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Senior School Certificate Examination

March 2019

Marking Scheme – CHEMISTRY (SUBJECT CODE: 043)

(PAPER CODE – 56-2-2)

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 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.

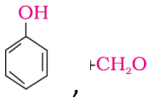
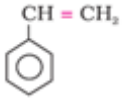
Marking scheme – 2019

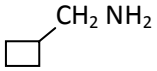
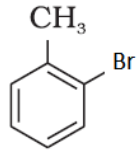
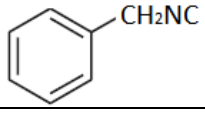
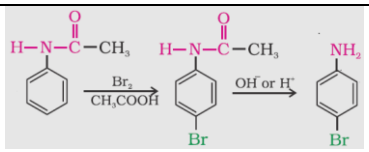
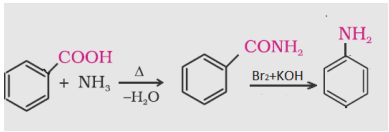
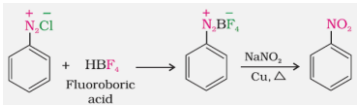
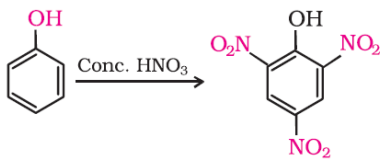
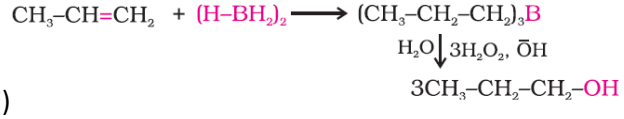
CHEMISTRY (043)/ CLASS XII

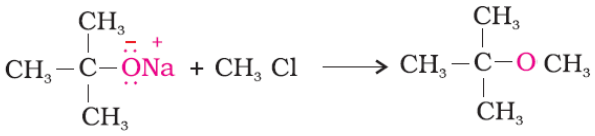
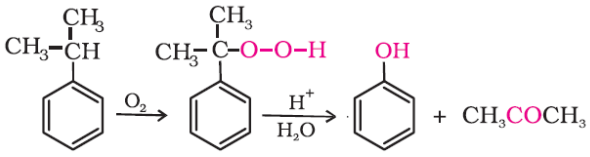
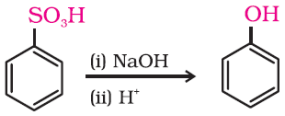
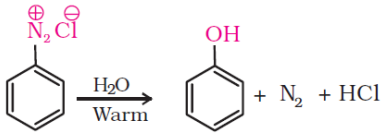
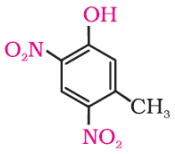
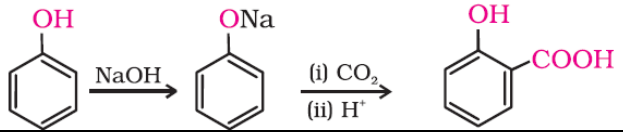
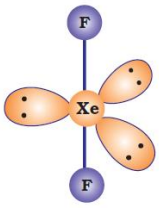
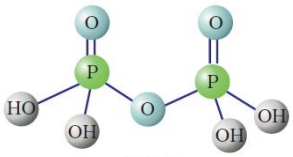
56/2/2

