Strictly Confidential: (For Internal and Restricted use only)
Senior School Certificate Examination
July 2019
Marking Scheme – CHEMISTRY (SUBJECT CODE -043)
(PAPER CODE – 56/1/2)

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.**Evaluation is a 10-12 days mission for all of us. Hence, it is necessary that you put in your best effortsin this process.**
2. 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.**However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them.**
3. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
4. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X"be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
5. If a question has parts, please award marks on 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 encircled. This may be followed strictly.
6. If a question does not have any parts, marks must be awarded in the left hand margin and encircled.This may also be followed strictly
7. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer 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. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 20 / 25 answer books per day.
11. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totaling on the title page.
    - Wrong totaling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.
    - Wrong transfer of marks from the answer book to online award list.

- Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
- Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

12. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as (X) and awarded zero (0)Marks.

13. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

14. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

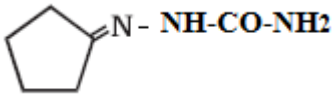
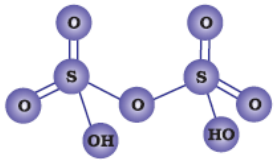
15. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

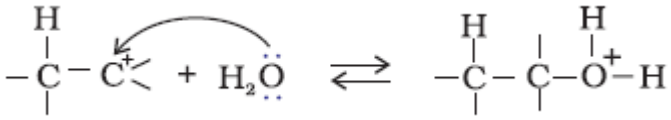
16. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

Marking scheme Compartment – 2019

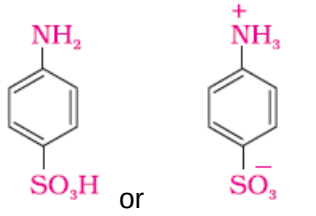
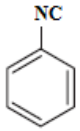
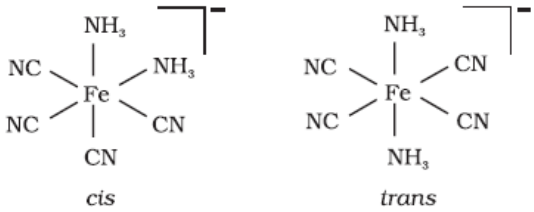
CHEMISTRY (043)/ CLASS XII

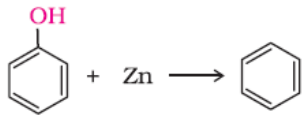
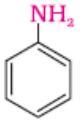
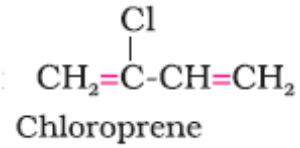
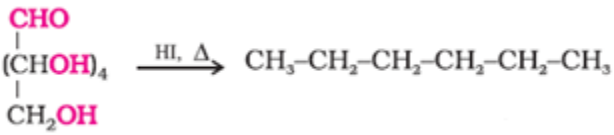
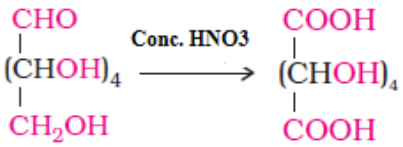
56/1/2

