Strictly Confidential: (For Internal and Restricted use only)

Senior School Certificate Examination

March 2019

Marking Scheme – CHEMISTRY (SUBJECT CODE: 043)

(PAPER CODE – 56-*3*-*3*)

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 efforts in 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. 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.
5. If a question does not have any parts, marks must be awarded in the left hand margin and encircled.
6. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
7. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
8. A full scale of marks 0-70 has to be used. Please do not hesitate to award full marks if the answer deserves it.
9. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 25 answer books per day.
10. 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.

11. 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.

12. 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.

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

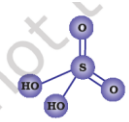
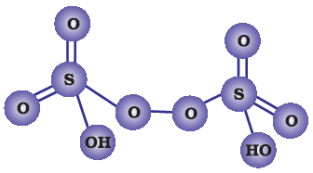
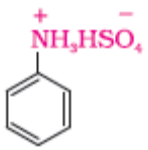
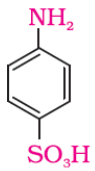
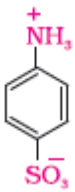
14. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

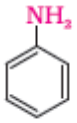
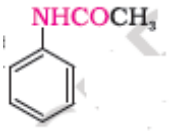
15. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

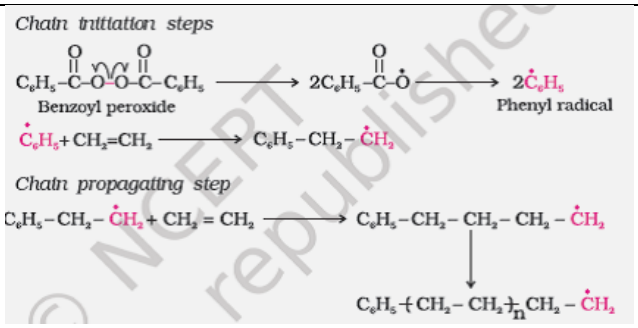
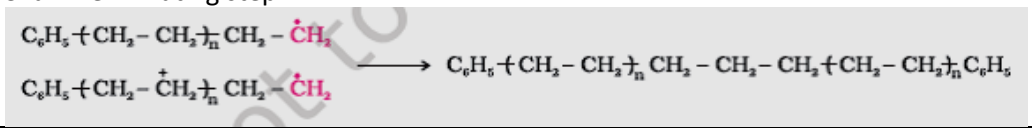
Marking Scheme – 2018-19

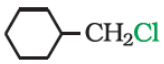
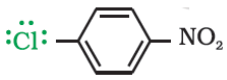
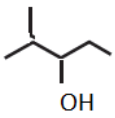
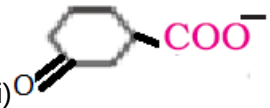
CHEMISTRY (043)/ CLASS XII

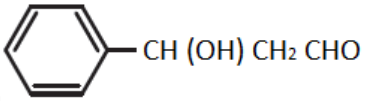
56/3/3

Q.No	Value Points	Marks
1	1-Phenylbutan-2-one.	1
2	Chloroform in the presence of light forms phosgene gas ($COCl_2$) which is poisonous in nature.	1
3	Dichloridobis(ethylenediamine)cobalt(III) ion.	1
	OR	
3	$Na_2[NiCl_4]$	1
4	Glycosidic linkage is the linkage which joins two monosaccharides through oxygen atom while peptide Linkage is the linkage which joins two amino acids through –CO-NH- bond	1
	OR	
	Base linked with pentose sugar called as nucleoside while Nucleoside linked with phosphate group are called as nucleotide	1
5	Ethanol < Water < Phenol	1
6	a) 0.1 molalKCl , Because KCl undergoes dissociation whereas glucose does not. b) I) Van't Hoff factor i> 1 ii) Van't Hoff factor i< 1	½ +1/2 1/2 1/2
7	Cationic vacancies are produced ; Impurity defect.	1 + 1
	OR	
7	a) Schottky defect b) Metal excess defect (due to anionic vacancies)	1 1
8	(a) $8NH_3(excess) + 3Cl_2 \rightarrow 6NH_4Cl + N_2$ (b) $XeF_6 + 2H_2O \rightarrow XeO_2F_2 + 4HF$	1 1
	OR	
8	a) $XeF_4 + SbF_5 \rightarrow [XeF_3]^+ [SbF_6]^-$ b) $2Ag + PCl_5 \rightarrow 2AgCl + PCl_3$	1 1
9	a) Sulphuric acid  b)Peroxodisulphuric acid  (Or any other)	½ × 4
10	Methane and methanol. Pollution free ,High efficiency	½ + ½ ½ + ½
11	i) A=  ; B=  / 	½ + ½

