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Senior School Certificate Examination
2018
Marking Scheme ------- Chemistry

General Instructions

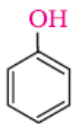
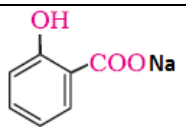
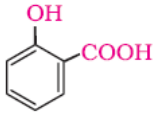
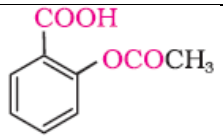
1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. The answers given in the Marking Scheme are Suggested answers. The content is thus indicative. If a student has given any other answer which is different from the one given in the Marking Scheme, but conveys the same meaning, such answers should be given full weight-age.
2. The Marking Scheme carries only suggested value point for the answers. These are only guidelines and do not constitute the complete answers. The students can have their own expression and if the expression is correct the marks will be awarded accordingly.
3. The Head-Examiners have to go through the first five answer-scripts evaluated by each evaluator to ensure that the evaluation has been carried out as per the instruction given in the marking scheme. The remaining answer scripts meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
4. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration – Marking Scheme should be strictly adhered to and religiously followed.
5. If a question has parts, please award marks in the right hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left hand margin and circled.
6. If a question does not have any parts, marks be awarded in the left-hand margin.
7. If a candidate has attempted an extra question, marks obtained in the question attempted first should be retained and the other answer should be scored out.
8. No Marks to be deducted for the cumulative effect of an error. It should be penalized only once.
9. A full scale of marks 0-70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
10. Separate marking schemes for all the three sets have been provided.
11. As per orders of the Hon'ble Supreme Court. The candidate would now be permitted to obtain photocopy of the Answer Book on request on payment of the prescribed fee. All examiner/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.
12. The Examiners should acquaint themselves with the guidelines given in the Guidelines for sport Evaluation before starting the actual evaluation.
13. Every Examiner should stay upto sufficiently reasonable time normally 5-6 hours every day and evaluate 20-25 answer books and should minimum 15-20 minutes to evaluate each answer book.
14. Every Examiner should acquaint himself/herself with the marking schemes of all the sets.

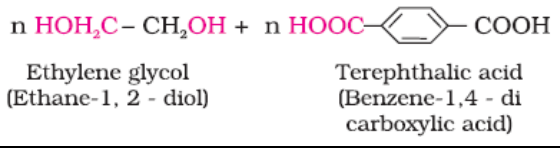
Marking Scheme – 2017-18

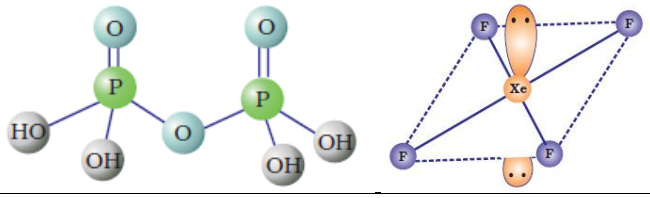
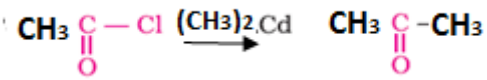
CHEMISTRY (043)/ CLASS XII

56(B)