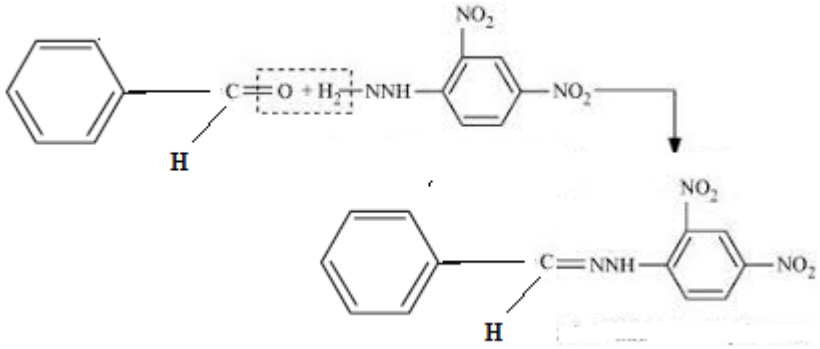
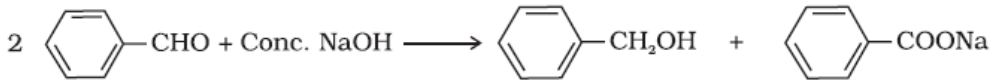
Q.No	Value Points	Marks
	SECTION A	
1	Chemicals which prevent spoilage of food due to microbial growth . eg: sodium benzoate / table salt/ sugar/ any other correct example	½ , ½
2	Homopolymer	1
3	Glucose and Fructose	1
4		1
	OR	
4	CH_3-CH_2-CH_3	1
5	No unpaired electron.	1
	OR	
5	$[Fe(C_2O_4)_3]^{3-}$; $C_2O_4^{2-}$ is a didentate / chelating ligand so it is more stable	½ , ½
	SECTION B	
6	Since its a first order reaction, a) Unit of rate constant is s^{-1} / $time^{-1}$ b) $t_{1/2} = \frac{0.693}{k}$ $= \frac{0.693}{5.5 \times 10^{-14}}$ $= 1.26 \times 10^{13}$ s (or any other unit of time)	1 ½, ½
7	a) Conductivity of a solution at any given concentration is the conductance of one unit volume of solution kept between two platinum electrodes with unit area of cross-section. Molar conductivity is the conductivity of solution for 1M solution. b) Because number of ions per unit volume that carry the current in a solution decreases.	½ ½ 1
8	 a) b) Carbon dioxide is formed , $C + 2H_2SO_4(conc.) \rightarrow CO_2 + 2\ SO_2 + 2\ H_2O$ (Award full marks if only balanced equation is given)	1 ½ , ½
9	a) Because Cr is more stable in +3 oxidation state due to t_2g^3 configuration whereas Mn is more stable In +2 oxidation state due to half filled $3d^5$ configuration. B) Because it undergoes disproportionation reaction	1 1
10.	For fcc, $r = \frac{a}{2\sqrt{2}}$ $a = 2r \times \sqrt{2}$ $= 2 \times 125pm \times 1.414$ $= 353.5$ pm	½ ½ 1
	OR	
10.	$d = \frac{zM}{a^3 N_A}$	½

	$a^3 = \frac{4 \times 99 \text{ g mol}^{-1}}{3.04 \text{ g cm}^{-3} \times 6.022 \times 10^{23} \text{ mol}^{-1}}$ $a^3 = 21.6 \times 10^{-23} \text{ cm}^3$ (Deduct half marks if correct unit is not given)	½ 1
11	$CH_3-C(CH_3)=CH_2$; 2--Methylpropene	1,1
	OR	
11	 a) b) 2,6-dimethylphenol	1 1
12	a) A_2B_3 b) Frenkel defect , due to small size of Zn^{2+} ion.	1 ½ , ½
	SECTION C	
13	$\log \frac{k2}{k1} = \frac{Ea}{2.303R}[\frac{1}{T1} - \frac{1}{T2}]$ $\log \frac{6 \times 10^{-2}}{2 \times 10^{-2}} = \frac{Ea}{2.303 \times 8.314\ J\ K^{-1}mol^{-1}}[\frac{1}{300} - \frac{1}{320}]\ K^{-1}$ $\log 3 = \frac{Ea}{19.15\ J\ mol^{-1}}[\frac{320-300}{300 \times 320}]$ $0.4771 = \frac{Ea}{19.15\ J\ mol^{-1}}[\frac{20}{300 \times 320}]$ Ea= 43855 J mol^{-1} or 43.855 kJ mol^{-1} (Deduct half marks if correct unit is not given)	½ 1 ½ 1
14	$Zn^{2+} + 2e \rightarrow Zn(s)$ $E_{Zn2+/Zn} = E^o_{Zn2+/Zn} - \frac{0.059}{2} \log \frac{1}{[Zn2+]}$ $E_{Zn2+/Zn} = -0.76 - \frac{0.059}{2} \log \frac{1}{[0.01]}$ $= -0.76 - \frac{0.059}{2} \log 10^2$ $= -0.76 - 0.059$ V $E_{Zn2+/Zn} = -0.819$ V (Deduct half marks if correct unit is not given)	1 1 1
15	a) Calamine is an ore of Zn while malachite is an ore of copper. / Calamine is $ZnCO_3$ while malachite is $CuCO_3.Cu(OH)_2$ b) Zn is more reactive than Cu , so reduction will be faster in case of Zn. c) Cryolite makes alumina a good conductor of electricity and lowers melting point of the mixture.	1 1 1
	OR	
15	a)	1+ 1

