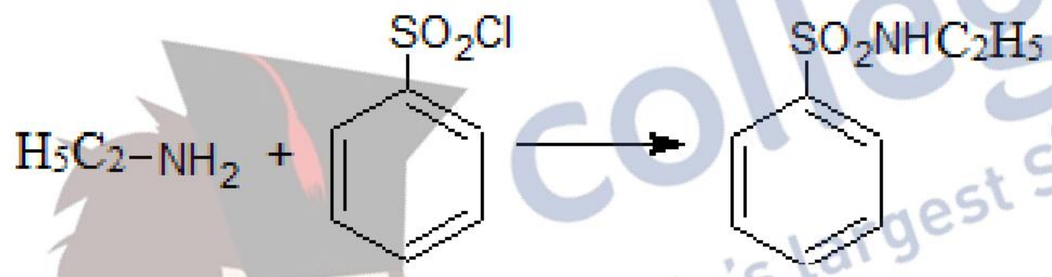
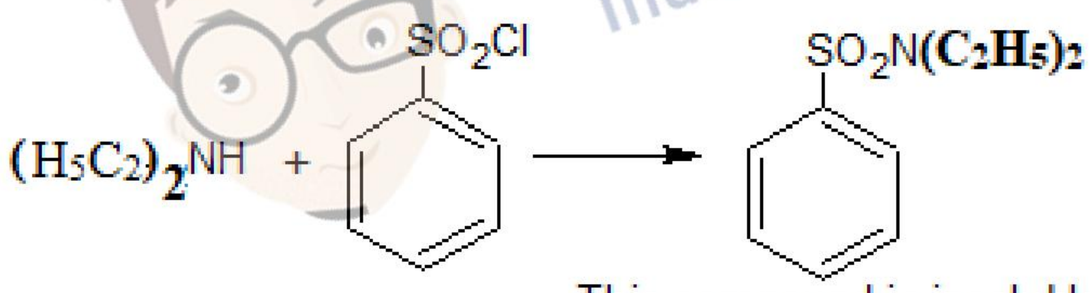
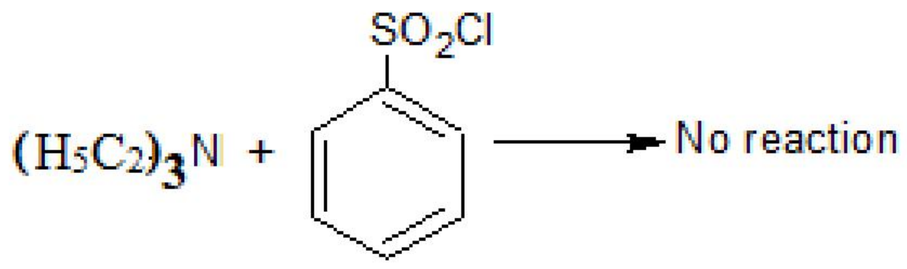
28	a)  b) CH_3CH_2OH c)  **OR** a) i)  ii)  b) 4-Methylphenol < phenol < 4-Nitrophenol / 4-Methylphenol , phenol , 4-Nitrophenol	1 x3 1 1 1
29	Hinsberg Test: Ethyl amine or 1° amine reacts with Hinsberg's reagent or Benzene Sulphonyl Chloride to give a product which is soluble in alkali, Diethyl amine or 2° amine reacts with Hinsberg's reagent or Benzene Sulphonyl Chloride to give a product which is insoluble in alkali while Triethylamine or 3° amine doesn't react with Hinsberg's reagent or Benzene Sulphonyl Chloride.  **This compound is soluble in alkali**  This compound is insoluble in alkali  (**Or any other suitable chemical test to identify different degree methyl amines**)	½ ½ ½ ½ ½
30	$\Lambda_m = \frac{k}{c} \times 1000$ $= \frac{8 \times 10^{-5}}{0.002} \times 1000$ $= 40\ Scm^2mol^{-1}$ $\alpha = \frac{\Lambda_m^c}{\Lambda_m^o}$ $= 40/390.5 = 0.102$	½ 1 ½ 1