Q.No	Value Points	Marks
1	Molecular solid : I_2 Ionic solid : NaCl (or any other suitable example)	½ ½
2	Dispersed phase- solid ; Dispersion medium- gas	½ , ½
3	$[Pd(NH_3)_4]Cl_2$	1
4	Due to stability of benzyl carbocation / Resonance	1
5	A= C_6H_5COOH ; B= C_6H_5COCl	½ , ½
6	a) Saline water contains many electrolytes which help in the flow of electric current. b) Ions are not involved in the overall cell reaction in the mercury cell.	1 1
	OR	
6	Cells that convert the energy of combustion of fuels (like hydrogen, methane, methanol, etc.) directly into electrical energy are called fuel cells. Cathode: $O_2(g) + 2H_2O(l) + 4e^- \longrightarrow 4OH^-(aq)$ Anode: $2H_2(g) + 4OH^-(aq) \longrightarrow 4H_2O(l) + 4e^-$	1 ½ ½
7	a) Order : 1/3 b) Rate of the reaction increases	1 1
8	a) H_3PO_2 , H_3PO_3 , H_3PO_4 , $H_4P_2O_7$ (Any two) b) Square pyramidal	½ , ½ 1
9	a) Because of higher oxidation state of Mn in Mn_2O_7. b) Because 5f electrons in actinoids have poor shielding effect than 4f electrons in lanthanoids.	1 1
10.	a) $C_6H_5OH \xrightarrow{\text{Zn dust, Heat}} C_6H_6 + H_3C{-}\overset{\overset{O}{\|}}{C}{-}Cl \xrightarrow{\text{Anhyd. } AlCl_3} C_6H_5COCH_3$ b) $CH_3CHO \xrightarrow{\text{(i)}CH_3MgBr,\ \text{Dry ether (ii)}H_2O/H^+} CH_3CH(OH)CH_3$	1 1
11	Length of edge(a) = 200 pm = 200 × 10^{-10} cm = 2× 10^{-8} cm Volume of unit cell = a^3 = (2× 10^{-8} cm)^3 = 8× 10^{-24} cm^3 Mass of unit cell= No. of atoms in unit cell × Mass of each atom Mass of an atom = $\frac{200\ g}{24 \times 10^{23}}$ Mass of unit cell = $\frac{200\ g}{24 \times 10^{23}}$ × 4 = 33.3 × 10^{-23} g Density of unit cell = Mass/ Volume = $\frac{33.3 \times 10^{-23}\ g}{8 \times 10^{-24}\ cm^3}$ = 41.6 g/cm^3	1 1 1
12	$E_{cell} = (E^o_c - E^o_a) - \frac{0.059}{2} \log \frac{[Mg^{2+}]}{[Ag^+]^2}$ $E_{cell} = [0.80 - (-2.37)] - \frac{0.059}{2} \log \frac{10^{-2}}{(10^{-4})^2}$ Ecell = 3.17 – 0.0295 log 10^6 = 2.993 V ΔG= - n F Ecell = -2 × 96500 × 2.993 = - 577649 J/mol = - 577.649 kJ/mol	½ ½ ½ 1 ½
	OR	

12	Λ^c_m =κ x 1000/M = 4.95 x 10^{-5} x 1000/ 0.001 = 49.5 S cm^2/mol $CH_3COOH \rightarrow CH_3COO^- + H^+$ $\Lambda^0 CH_3COOH = \lambda^0 CH_3COO^- + \lambda^0 H^+$ = 40.9 +349.6 $\Lambda^0 CH_3COOH$ = 390.5 S cm^2/mol $\alpha = \frac{\Lambda_m}{\Lambda^0_m}$ = 49.5/ 390.5 = 0.127	1 1 1
13	$k = \frac{2.303}{t} \log \frac{[A]o}{[A]}$ $k = \frac{2.303}{10\ min} \log \frac{100}{75} = \frac{2.303}{10\ min} \log \frac{4}{3}$ $= \frac{2.303}{10\ min}$ [log4- log 3] $= \frac{2.303}{10\ min}$ [0.6021- 0.4771] = 0.029 min^{-1} $t_{1/2} = \frac{0.693}{k} = \frac{0.693}{0.029}$ ≈ 24 min	½ 1 ½ 1
14	a) The zig zag motion of colloidal particles due to unbalanced bombardment by the particles of dispersion medium. b) On dissolution a large number of atoms or smaller molecules of a substance aggregate together to form species having size in colloidal range. c) When reactants and catalyst occur in the same phase.	1 1 1
15	a) Zinc is more reactive than copper, therefore zinc displaces silver from its solution easily. b) The melting point of alumina is very high. It is dissolved in cryolite which lowers the melting point . c) Reduction of ZnO by carbon is spontaneous whereas reduction of Cr_2O_3 is non-spontaneous.	1 1 1
16	a) Oxygen and fluorine have small size and high electronegativity . Hence, they can oxidise the metal to highest oxidation states. b) Due to d-d transition / Due to presence of unpaired electrons in d-orbitals. c) Because small size atoms (like B, C, H, N) occupy interstitial sites in the lattice of transition elements.	1 1 1
17	a) This is due to the difference in the hybridisation state of Ni. In $[Ni(CO)_4]$, it is sp^3 hybridised while in $[Ni(CN)_4]^{2-}$, its is dsp^2 hybridised. b) Potassium tetracyanidonickelate(II) c) d^2sp^3, Octahedral	1 1 ½ , ½
18	a) 1,3-Dichloro-2-nitrobenzene b) CH_3-CH_2-CH=CH-CH_3 , CH_3-CH_2-CH_2-CH=CH_2 Pent-2-ene , Pent-1-ene (names or structures) c) $(CH_3)_2CH-Cl < CH_3CH_2Cl < CH_3Cl$	1 ½ + ½ 1
19.	A=  , B=  , C=  , D= 	1, ½ , ½,1
20.	a) Methylamine is a base and dissolves in water to produce OH^- ions which react with $FeCl_3$ forming $Fe(OH)_3$ (Reddish brown ppt)	1

