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

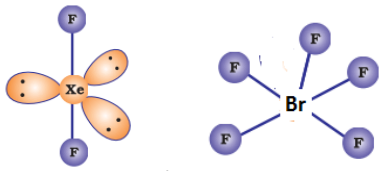
General Instructions

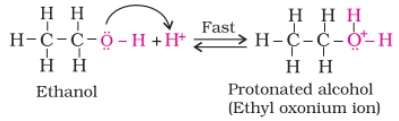
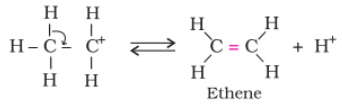
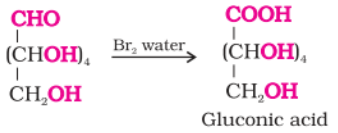
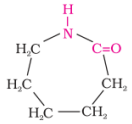
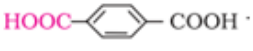
1. The Marking Scheme provides general guidelines to reduce subjectivity in the marking. The answers given in the Marking Scheme are Suggested answers. The content is thus indicative. If a student has given any other answer which is different from the one given in the Marking Scheme, but conveys the 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

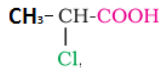
CHEMISTRY (043)/ CLASS XII (Compartment Exam)

56/1

Q.No	Value Points	Marks
1	Order of reaction = ½	1
2	Due to the bond formation between the adsorbent and the adsorbate.	1
3	$[Pt(NH_3)_4][CuCl_4]$	1
4	$C_6H_5COCH_3$	1
5	2-Methylprop-1-ene / isobutene / structure	1
6	Intermolecular forces of attraction between carbon disulphide and acetone are weaker than the pure components. Minimum boiling azeotrope at a specific composition	1 1
7	$CH_3CH_2CH_2Cl$, due to primary halide which has less steric hindrance	1,1
8	Quantity of charge required to deposit 108 g of silver = 96500 C Quantity of charge required to deposit 1.50 g of silver $= \frac{96500}{108} \times 1.50 = 1340.28$ C Time taken $= \frac{Q}{I} = \frac{1340.28}{1.50} = 893.5$ s (or by any other suitable method)	½ ½ 1
	OR	
8	$\Lambda m = \frac{1000\ k}{C}$ $\Lambda m = \frac{1.65 \times 10^{-4} \times 1000}{0.01}$ $= 16.5\ S\ cm^2\ mol^{-1}$	½ ½ 1
9	 (square pyramidal)	1,1
10.	i) Mn ii) Mischmetall	1 1
11	i) Propene ii) 4-nitrochlorobenzene and 2-nitrochlorobenzene / structures iii) Methylcyanide / Ethanenitrile / structure	1 ½ + ½ 1
12	Moles for $MgBr_2 = \frac{10.5}{184} = 0.0571$ mol Molality $= \frac{0.0571}{200} \times 1000 = 0.2855$ m i=3 $\Delta T_f = i\ K_f\ m$ $= 3 \times 1.86 \times 0.2855$ $= 1.59$ K Freezing point = 273 – 1.59 = 271.41K or -1.59 °C	½ ½ 1 1
13	i) $C_2H_5OH \xrightarrow[443\ K]{H_2SO_4} CH_2 = CH_2 + H_2O$	½ ½

	Step 1: Formation of protonated alcohol.  Ethanol — Protonated alcohol (Ethyl oxonium ion) *Step 2:* Formation of carbocation: It is the slowest step and hence, the rate determining step of the reaction.  *Step 3:* Formation of ethene by elimination of a proton.  Ethene ii) o-Nitrophenol is steam volatile due to intramolecular hydrogen bonding while p-nitrophenol is less volatile due to intermolecular hydrogen bonding.	½ ½ 1
14	i) Rate = $k[A][B]^2$ ii) Rate becomes 9 times iii) Rate becomes 8 times	1 1 1
15	i) $Cu(s)\,|\,Cu^{2+}(aq)\,||\,Ag^{+}(aq)\,|\,Ag(s)$ ii) Current will flow from silver to copper electrode in the external circuit. iii) Cathode : $2Ag^{+}(aq) + 2e^{-} \rightarrow 2Ag(s)$ Anode : $Cu(s) \rightarrow Cu^{2+}(aq) + 2e^{-}$	1 1 ½ + ½
16	i) The precipitated silver iodide adsorbs iodide ions from the dispersion medium resulting in the negatively charged colloidal solution. ii) Due to large surface area iii) If the dispersion medium is separated from the dispersed phase , the sol can be reconstituted by simply remixing with the dispersion medium. That is why these sols are also called reversible sols.	1 1 1
17	i) $(CH_3)_3N < CH_3NH_2 < (CH_3)_2NH$ ii) A : $C_6H_5N_2^+Cl^-$ B: C_6H_5OH iii) $R{-}NH_2 + CHCl_3 + 3KOH \xrightarrow{Heat} R{-}NC + 3KCl + 3H_2O$	1 1 1
18	i) Due to the formation of zwitter ion. ii) The two strands are complementary to each other because the hydrogen bonds are formed between specific pairs of bases iii)  Gluconic acid Or glucose gets oxidised to gluconic acid on reaction with mild oxidising agent like Bromine water.	1 1 1
19.	i) $CH_2{=}CH{-}CH{=}CH_2 + CH_2{=}\underset{\displaystyle CN}{\underset{|}{C}}H$ ii)  iii) $HOH_2C{-}CH_2OH +$ 	1 1 1
20.	a) Gold is leached out in the form of a complex with dil. solution of NaCN in the presence of air/ NaCN acts as leaching agent.	1