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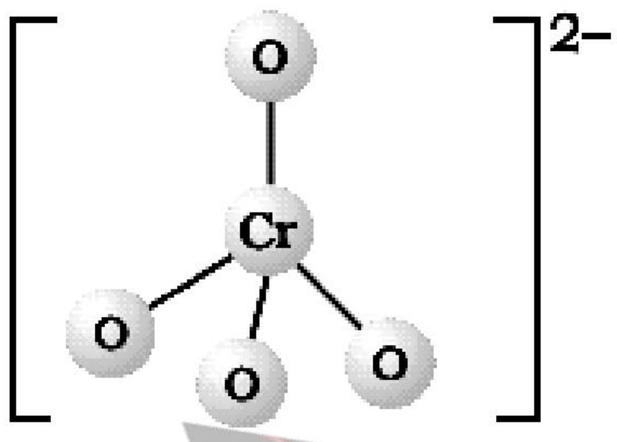
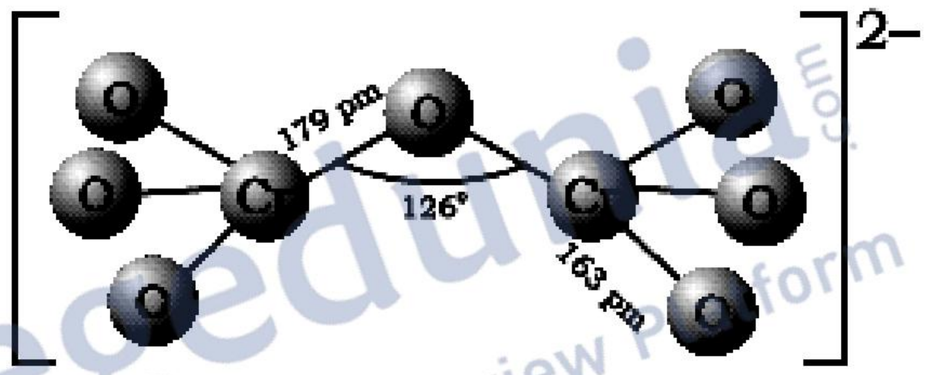
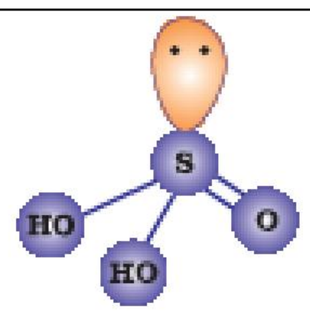
31	$K = \frac{2.303}{t} log \frac{[Ro]}{[R]}$ $4.9 \times 10^{-3} = \frac{2.303}{t} log \frac{4}{3}$ $t = \frac{2.303}{4.9\ x\ 10^{-3}} \log (0.6020 - 0.4771)$ = 58.7 sec **OR** d) Molecularity =2 or bimolecular. e) Order =1 or pseudo first order. f) Rate = $\frac{-\Delta[C_{12}H_{22}O_{11}]}{\Delta t} = + \frac{\Delta[C_6H_{12}O_6]}{\Delta t} = + \frac{\Delta[C_6H_{12}O_6]}{\Delta t}$	½ 1 1 ½ 1 1 1
32	d) Electro-osmosis. e) Coagulation / precipitation / mutual coagulation / hardening of leather. f) Coagulation /precipitation / artificial rain	1 1 1
33	In basic medium or at high pH, $Cr_2O_7^{2-}$ (dichromate ion) changes to CrO_4^{2-} (chromate ion) / orange coloured solution changes to yellow coloured solution / Reaction: $Cr_2O_7^{2-} + 2\ OH^- \rightarrow 2\ CrO_4^{2-} + H_2O$  **Chromate ion (Yellow Colour)**  **Dichromate ion (Orange colour)** (½ marks each to be awarded for the colour and structure of each ion).	1 ½ x 2 ½ x 2
34	d) Grignard's reagent gets hydrolysed easily / It reacts with moisture readily / It is highly reactive with any source of proton/ it forms hydrocarbons or alkanes / $RMgX + H_2O \rightarrow RH + Mg(OH)X$. e) Due to resonance, C-Cl get partial double bond character/ sp^2-hybrid C-atom in chlorobenzene has greater s-character or is more electronegative / Instability of phenyl **cation /** Due to repulsion, it is less likely for the electron rich nucleophile to approach electron rich arenes. f) **Symmetrical structure can easily fit into the lattice**. So, due to higher packing efficiency large energy is required to melt. **(or any other correct reason)**	1 1 1
	SECTION D	
35	 **Sulphurous acid (H_2SO_3)** c) i) There are two -O-H bonds or groups / ii) Due to lower bond dissociation enthalpy of Te-H than H-O/ due to large size of Te / longer bond length of Te-H than H-O. iii) Due to highest electronegativity / due to absence of vacant d-orbitals / It can show only one oxidation state / it can't show higher positive oxidation state. d) i) $2XeF_6 + 2H_2O \longrightarrow XeO_2F_2 + 4HF$ (ignore balancing) ii) $I_2 + 3Cl_2 \longrightarrow 2ICl_3$ (ignore balancing)	1 1 1 1 1

