Strictly Confidential: (For Internal and Restricted use only)
Senior School Certificate Examination-2020
Marking Scheme – CHEMISTRY
(SUBJECT CODE -043) (PAPER CODE – 56/2/1,2,3)

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. 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 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).
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 totaling of marks awarded on a reply.
    - 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 cross (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.

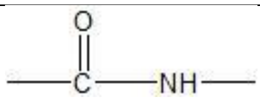
15. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

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.

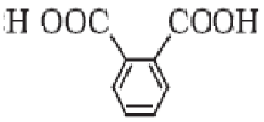
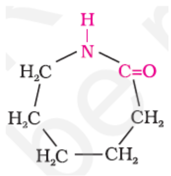
Marking scheme – 2020

CHEMISTRY (043)/ CLASS XII

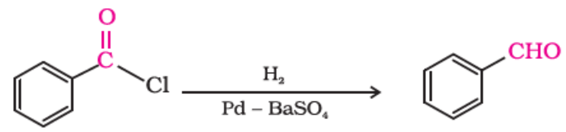
56/2/1

Q.No	Expected Answer / Value Points	Marks
	SECTION A	
1	Simple organic compounds containing both carboxyl (—COOH) and amino (—NH_2) group. / Building blocks of protein. / Amino substituted carboxylic acid / structure	1
2	They contain both acid (-COOH) and basic(NH_2) group / Zwitter ion form or structure / It can react both acids and bases.	1
3	Acidic aminoacids- will have more number of carboxyl groups than amino groups. / Basic amino acids- will have more number of amino groups than carboxyl groups.	1
4	Those which are not synthesized in our body or must be supplied through diet.	1
5	Peptide linkage/amide linkage/ 	1

6	Leaching	1
7	Zinc, Mercury or any other suitable metal	1
8	Linkage	1
9	Desorption	1
10	2	1
11	(D)	1
12	(A)	1
13	1 Mark will be given if attempted / if written none of the answer is right / 4	1
14	(A)	1
15	(C)	1
16	(iii)	1
17	(i)	1
18	(iii)	1
19	(iii)	1
20	(i)	1
	SECTION B	
21	a) Tranquilizers: Used to treat mild to severe mental diseases. Analgesics: Used to reduce pain b) Antiseptics- are applied to living tissues. Disinfectants – are applied to inanimate objects or non living objects (or any other correct difference) **OR** Cationic detergent-are quartenary ammonium salts of amines with acetates, chlorides or bromides as anions. Anionic detergent – are sodium salts of sulphonated long chain alcohols or or hydrocarbons. e.g. cetyltrimethyl ammonium bromide. e.g. Sodium lauryl sulphate / sodium dodecyl benzene sulphonate. (or any other suitable example)	1 1 1 ½ + ½
22	(a) Due to lone pair -lone pair repulsion on oxygen. (b) Due to resonance in phenol and not in methanol / sp^2 hybridised carbon atom in phenol / sp^3 hybridised carbon atom in methanol.	1 1
23	(a) $2MnO_4^- + H_2O + I^- \rightarrow 2\ MnO_2 + + 2OH^- + IO_3^-$ (b) $2MnO_4^- + 10I^- + 16H^+ \rightarrow 2Mn^{2+} + 8H_2O + 5I_2$ (deduct half mark if balancing is incorrect)	1 1
24 24	The curve obtained by plotting the amount of gas adsorbed by the adsorbent with pressure at constant temperature. $x/m = kp^{1/n}$ OR The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. Shape selective catalysis / Catalytic dehydration .	1 1 1 1
25	Rate = k[A][B] Average rate - Rate of a reaction for a particular period or interval of time. Instantaneous rate - Rate of a reaction at a particular instant of time. (or any other suitable difference)	1 ½ ½