Cast iron	Pig iron
1.It contains low percentage of carbon and other impurities	1.It contains high percentage of carbon and other impurities
2.It is moulded pig iron	2. It is directly obtained from blast furnace

	3. It is less brittle | 3. It is more brittle (Any two) b)Zone refining – impurities are more soluble in the melt than the solid state of the metal.	 1
16	a) Because acid formed in the reaction provides H^+ which acts as a catalyst in hydrolysis. b) The solution becomes colourless because the molecules of methylene blue/ dye get adsorbed on the surface of charcoal. c) Milk / Vanishing cream (or any other suitable example)	1 1 1
	OR	
16	a) Colloids which acts as electrolytes at low concentration and show colloidal behaviour at high concentration b) The movement of colloidal particles towards a particular electrode under the influence of an electric field. c) The potential difference between fixed layer and the diffused layer of opposite charges.	1 1 1
17	a) i) $5NO_2^- + 2MnO_4^- + 6H^+ \longrightarrow 2Mn^{2+} + 5NO_3^- + 3H_2O$ ii) $3MnO_4^{2-} + 4H^+ \rightarrow 2MnO_4^- + MnO_2 + 2H_2O$ b) Cerium / Ce	1 1 1
18	a) i) Propene ii)  b)Phenyl isocyanides / 	1 1 1
19	 a) b)In the presence of strong field ligand CO , the unpaired d-electrons of Ni pair up so $[Ni(CO)_4]$ is diamagnetic but Cl^- being a weak ligand is unable to pair up the unpaired electrons, so $[Ni(Cl_4)]^{2-}$ is paramagnetic.	1,1 1
	OR	
19	a) Ligand that can ligate through two different atoms. b) Ligands can be arranged in a series in the order of increasing field strength. / An experimentally determined series based on absorption of light by complexes with different ligands. c)Complexes in which a metal is bound to more than one kind of ligands / donor groups	1 1 1

20.	a) i) 	1
	ii) $CH_3–CH=CH_2 \xrightarrow[\text{ii) NaOH, H2O2}]{\text{i)B2H6}} CH_3CH_2CH_2OH$ (or any other suitable method)	1
	b) Because $–NO_2$ is an electron withdrawing group and stabilises the conjugate base.	1
21	a) A =  / Aniline , B =  / 2,4,6-Tribromoaniline	1+ 1
	b) Because of hydrogen bonding in ethylamine whereas it is hindered by the bulky phenyl group in aniline.	1
22	a) Antiseptics – chemicals applied on living tissues to prevent the growth of microorganisms while disinfectants are applied on non-living tissues. Example: Antispetic- Dettol , Disinfectants- 1% phenol (or any other suitable example)	½ + ½ ½ + ½
	b) It is needed by diabetic persons as it is excreated from the body in urine unchanged. / Reduces calories intake	1
	OR	
22	i) Chemical compounds used for the treatment of stress and mental diseases. ii) Chemical compounds which stop overproduction of acid in stomach. iii) Chemical compounds which reduce or abolish pain without disturbing nervous system.	1 1 1
23	 Chloroprene a)	½ , ½
	b) C_6H_5OH + HCHO , phenol and formaldehyde	½ , ½
	c) CH_2=CH-Cl , vinyl chloride	½ , ½
24	**a) i)**  or n-Hexane is formed	1
	ii)  or Saccharic acid is formed	1
	b) Starch is a polymer of α-glucose while cellulose is a polymer of β-glucose.	1
	SECTION D	
25	a) Compound = Benzaldehyde or C_6H_5CHO	1