	SECTION - A	
1	Starch is a polymer of α- glucose whereas cellulose is a polymer of β- glucose. OR 2-deoxyribose + nitrogen containing heterocyclic base + phosphate	1 1
2	$C_6H_5CH_2NH_2 < C_6H_5NHCH_3 < C_6H_5NH_2$	1
3	Gel , Example- Cheese / butter	½ + ½
4	p-Nitrochlorobenzene ; Due to electron withdrawing nature of $–NO_2$ group.	½ + ½
5	KCl , due to comparable sizes of K^+ and Cl^- OR On heating excess Zn^{2+} ions move to interstitial sites and the electrons to neighbouring interstitial sites/ because of metal excess defect due to presence of extra Zn^{2+} cations at interstitial sites	½ +1/2 1
	SECTION -B	
6	A = Na_2CrO_4 B=$Na_2Cr_2O_7$ C= $K_2Cr_2O_7$ D= Na_2SO_4	½ x4=2
7	a) Ethanol-acetone interaction is weaker than pure ethanol or acetone interactions. b) On adding KCl, vapour pressure of the solution decreases	1+1
8	a) $2Ca(OH)_2 + 2Cl_2 \longrightarrow CaCl_2 + Ca(OCl)_2 + 2H_2O$ b) $SO_2 + 2Fe^{3+} + 2H_2O \longrightarrow 2Fe^{2+} + SO_4^{2-} + 4H^+$	1 1
	OR	
	a) Mustard gas, tear gas, phosgene (Any two) b) Because it forms blue coloured complex $[Cu(NH_3)_4]^{+2}$ (aq) or Equation	½ + ½ 1
9	i) A = C_6H_5COCl B= C_6H_5CHO ii) A= CH_3COCH_3 B = $CH_3CH_2CH_3$	½ + ½ ½ + ½
10	a) A complex formed by bi or polydentate ligands with metal Example- $[Co(en)_3]^{3+}$ b) A ligand which can ligate through two different donor atoms.Example- SCN^- (Or any other correct example)	½ , ½ ½ , ½
	OR	
10	i) $[Co(NH_3)_4(H_2O)_2]Cl_3$ ii) $[Pt\ Br_2(en)_2](NO_3)_2$	1 1
11	a) d^2sp^3, diamagnetic b) i) $t_{2g}^4e_g^2$ ii) $t_{2g}^6e_g^0$	½ + ½ ½ + ½
12	It is defined as the sum of powers to which the concentration terms are raised in the rate law equation. i) First order ii) zero order	1 ½ + ½
	SECTION -C	

13	i) Dispersed phase = liquid ; Dispersion medium = liquid ii) Due to the formation of new bonds / force of attraction between adsorbate and adsorbent . iii) $x/m=kp^0=k$	1 x 3 =3
14	Rate = $k[A]^p[B]^q$ On solving a) Order with respect to A=2 , B=1 b) Rate = $k[A]^2[B]^1$; overall order = 3 c) Experiment 1 : $4.2 \times 10^{-2} = k\,(0.2)^2\,(0.3)$; k=3.5 Experment 2 : $6.0 \times 10^{-3} = k\,(0.1)^2\,(0.1)$; k=6 (Full marks may be awarded for any one correct answer)	 ½ + ½ ½ , ½ 1
15	a) Liquation : Metals having low melting points than impurities. a) Electrolytic refining : The more basic metal remains in the solution and the less basic ones go to the anode mud. b) Mond's process : Ni should form a volatile compound with a suitable reagent which decomposes at higher temperature to pure Ni.	½ + ½ ½ + ½ ½ + ½
16	i) Because of comparable energies of (n-1)d and ns orbitals / Incomplete filling of d-orbital. ii) Because of stable $3d^{10}$ configuration of Zn^{2+} whereas due to low hydration enthalpy and high enthalpy of atomization of Cu^{2+}. iii) Due to the ability of oxygen to form multiple bonds with metal.	1 x 3=3
17	$d=\frac{ZM}{Na\ x\ a^3}$ $Z = \frac{dx N_a a^3}{M}$ $= \frac{10.2\ x\ 6.022\ x\ 10^{23}\ x\ 2.7\ x\ 10^{-23}}{81}$ = 2 Hence lattice is bcc.	½ 1 ½ ½ ½
18	π_1 (urea) = π_{2+} (KCl) $C_1RT = i\ C_2RT$ $\frac{n_1}{V1} = i\ \frac{n_2}{V2}$ (V1 = V2) $\frac{3}{60} = i\ x\ \frac{1.9}{74.5}$ i= 1 .96 $\propto = \frac{i-1}{n-1}$ $= \frac{1.96-1}{2-1}$	½ 1 ½

	= 0.96 or 96%	1
19	a) $HOOC(CH_2)_4COOH$, $H_2N(CH_2)_6NH_2$ b)  , CH_2O c) $CH_2 = CH - CH = CH_2$, 	1x3=3
	OR	
19	a) i) Polythene ii) Buna-S (Or any other correct example) b) Buna-S < polythene < Nylon-6,6 c) Hydrogen bonding	½ + ½ 1 1
20	I) $CH_3CH_2CH(Br)CH_3$ II) $CH_3CH_2CH_2CH_2Br$ III) $(CH_3)_3CBr$ and $(CH_3)_2CHCH_2Br$	1 1 ½ + ½
21	i) Bithional ii) Non-ionic detergents iii) Because it is unstable at cooking temperature.	1,1,1
	OR	
21	a) These are chemical substances produced by micro-organisms which kill or inhibit the growth of microorganisms. Ex. Penicillin b) These are chemical substances which kill or prevent the growth of microorganisms when applied on living tissues. Ex. Dettol c) These are sodium salts of sulphonated long chain alcohols or hydrocarbons. / Anionic part of the molecule is involved in cleansing action.Example- sodium lauryl sulphate. (Or any other one correct example)	½ + ½ ½ + ½ ½ + ½
22	a) Glucose + Glucose b) Hydrogen bonding c) Vitamin $-B_{12}$	 1+1+1
	OR	
	i) Hydrolysis of sucrose brings a change of sign of rotation from dextro(+) to laevo(-) and the product is named as invert sugar. ii) Protein found in biological system with unique three dimensional structure and biological activity is called native protein. iii) A unit formed by the combination of nitrogenous base , pentose sugar and phosphate .	1,1,1
23	a)	