26.	$Mg_{(s)} \| Mg^{2+}_{(aq)} \|\| Ag^{+}_{(aq)} \| Ag_{(s)}$ $E_{cell} = E^{0}_{cell} - \frac{0.059}{2} \log [Mg^{2+}] / [Ag^{+}]^2$	1 1
27	(a) Dissociated (b) Associated	1 1
	SECTION C	
28	(a) $CF_2=CF_2$ (b)  and CH_2OH-CH_2OH (c)  / NH_2-$(CH_2)_5$-COOH	1 ½ +½ 1
	OR	
28	(i) Hexamethylene diamine and Adipic acid (ii) 1,3-Butadiene and Styrene (iii) Chloroprene (or IUPAC names of the monomers)	½ +½ ½ +½ 1
29	(a) the lone pair of nitrogen in aniline is in resonance or conjugation with the benzene ring. (b) Aniline forms salt with anhydrous $AlCl_3$. (c) As only alkyl halides undergo nucleophilic substitution.	1 1 1
30	(a) 1-bromobutane< 2-bromobutane< 2-bromo-2-methylpropane. Tertiary carbo cation is more stable than secondary than primary. (b) 2-bromo-2-methyl propane < 2-bromobutane< 1-bromobutane. due to decrease in steric hindrance.	1 ½ 1 ½
31	(a) Potassiumhexacyanidomanganate(II) / Potassiumhexacyanomanganate(II) $t_{2g}^{5}\ eg^{0}$ (b) Increased stability of the complex due to presence of chelating or didentate or polydentate ligands. e.g.$[Cr(en)_3]^{3+}$ (or any other suitable example.)	1 1 ½ ½
	OR	
31	(i) d^2sp^3,diamagnetic (ii) sp^3d^2, paramagnetic (iii) sp^3, diamagnetic	½ +½ ½ +½ ½ +½
32	$Al_2O_3 + 2NaOH + 3H_2O \rightarrow 2Na[Al(OH)_4]$ $2Na[Al(OH)_4] + CO_2 \rightarrow Al_2O_3.xH_2O + 2NaHCO_3$ $Al_2O_3.xH_2O \xrightarrow{\Delta} Al_2O_3 + xH_2O$	1 1 1

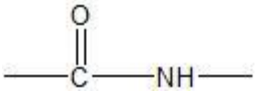
33	Λ_m = k x 1000/ M = 8 x 10^{-5} x 1000 / 2 x 10^{-3} = 40 Scm^2mol^{-1} $\alpha = \Lambda_m / \Lambda^o_m$ = 40/ 404 = 0.099. (1/2 mark to be deducted if no or incorrect unit)	½ 1 ½ 1
34	$\Delta T_f = K_f m$ =1.86 x 31x 1000/ 62 x 600 = 1.55 ^oC or K $\Delta T_f = T_f^o - T_f$ T_f = -1.55^{o}C OR T_f = 271.45K OR 271.6K (1/2 mark to be deducted if no or incorrect unit)	½ ½ 1 1
	SECTION D	
35	(a) (i) zero oredr (ii) slope = - k (iii) $molL^{-1}s^{-1}$ (b) k = *2.303/t* log $[A_0]/[A]$ = 2.303/25 log 100/75 = 2.303/25 log4/3 = 2.303/25(0.6021 – 0.4771) = 0.0115 min^{-1} $t_{1/2}$ = 0.693/k = 0.693/0.0115 = 60.26 min or 60.2 min (or by any other suitable method) (deduct half mark for no or incorrect unit)	1 1 1 ½ ½ 1
	OR	
35	(a) t = 2.303/k log $[A_0]/[A]$ = 2.303/ 60 log 1/1/16 = 0.046 s (or by any other suitable method) (deduct half mark for no or incorrect unit) (b) Concentration of reactants, Temperature, Pressure, surface area and catalyst (any two factors) (c) Proper orientation and energy of colliding particles should be equal to or greater than threshold energy.	1 1 1 1 1
36	a) A= S_8 B= SO_2, C= SO_3, D= $H_2S_2O_7$, E= H_2SO_4, F=$CuSO_4$ b) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$ c) dehydrating agent, oxidising agent, electrolyte and catalyst (any two)	½ x 6 1 ½ x 2
	OR	
36	(a) (i) readily accept one electron to attain noble gas configuration (ii) due to weak dispersion forces / van der Waal forces. (iii) due to smaller size of oxygen as compared to chlorine / due to higher electron density on O than on Cl / due to larger size of chlorine as compared to oxygen. (b) (i) $\underset{\text{(cold, dil.)}}{2NaOH} + Cl_2 \rightarrow NaCl + NaOCl + H_2O$	 1 1 1 1