	b) In ethylamine, ethyl group is electron donating group (+I effect), thereby increasing electron density on nitrogen atom and hence a stronger base than NH_3 where there is no +I effect. c) Because it is branched and has less surface area.	1 1
21	a) CH_2=CH-CH=CH_2 and $C_6H_5CH=CH_2$ b) Thermoplastic polymer c)  Ethylene glycol (Ethane-1, 2 - diol) Terephthalic acid (Benzene-1,4 - di carboxylic acid) (Name or structures)	½ , ½ 1 ½ , ½
22	a) Because of the biodegradable nature, they donot pollute the environment. b) Antiseptics do not harm the living tissues so can be applied to the skin whereas disinfectants are toxic to the living tissues. c) Because they contain preservatives like salts/sugar/vegetable oil.	1 1 1
23	a) Concern for health, General awareness (or any other two values) b) Vitamin B_{12} c) Vitamin C / B(except B_{12}) d) Meat, egg, (or any other two sources)	1 1 1 ½ , ½
24	a) $\frac{p_1^0 - p_1}{p_1^0} = \frac{w_2 \times M_1}{M_2 \times w_1}$ $\frac{23.75-23.375}{23.75} = \frac{5 \times 18}{M2 \times 95}$ M_2 = 60 g/mol (Deduct half mark if unit is wrong or not written) b) (i)The value of osmotic pressure at a given temperature is directly proportional to the number of moles of the solute. (ii)Molality of a solution does not change with temperature as it involves mass.	1 1 1 1 1
	OR	
24	a) $\Delta T_f = i K_f w_2 x 1000 / M_2 X w_1$ i=3 $2 = 3 \times 1.86 \times \frac{w2 \times 100}{111 \times 500}$ $w_2 = \frac{2 \times 111 \times 500}{3 \times 1.86 \times 1000}$ = 19.89 g b)(i) Due to osmosis, water enters into the cell due to which the blood cells swell and even burst. (ii)On mixing, chloroform and acetone molecules develop hydrogen bonding resulting in release of energy, so the temperature rises.	½ ½ 1 1 1 1
25	a) On standing, Cl_2 reacts with water to form colourless products HCl and HOCl. b) Due to small size of fluorine, large interelectronic repulsions/ electron-electron repulsions among the lone pairs of fluorine. c)Because of lowest dissociation enthalpy of Bi-H bond. d) Due to weak dispersion forces. e) Ozone oxidises iodide ions to iodine (violet vapours)	1 1 1 1 1
	OR	

25	a) (i) $2XeF_2\ (s) + 2H_2O(l) \rightarrow 2Xe\ (g) + 4\ HF(aq) + O_2(g)$ ii) $XeF_6 + NaF \rightarrow Na^+ [XeF_7]^-$ iii) $XeF_4 + SbF_5 \rightarrow [XeF_3]^+ [SbF_6]^-$ b) i) ii)  	1 1 1 1,1
26	a) i)$C_6H_5COOH \xrightarrow{NaOH} C_6H_5COONa \xrightarrow{Sodalime,\ Heat} C_6H_6$ ii)  iii) $C_6H_5COCH_3 \xrightarrow{Zn\text{-}Hg,\ Conc\ HCl} C_6H_5CH_2CH_3$ (or any other suitable method) b) i) Add Schiff reagent to both the compounds, benzaldehyde gives pink colour while acetophenone does not. ii) Add NaOH and I_2 both the compounds and heat, ethanal gives yellow ppt of iodoform while propanal does not. (or any other suitable chemical test)	1 1 1 1 1
	OR	
26	a) i)Chloroacetate ion is more stable than acetate ion due to electron withdrawing chlorine atoms (-I effect). ii) It is due to the less electron releasing effect of alkyl group in the aldehydes. The presence of two alkyl groups in ketones decreases the magnitude of positive charge on carbonyl carbon atom. iii) Due to the absence of α-hydrogen atom. b) i) A : CH_3CHO , B: CH_3-CH=N-OH ii) A: CH_3COOH , B : CH_3COCl	1 1 1 ½ ×4