*These answers are meant to be used by evaluators

OR

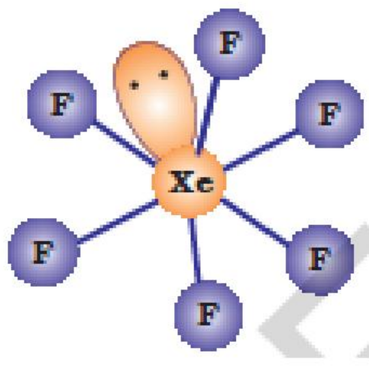
35

c) i) $I_2 < F_2 < Br_2 < Cl_2$ — 1

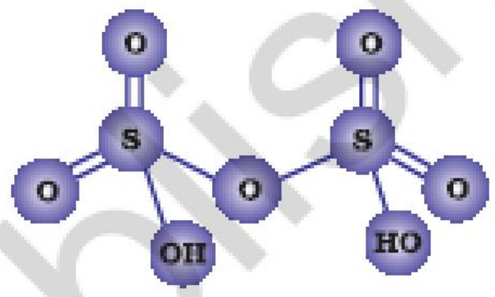
iv) $HF < HCl < HBr < HI$ — 1

v) $H_2O > H_2S > H_2Se > H_2Te$ — 1

d) i)



ii)



1+1

36

c) Henry's law : The law states that at a constant temperature, **the solubility (mole fraction) of a gas in a liquid is directly proportional to the partial pressure of the gas present above the surface of liquid or solution.** — 1

Applications: To avoid bends, in the condition of anoxia and to fill CO_2 in cold drink bottles (any of the two applications) — ½+½

d) $\frac{Po-P}{Po} = X_2$ — 1

$\frac{Po-P}{Po} = \frac{n2}{n1+n2} \approx \frac{n2}{n1}$

$\frac{760-745}{760} = \frac{w2}{M2} x \frac{M1}{w1}$ = $\frac{15}{760} = \frac{5}{M2} x \frac{18}{95}$ — 1

$M_2 = \frac{760\ x\ 5\ x18}{95\ x\ 15} = 48 g mol^{-1}$ or u — 1

OR

36

a)

Ideal Solution	**Non-Ideal solution**
It obeys Raoult's law over the entire range of concentration.	It doesn't obey Raoult's law over the entire range of concentration.
$\Delta V_{mixing} = 0$ and $\Delta H_{mixing} = 0$	$\Delta V_{mixing} \neq 0$ and $\Delta H_{mixing} \neq 0$.