	(ii) $2I^-_{(aq.)} + H_2O_{(l)} + O_{3(g)} \rightarrow I_{2(s)} + O_{2(g)} + 2OH^-_{(aq.)}$	1
37	a) A= $CH_3CH_2COCH_2CH_3$ / pentan-3-one $CH_3CH_2COCH_2CH_3 \xrightarrow{\text{Zn-Hg, HCl(conc.)}} CH_3CH_2C\ H_2CH_2CH_3$ b) i) $CH_3CH_2COOH + Br_2 \xrightarrow{\text{Red P}} CH_3CHBrCOOH$ ii)  Benzoyl chloride Benzaldehyde c) On heating with NaOH / I_2, acetaldehyde will give yellow ppt of CHI_3 , while benzaldehyde doesn't. (OR any other suitable chemical test) **OR**	1 1 1 1 1
37	a) i) A = $(CH_3)_2CH(OH)\ CH_2\ COCH_3$, B = $(CH_3)_2CH{=}CH\ COCH_3$, C and D =CHI_3 and $(CH_3)_2CH{=}CH\ COONa$ ii) 4-Hydroxy-4-methylpentan-2-one b) i) Propanone will give yellow coloured solution with 2,4-DNP but ethanol doesn't. (or any other suitable chemical test) ii) benzoic acid will give brisk effervescence with $NaHCO_3$ but phenol doesn't. (or any other suitable chemical test)	½ x 4 1 1 1

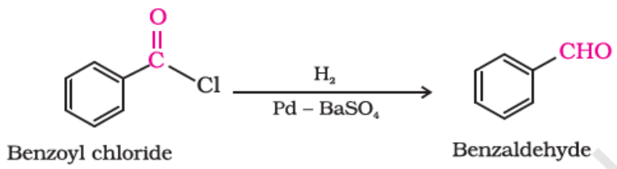
Marking scheme – 2020

CHEMISTRY (043)/ CLASS XII

56/2/2

Q.No	Expected Answer / Value Points	Marks
	SECTION A	
1	Acidic aminoacids- will have more number of carboxyl groups than amino groups. / Basic amino acids- will have more number of amino groups than carboxyl groups.	1
2	Those which are not synthesized in our body or must be supplied through diet.	1
3	They contain both acid (-COOH) and basic(NH_2) group / Zwitter ion form or structure / It can react both acids and bases.	1
4	Peptide linkage/amide linkage/ 	1
5	Simple organic compounds containing both carboxyl (—COOH) and amino (—NH_2) group. / Building blocks of protein. / Amino substituted carboxylic acid / structure	1
6	Vapour phase refining	1
7	Desorption	1
8	Zinc, Mercury or any other suitable metal	1
9	Linkage	1
10	Order =3	1
11	(C)	1
12	(D)	1
13	(A)	1
14	(D)	1
15	(A)	1
16	(i)	1
17	(iii)	1
18	(iii)	1
19	(i)	1
20	(iii)	1
	SECTION B	
21	(a) Due to lone pair -lone pair repulsion on oxygen. (b) Due to resonance in phenol and not in methanol / sp^2 hybridised carbon atom in phenol / sp^3 hybridised carbon atom in methanol.	1 1
22	a) Tranquilizers:used to treat mild to severe mental diseases. Analgesics: Used to reduce pain b) Antiseptics- are applied to living tissues. Disinfectants – are applied to inanimate objects or non living objects (or any other correct difference) **OR** Cationic detergent-are quartenary ammonium Anionic detergent – are sodium salts	1 1 1