	ii) A=  ; B= 	½ + ½
12.	(a) Because aryl halide does not undergoes nucleophilic substitution reaction. (b) Because of the absence of acidic hydrogen attached to nitrogen (N-H) in the product of secondary amine.	1 1
13	a) $E^{o}_{cell} = E^{o}_{(Ag+ / Ag)} - E^{o}_{(Zn2+/Zn)}$ $= 0.80 – (- 0.76)$ $= 1.56V$ $\Delta G^{o} = - nFE^{o}_{cell}$ $= - 2 \times 96500 \times 1.56$ $= - 301080$ joules/mol $= -301.080$ kJ/mol (Deduct half mark if unit is wrong or not written) b) Λ^{0}_{m} for strong electrolyte is obtained as intercept from plot of Λ_m verses $\sqrt{c}$ whereas Λ^{0}_{m} for weak electrolyte is obtained from Kohlrausch's law.	½ ½ 1 1
14	a)Coagulation : The settling of colloidal particles is known as coagulation. Example-Delta formation. b)Multi molecular colloids: When large number of atoms or molecules aggregate to form species having size in the colloidal range. Such colloids are known as multimolecular colloids. Example- Gold sols . c)Gel : When liquid is dispersed in solid then it is called as gel.Example:Butter, cheese (Or any other relevant example).	½,½ ½,½ ½,½
	OR	
14	a)Ferric hydroxide , Because it is lyophobic sol. b) Demulsification occurs. c) Promoters increases the efficiency of catalyst whereas poison decreases the efficiency of catalyst.	½ + ½ 1 ½ + ½
15	a) $d = \frac{zM}{a^3 N_A}$ $6.89 = 2x\ M / 6.022x10^{23} \times (3 \times 10^{-8})^3$ $M = 6.89 \times 6.022x10^{23} \times 27 \times 10^{-24} / 2$ $M = 56$ g/mol. b) i) p-type ii) n-type	½ 1 ½ ½ ½

16	α= 0.95 α=(i-1)/ (n-1) 0.95 = (i-1) / (3-1) i=2.9 (Or any other method for calculation of i) Π = i CRT = 2.9 x 0.1 x 0.0821 x 300 = 7.143 atm. (Deduct half mark for no unit or wrong)	 ½ ½ 1 1
17	At 500 – 800 K , $3Fe_2O_3 + CO \rightarrow 2Fe_3O_4 + CO_2$ $Fe_3O_4 + 4CO \rightarrow 3Fe + 4CO_2$ $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$ Limestone decomposes to CaO and CO_2 . CaO combines with impurity (i.e.) SiO_2 to form slag which is then removed. / $CaO + SiO_2 \rightarrow CaSiO_3$ (Balancing may be ignored)	 ½ 1 ½ 1
	OR	
17	a)It forms complex $[Ag(CN)_2]^-$ (Or in equation form) b) FeS undergoes roasting to FeO , which combines with SiO_2 to form slag whereas Cu_2S on roasting gives Cu_2O which on reduction gives Cu. (Or in equation form) c) It selectively prevents the ZnS from coming to the froth / It acts as Depressant.	1 1 1
18	a) As the Size / metallic character increases, acidic character decreases from nitrogen to Bismuth. b) Because axial bond pairs suffer more repulsion as compared to equatorial bond pairs. c) HF remains hydrogen bonded with water / Due to lower bond dissociation enthalpy of HCl / Due to high bond dissociation enthalpy of HF	1 1 1
19	a) $CH_2=C(Cl)-CH=CH_2$ b) $CH_2=CHCl$ c) $HOOC-(CH_2)_4-COOH$ and $H_2N-(CH_2)_6-NH_2$	1 1 1
	OR	
19	 Chain Terminating step 	1 1 1
20	a)Metal hydroxides are insoluble and do not increase the pH above neutrality. b) Because it has anticlotting property.	1 1