½ x 4

(Any other two points of difference between the two).

b) $\Delta T_f = iK_f m$, — ½

for NaCl, i=2, — ½

$2 = 2x\ K_f \frac{Wb\ x\ 1000}{Mb\ x\ Wa}$ — ½

$1 = 1.86\ x\ \frac{w\ x\ 1000}{58.5\ x\ 100}$ — ½

w = 3.147 g **(1/2 mark to be deducted for incorrect or no units)** — 1

(or by any other correct method)

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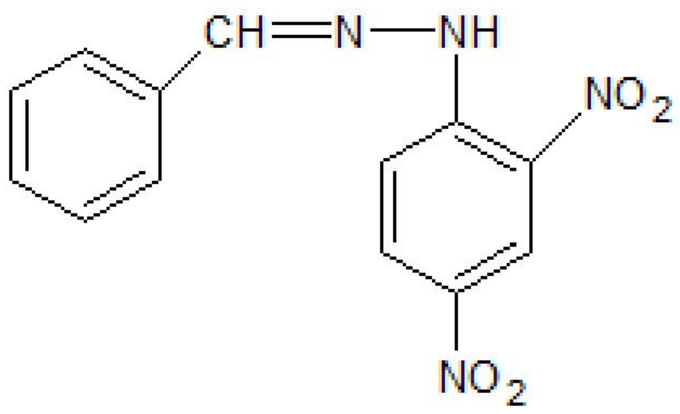
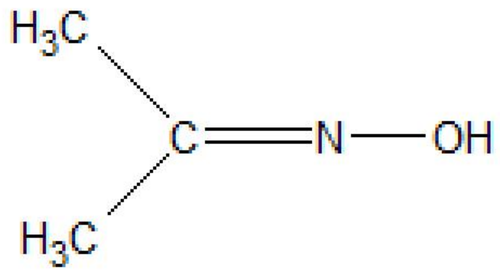
37

a) i)

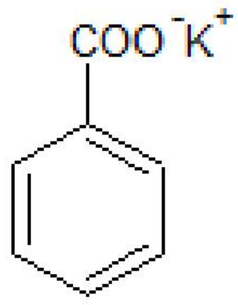


ii)

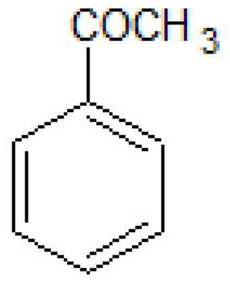


1+1

b) i)



ii)



1+1

c) Carboxylate ion is more stablised than phenoxide ion / conjugate base of carboxylic acid is more stable than that of phenol / carboxylate ion has two equivalent resonating structures while the structures are non equivalent in phenoxide ion/ negative charge in carboxylate ion is delocalised over more electronegative two Oxygen atoms while in phenoxide ion negative charge is delocalised over one Oxygen atom and less electronegative Phenyl ring (or C atoms). /Carboxylic acid reacts with $NaHCO_3$ to give brisk effervescence of CO_2 while phenol doesn't or reaction given by the student.

1

OR

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a) $CH_3COOCH_2CH_3 \xrightarrow{H_2SO_{4\ dil}} CH_3COOH + CH_3CH_2OH$

A B C

$CH_3CH_2OH \xrightarrow{oxidation} CH_3COOH$

$CH_3CH_2OH \xrightarrow{dehydration} CH_2{=}CH_2$

½ x 3

A = Ethyl acetate ($CH_3COOCH_2CH_3$) , B = Acetic or Ethanoic acid (CH_3COOH), C = Ethanol (CH_3CH_2OH)

1

b) i) $CH_3CHO \xrightarrow{LiAlH_{4,\ dry\ ether}} CH_3CH_2OH$

1

ii) $CH_3CHO \xrightarrow{Zn/Hg\ in\ HCl} CH_3CH_3$

Or NH_2NH_2

(or any other suitable reagent for the above reactions or any other correct method for conversion)

*These answers are meant to be used by evaluators