	salts of amines with acetates, chlorides or bromides as anions. e.g. cetyltrimethyl ammonium bromide. / of sulphonated long chain alcohols or or hydrocarbons. e.g. Sodium lauryl sulphate / sodium dodecyl benzene sulphonate.	½ + ½
23	$8\ MnO_4^- + 3S_2O_3^{2-} + H_2O \rightarrow 8MnO_2 + 6SO_4^{2-} + 2OH^-$ $2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 8H_2O + 10CO_2$ (deduct 1/2 mark if not balanced)	1 1
24	Rate = k[A][B] Average rate - Rate of a reaction for a particular period or interval of time. Instantaneous rate - Rate of a reaction at a particular instant of time. (or any other suitable difference)	1 ½ ½
25	The curve obtained by plotting the amount of gas adsorbed by the adsorbent with pressure at constant temperature. $x/m = kp^{1/n}$	1 1
	OR	
25	The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. Shape selective catalysis / Catalytic dehydration.	1 1
26	Ni (s) | Ni^{2+} (aq) || Cu^{2+} (aq) | Cu (s) $E_{cell} = E^0_{cell} - 0.059/2 \log [Ni^{2+}] / [Cu^{2+}]$	1 1
27	a) Associated b) Dissociated	1 1
	SECTION C	
28	a) $CH_2 = C(Cl) – CH = CH_2$ b) $HOOC- (CH_2)_4 – COOH$ and $NH_2 – (CH_2)_6- NH_2$ c) $CH_2OH – CH_2OH$ and $HOOC – C_6H_4 –COOH$	1 x 3
	OR	
28	i) Amino caproic acid / Caprolactum / 6 -Aminohexanoic acid ii) Vinyl cyanide / Acrylonitrile iii) Melamine and formaldehyde.	1 1 1
29	(a) Potassiumhexacyanidomanganate(II) / Potassiumhexacyanomanganate(II) $t_{2g}^5\ eg^0$ (b) Increased stability of the complex due to presence of chelating or didentate or polydentate ligands. e.g.$[Cr(en)_3]^{3+}$ (or any other suitable example.)	1 1 ½ ½
	OR	
29	(i) d^2sp^3,diamagnetic (ii) sp^3d^2, paramagnetic (iii) sp^3, diamagnetic	½ +½ ½ +½ ½ +½
30	a) $C_6H_5CH_2Br < C_6H_5CH(Br)CH_3 < C_6H_5C(Br)(CH_3)_2$ due to increasing stability of carbocation b) $C_6H_5C(Br)(CH_3)_2 < C_6H_5CH(Br)CH_3 < C_6H_5CH_2Br$ due to decreasing steric hindrance.	1 ½ 1 ½
31	(a) The lone pair of nitrogen in aniline is in resonance or conjugation with the benzene ring. (b) Aniline forms salt with anhydrous $AlCl_3$. (c) As only alkyl halides undergo nucleophilic substitution.	1 1 1