	c) Because antihistamines and antacids act on different receptors. (OR) a)Chemical compounds used for the treatment of stress and mental diseases. example:. Equanil. b) Antibiotic:. Chemical substances produced by micro-organisms that inhibit growth or even destroy micro-organisms. Example:.Pencillin. c)Non-ionic detergents:. The detergents which do not contains any ion in their constituition. Example:. Dish washer liquids. (Or any other suitable example)	1 ½ + ½ ½ + ½ ½ + ½
21.	(a)  It is primary halide and therefore undergoes S_N2 reaction faster. (b)  It is more reactive due to the presence of electron withdrawing $-NO_2$ group. (iii)  It is optically active due to chiral carbon.	½ + ½ ½ + ½ ½ + ½
22.	a) Anisole is formed $C_6H_5ONa + CH_3Cl \rightarrow C_6H_5OCH_3 + NaCl$ b) Propenal is formed $CH_2=CH-CH_2-OH \xrightarrow{PCC} CH_2=CH-CHO$ c) Award one mark if attempted.	1 1 1
23.	a) On addition of silver nitrate, $[Co(NH_3)_5(SO_4)]Cl$ will form white precipitate of AgCl while other does not.(Or any other correct chemical test). b)In $[Ni(CO)_4]$, Ni is in zero oxidation state whereas $[NiCl_4]^{2-}$,it is in +2 oxidation state. In the presence of CO ligand the unpaired d electrons of nickel pair up but Cl^- being a weak ligand is unable to pair up the unpaired electrons. c)i) Strong field ligand --- $t_2g^5\ eg^0$ ii) Weak field ligand ---- $t_2g^3\ eg^2$	1 1 ½ ½
24.	a) The tertiary structure of proteins represent overall folding of the poly peptide chains. Example- Insulin b)Essential amino acid are those which cannot be synthesised in the body. Example- Valine c)Disaccharides are those which yield two monosaccharide units on hydrolysis. Example- Sucrose (any other correct example)	½ + ½ ½ + ½ ½ + ½
25	a) (i)  (ii) $CH_3\ CH(OH)\ COOCH_3$	1 1

	(iii)  a) On adding NaOH / I_2 and heat, acetophenone forms yellow ppt. of iodoform(CHI_3) whereas benzophenone does not. b) Due to resonance stabilisation of conjugate base of carbonyl compound.	1 1 1
	OR	
25	a) i) $CH_3CH_2CH(OCH_3)_2$ ii) $CH_3CH_2CH(OH)CH(CH_3)CHO$ iii) $CH_3CH_2CH_3$ b) i) $CH_3COOH < HCOOH < FCH_2COOH < O_2N\text{-}CH_2COOH$ ii) Acetophenone < Benzaldehyde < acetone < acetaldehyde	1 1 1 1 1
26.	a) i)Due to the presence of maximum no. of unpaired electrons in 3d and 4s orbitals. ii) because Cr is more stable in +3 oxidation state due to stable t_{2g}^3 configuration whereas Mn is more stable +2 oxidation state due to half filled $3d^5$ configuration. iii) Due to the presence of one unpaired electron in V^{4+} whereas there is no unpaired electron in Ti^{4+} . b) $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$ $3MnO_4^{2-} + 4H^+ \rightarrow 2\ MnO_4^- + MnO_2 + 2H_2O$ Due to the formation of Mn^{2+} ion from MnO_4^- / or reaction	1 1 1 ½ ½ 1
	OR	
26	a) Transition elements show variable oxidation states that differ by 1 unit whereas p-block elements it differs by 2 units / Heavier transition elements are stable in higher oxidation state whereas p-block elements are stable in lower oxidation state. b) Because of strong interatomic interactions / Strong metallic bonding between atoms. c) Cerium / Terbium ; Oxidising agent. d) Steady decrease in atomic radii with increase in atomic number due to poor shielding effect of 4f orbital electrons. Consequence : 5d series have almost same size as 4d series (Or any other correct consequence) e) $Cr_2O_7^{2-} + 14\ H^+ + 6\ Fe^{2+} \rightarrow 2\ Cr^{3+} + 6\ Fe^{3+} + 7\ H_2O$	1 1 ½ , ½ ½ ½ 1
27	a)Order of a reaction:. It is the sum of the power to which the concentration terms are raised in the rate law equation. Order of reaction is applicable for complex reaction but molecularity has no meaning for the complex reaction. ii) $k = 2.303/t \log [R]_o/[R]$ $= (2.303/25) \log (100/50)$ $= 0.0277\ min^{-1}$ $t_{80\%} = (2.303/0.0277) \log 100/20$ $= 58.11$ min	1 1 ½ 1 ½ 1
	OR	
27	a)	1

	$\log\frac{k_2}{k_1} = \frac{E_a}{2.303R}[\frac{1}{T_1} - \frac{1}{T_2}]$ $\log\frac{7.5x10^4}{2.5x10^4} = \frac{19.147\ x\ 10^3}{2.303x8.314}[\frac{1}{300} - \frac{1}{T_2}]$ log 3 = 1000 $[\frac{T_2-300}{300\ T_2}]$ $\frac{0.4771\ \text{x}\ 300\ \text{x}\ T_2}{1000}$ = T_2 – 300 $T_2 = \frac{300}{0.856}$ = 350K b)When one of the reactants is in excess. CH_3COOCH_3 + H_2O (excess) -------→ CH_3COOH + CH_3OH (Or any other suitable example)	1 1 1 1