	Reaction Reaction with 2,4-DNP  (orange ppt) With Tollens reagent $RCHO + 2[Ag(NH_3)_2]^+ + 3\,\bar{O}H \longrightarrow R\bar{C}O\bar{O} + 2Ag + 2H_2O + 4NH_3$ (Where R= $-C_6H_5$) Cannizzaro  b) i)Add neutral $FeCl_3$ to both the compounds, phenol will give violet colour] ii) Add $NaHCO_3$ to both the compounds, benzoic acid acid will give brisk effervescence of CO_2	½ ½ 1 1 1
	OR	
25	a) A= CH_3COOH B= CH_3COCl C= CH_3CONH_2 D= CH_3NH_2 b) $HCOOH < ClCH_2COOH < CCl_3COOH < CF_3COOH$	1 1 1 1 1
26	a)$\Delta T_f = T_f^o - T_f = 273.15 - 271\ K = 2.15\ K$ $\Delta T_f = K_f\, m$ $\Delta T_f = K_f \times \frac{w_b \times 1000}{M_B \times w_A}$ $K_f = \frac{2.15K \times 342\ g\ mol^{-1} \times 95\ g}{5g \times 1000\ g\ Kg^{-1}}$ $= 13.97\ K\ kg\ mol^{-1}$ For 5% glucose in water, $\Delta T_f = K_f\, m$ $\Delta T_f = K_f \times \frac{w_b \times 1000}{M_B \times w_A}$ $= \frac{13.97\ K\ Kg\ mol^{-1} \times 5g \times 1000\ g\ K^{-1}}{180\ g\ mol^{-1} \times 95\ g}$ $= 4.08K$ $T_f = T_f^o - \Delta T_f = 273.15 - 4.08\ K = 269.07\ K$ b) It is due to the fact that KCl dissociates to give K^+ and Cl^- ions whereas urea does not dissociate	½ ½ ½ 1 ½

	into ions c) Liquids having similar nature and polarities / which obey Raoults' law	1 1
	OR	
26	$\Delta T_f = K_f \, m$ $\Delta T_f = K_f \times \frac{w_b \times 1000}{M_B \times w_A}$ $M_b = K_f \times \frac{w_b \times 1000}{\Delta T_f \times w_A}$ $= 5.12 \times \frac{1 \times 1000}{0.40 \times 50}$ $= 256 \text{ g mol}^{-1}$ b) Higher the value of K_H, lower will be the solubility of a gas in the liquid. c) Low level of oxygen in the blood and tissues of people at high altitudes leads to the condition of anoxia.	1 1 1 1 1 1
27	A= S_8 / Sulphur $S_8 + 8\ O_2 \rightarrow 8SO_2$ / $S + O_2 \rightarrow SO_2$ B= SO_2 $Ca(OH)_2$ (aq) + SO_2 (g) → $CaSO_3$ (s) + H_2O (milky) Decolourises $KMnO_4$ $2KMnO_4 + 5\ SO_2 + 2H_2O \rightarrow 2\ H_2SO_4 + 2MnSO_4 + K_2SO_4$ / $2\ MnO_4^- + 5\ SO_2 + 2H_2O \rightarrow 4\ H^+ + 2Mn^{2+} + 5\ SO_4^{2-}$ Reduces Fe^{3+} to Fe^{2+} $2Fe^{3+} + SO_2 + 2\ H_2O \rightarrow 2\ Fe^{2+} + SO_4^{2-} + 4H^+$	1 ½ 1 ½ 1 1
	OR	
27	a) $H_2Te > H_2Se > H_2S > H_2O$ b) PCl_4^- , as phosphorous has 10 e^- which cannot be accommodated in sp^3 orbitals. c) Rhombic sulphur d) H_3PO_4 e) PCl_3 hydrolyses in presence of moisture to give fumes of HCl / $PCl_3 + 3H_2O \rightarrow H_3PO_3 + 3HCl$	1 ½ , ½ 1 1 1