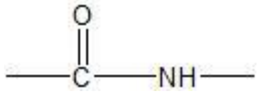
32	$4\,Au + 8CN^- + 2H_2O + O_2 \rightarrow 4[Au(CN)_2]^- + 4OH^-$ $2\,[Au(CN)_2]^- + Zn \rightarrow [Zn(CN)_4]^{2-} + 2\,Au$ Zn acts as a reducing agent.	1 1 1
33	Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. Molar conductivity of $Sr(NO_3)_2$ $= \lambda^o_{Sr^{2+}} + 2\,\lambda^o_{NO_3^-}$ $=119 + (2 \times 72)$ $= 263\ Scm^2/mol$ (deduct ½ mark if no or incorrect unit)	1 ½ ½ 1
34	$\Delta T_f = K_f\,m$ $=1.86 \times 31 \times 1000/\ 62 \times 600$ $= 1.55\ ^oC$ or K $\Delta T_f = T_f^o - T_f$ $T_f = -1.55^oC$ OR $T_f = 271.45K$ OR $271.6K$ (1/2 mark to be deducted if no or incorrect unit)	½ ½ 1 1
	Section D	
35	a) A= $CH_3CH_2COCH_2CH_3$ / pentan-3-one $CH_3CH_2COCH_2CH_3 \xrightarrow{\text{Zn-Hg, HCl(conc.)}} CH_3CH_2C\,H_2CH_2CH_3$ b) i) $CH_3CH_2COOH + Br_2 \xrightarrow{\text{Red P}} CH_3CHBrCOOH$ ii)  c) On heating with NaOH / I_2, acetaldehyde will give yellow ppt of CHI_3 , while benzaldehyde doesn't. (OR any other suitable chemical test) **OR**	1 1 1 1 1
35	a) i) A = $(CH_3)_2CH(OH)\ CH_2\ COCH_3$, B = $(CH_3)_2CH{=}CH\ COCH_3$, C and D $=CHI_3$ and $(CH_3)_2CH{=}CH\ COONa$ ii) 4-Hydroxy-4-methylpentan-2-one b) i) Propanone will give yellow coloured solution with 2,4-DNP but ethanol doesn't. (or any other suitable chemical test) ii) benzoic acid will give brisk effervescence with $NaHCO_3$ but phenol doesn't. (or any other suitable chemical test)	½ x 4 1 1 1

36	(a) (i) zero order (ii) slope = - k (iii) $molL^{-1}s^{-1}$ (b) $k = \mathit{2.303/t} \log [A_0]/[A]$ $= 2.303/25 \log 100/75$ $= 2.303/25 \log 4/3$ $= 2.303/25(0.6021 – 0.4771)$ $= 0.0115\ min^{-1}$ $t_{1/2} = 0.693/k = 0.693/0.0115$ $= 60.26$ min or 60.2 min (or by any other suitable method) (deduct half mark for no or incorrect unit) **OR**	1 1 1 ½ ½ 1
36	(a) $t = 2.303/k \log [A_0]/[A]$ $= 2.303/ 60 \log 1/1/16$ $= 0.046$ s (or by any other suitable method) (deduct half mark for no or incorrect unit) (b) Concentration of reactants, Temperature, Pressure, surface area and catalyst (any two factors) (c) Proper orientation and energy should be equal to or greater than threshold energy.	1 1 1 1 1
37	(a) A= S_8 B= SO_2, C= SO_3, D= $H_2S_2O_7$, E= H_2SO_4, F=$CuSO_4$ (b) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$ (c) Dehydrating agent, oxidising agent, electrolyte in automobile batteries and catalyst (any two) **OR**	½ x 6 1 ½ x 2
37	(a) (i) Readily accept one electron to attain noble gas configuration (ii) Due to weak dispersion forces / van der Waal forces. (iii) Due to smaller size of oxygen as compared to chlorine / due to higher electron density on O than on Cl / due to larger size of chlorine as compared to oxygen. (b) (i) $2NaOH + Cl_2 \rightarrow NaCl + NaOCl + H_2O$ (cold, dil.) (ii) $2I^-_{(aq.)} + H_2O_{(l)} + O_{3(g)} \rightarrow I_{2(s)} + O_{2(g)} + 2OH^-_{(aq.)}$	1 1 1 1 1