	i) Due to greater electronegativity of sp^2 hybridised carbon to which carboxyl carbon is attached / Due to greater resonance stabilization of carboxylate ion with the benzene ring. ii) Because carbonyl carbon of methanal is more electrophilic than that of ethanol / due to +I effect of methyl group in ethanal, reactivity decreases. b) On heating with Tollens'reagent / $[Ag(NH_3)_2]^+$, propanal forms silver mirror whereas propanone does not. (or any other suitable chemical test)	*1+1* *1*
24	a)  b)  c) 	1x3=3
	OR	
	a)  b)  c)  (or any other suitable method)	1x3 = 3
	SECTION-D	
25	a) (i)  (ii) 	1 1

	(iii) 	1
	b) On heating with NaOH / I_2 , butan - 2 - ol forms yellow ppt of iodoform (CHI_3) whereas butan -1-ol does not. (Or any other test)	1
	c) Ethanol < water < Phenol	1
	OR	
25	a) (i) 	1
	(ii) 	1
	(iii) 	1
	b) 	1
	c) 	1
26	a) i) Due to increase in size and metallic character. ii) Due to decrease in bond dissociation enthalpy . iii)Due to low bond dissociation enthalpy of F-F bond than Cl-F bond whereas Cl-Cl bond has higher bond dissociation enthalpy than Cl-F bond. b) (i) (ii)  	1 1 1 1+1

	OR	
26	i) $2F_2(g) + 2H_2O(l) \rightarrow 4H^+(aq) + 4F^-(aq) + O_2(g)$ ii) White phosphorus is discrete tetrahedral whereas red phosphorus is polymeric / or structures drawn iii) It forms $Na^+ [XeF_7]^-$ / $XeF_6 + NaF \rightarrow Na^+ [XeF_7]^-$ iv) Due to lower bond dissociation enthalpy of H-S bond than H-O bond. v) HF < HCl < HBr< HI	1x5
27	$\Lambda_m = \frac{\kappa}{c} = \frac{4.95\times10^{-5}\ S\,cm^{-1}}{0.001\ mol\,L^{-1}} \times \frac{1000\ cm^3}{L} = 49.5\ S\,cm^2\ mol^{-1}$ $\alpha = \frac{\Lambda_m}{\Lambda_m^\circ} = \frac{49.5\ S\,cm^2\,mol^{-1}}{390.5\ S\,cm^2\,mol^{-1}} = 0.126$ a) $K = \frac{c\alpha^2}{(1-\alpha)} = \frac{0.001\ mol\,L^{-1} \times (0.126)^2}{1-0.126} = 1.8\times10^{-5}\ mol\ L^{-1}$ (If K= cα^2 , then K= 1.6 × 10^{-5} mol L^{-1} b) $E_{(cell)} = E^\ominus_{(cell)} - \frac{0.059}{6}\log\frac{[Al^{3+}]^2}{[Cu^{2+}]^3}$ c) Batteries which are rechargeable Example- Lead storage, Ni-Cd batteries (Or any other one example)	1 1 1 1 ½ , ½
	OR	
27	a) Al(s) | Al^{3+}(0.01M) || Ni^{2+} (0.1 M) | Ni(s) $E_{(cell)} = E^\ominus_{(cell)} - \frac{0.059}{6}\log\frac{[Al^{3+}]^2}{[Ni^{2+}]^3}$ $E_{(cell)} = 1.41V - \frac{0.059}{6}\log\frac{[0.01]^2}{[0.1]^3}$ $E_{(cell)} = 1.4198V$ or E_{cell} =1.42V b) Λ_m decreases with increase in concentration for both strong & weak electrolyte Λ_m^0 can be obtained for weak electrolyte by applying Kohlrausch law / $\Lambda_m^\circ = \nu_+ \lambda_+^\circ + \nu_- \lambda_-^\circ$	1 ½ 1 ½ 1+1