	b) It lowers the melting point of alumina and makes it a good conductor of electricity. c) CO forms a volatile complex with nickel which is further decomposed to give pure Ni metal.	1 1
21	i) Hexaamminenickel(II) chloride ii) Potassium hexacyanidoferrate(III) iii) Tris(ethane-1,2-diamine)cobalt(III) ion	1 1 1
22	i) a) $5SO_3^{2-} + 2MnO_4^- + 6H^+ \longrightarrow 2Mn^{2+} + 3H_2O + 5SO_4^{2-}$ b) $Cr_2O_7^{2-} + 14\ H^+ + 6\ Fe^{2+} \rightarrow 2\ Cr^{3+} + 6\ Fe^{3+} + 7\ H_2O$ **ii)** **$Cr^{2+} < Fe^{2+} < Mn^{2+}$**	1 1 1
	OR	
22	i) $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$ (or any other correct equation) ii) $4\ FeCr_2O_4 + 8\ Na_2CO_3 + 7\ O_2 \rightarrow 8\ Na_2CrO_4 + 2\ Fe_2O_3 + 8\ CO_2$ iii) $2\ CrO_4^{2-} + 2H^+ \rightarrow Cr_2O_7^{2-} + H_2O$	1 1 1
23	a) Tranquilizers b) It may cause harmful effects and may acts as poison in case of overdose. Therefore, a doctor should be always consulted. c) Phenacetin d) Empathetic , Caring , sensitive (or any other two relevant values)	1 1 1 1
24	i)a) $2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$ (cold and dilute) b) $2XeF_2\ (s) + 2H_2O(l) \rightarrow 2Xe\ (g) + 4\ HF(aq) + O_2(g)$ ii) a) Sulphur is sterically protected by six F atoms, hence does not allow the water molecules to attack. b) It contains only two ionisable H-atoms which are present as –OH groups, thus behaves as dibasic acid. c) Xe has least ionization energy among the noble gases and hence it forms chemical compounds particularly with O_2 and F_2.	1 1 1 1 1
	OR	
24	i) a. Fluorine has less negative electron gain enthalpy than chlorine, b. Fluorine has low enthalpy of dissociation than chlorine c. Fluorine has very high enthalpy of hydration than chlorine. d. Fluorine is stronger oxidizing agent than chlorine. ii) a) iii) $3Cu + 8\ HNO_3(dilute) \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$ b) $2\ Fe^{3+} + SO_2 + 2H_2O \rightarrow 2\ Fe^{2+} + SO_4^{2-} + 4\ H^+$ c) $XeF_4 + O_2F_2 \rightarrow XeF_6 + O_2$ (Balancing of equations may be ignored)	½ ×4 1 1 1
25	i)a) Due to +I effect of methyl group in CH_3CHO. b)due to –I effect of nitro group in nitroacetic acid. c) Due to the strong electron withdrawing effect of the carbonyl group and resonance stabilisation of the conjugate base. ii) a) Add NaOH and I_2 to both the compounds and heat, ethanal gives yellow ppt of iodoform. b) Add NaOH and I_2 to both the compounds and heat, pentan-2-one gives yellow ppt of iodoform.	1 1 1 1 1
	OR	
25	a)	

	i)a) 	1
	b) C_6H_5CHO	1
	c) $CH_3OH + HCOOK$	1
	ii)a) $CH_3COCH_3 \xrightarrow{NaBH_4} CH_3CH(OH)CH_3 \xrightarrow{conc.H_2SO_4,\ 443K} CH_3\text{-}CH=CH_2$	1
	b) $C_6H_5CH_2Cl \xrightarrow{KCN} C_6H_5CH_2CN \xrightarrow{H_3O^+} C_6H_5CH_2COOH$	1
26	i) a) Antiferromagnetism	1
	b) i) Schottky defect ii) Frenkel Defect	½ + ½
	ii) $d=\frac{zM}{a^3\,Na}$	½
	z=4	½
	$11.2=\frac{4\times M}{(4\times 10^{-8})^3\times (6.02\times 10^{23})}$	½
	M= 107.9 g/mol	1
	Atomic mass = 107.9 u	½
	OR	
26	$r=\frac{a}{2\sqrt{2}}$	½
	$=\frac{3.0\times 10^{-8}}{2\times 1.414}$	½
	$= 1.06\times 10^{-8}$ cm	1
	$d=\frac{zM}{a^3\,Na}$	½
	z=4	½
	$d=\frac{4\times 108}{(3\times 10^{-8})^3\times (6.02\times 10^{23})}$	1
	$= 26.6\ g/cm^3$	1