Marking scheme – 2020

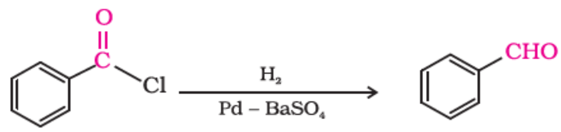
CHEMISTRY (043)/ CLASS XII

56/2/3

Q.No	Expected Answer / Value Points	Marks
	SECTION A	
1	Peptide linkage/amide linkage/ 	1
2	Those which are not synthesized in our body or must be supplied through diet.	1
3	Simple organic compounds containing both carboxyl (—COOH) and amino (—NH_2) group. / Building blocks of protein. / Amino substituted carboxylic acid / structure	1
4	They contain both acid (-COOH) and basic(NH_2) group / Zwitter ion form or structure / It can react both acids and bases.	1
5	Acidic aminoacids- will have more number of carboxyl groups than amino groups. / Basic amino acids- will have more number of amino groups than carboxyl groups.	1
6	Hydraulic washing / gravity separation	1
7	Linkage	1
8	Desorption	1
9	Zinc / Mercury or any other suitable metal	1
10	1	1
11	(A)	1
12	(C)	1
13	(D)	1
14	(C)	1
15	(A)	1
16	(i)	1
17	(iii)	1
18	(iii)	1
19	(i)	1
20	(iii)	1
	SECTION B	
21	(a) Associated (b) Associated	1 1
22	Pt| $I^-_{(aq.)}$ | $I_{2(s)}$ || $F_{2(g)}$ | $F^-_{(aq.)}$ | Pt (Pt may be ignored) $E_{cell} = E^0_{cell} - \frac{0.059}{2} \log [F^-]^2 / [I^-]^2$	1 1
23	a) $5Fe^{2+} + MnO_4^- + 8H^+ \rightarrow Mn^{2+} + 4H_2O + 5Fe^{3+}$ b) $2MnO_4^- + 3Mn^{2+} + 2H_2O \rightarrow 5MnO_2 + 4H^+$	1 1

24	a) Tranquilizers: Used to treat mild to severe mental diseases. Analgesics: Used to reduce pain b) Antiseptics- are applied to living tissues. Disinfectants – are applied to inanimate objects or non living objects (or any other correct difference) **OR** Cationic detergent-are quartenary ammonium salts of amines with acetates, chlorides or bromides as anions. e.g. cetyltrimethyl ammonium bromide. Anionic detergent – are sodium salts of sulphonated long chain alcohols or or hydrocarbons. e.g. Sodium lauryl sulphate / sodium dodecyl benzene sulphonate. (or any other suitable example)	1 1 1 ½ + ½
25	(a) Due to lone pair -lone pair repulsion on oxygen. (b) Due to resonance in phenol and not in methanol / sp^2 hybridised carbon atom in phenol / sp^3 hybridised carbon atom in methanol.	1 1
26	The curve obtained by plotting the amount of gas adsorbed by the adsorbent with pressure at constant temperature. $x/m = kp^{1/n}$	1 1
	OR	
26	The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules. Shape selective catalysis / Catalytic dehydration .	1 1
27	Rate = k[A][B] Average rate - Rate of a reaction for a particular period or interval of time. Instantaneous rate - Rate of a reaction at a particular instant of time. (or any other suitable difference)	1 ½ ½
	SECTION C	
28	a) $CH_2 = C(CH_3) – CH = CH_2$ b) $CH_2 = CH – CH = CH_2$ and $C_6H_5 – CH = CH_2$ c) $C_6H_5 – OH$ and HCHO	1 1 1
	OR	
28	i) Ethylene glycol and Terephthalic acid ii) Tetrafluoro ethene iii) β-Hydroxy butyric acid and β-Hydroxy valeric acid / 3-Hydroxybutanoic acid and 3-Hydroxypentanoic acid	1 1 1
29	$4 Ag + 8CN^- + 2H_2O + O_2 \rightarrow 4[Ag(CN)_2]^- + 4OH^-$ $2 [Ag(CN)_2]^- + Zn \rightarrow [Zn(CN)_4]^{2-} + 2 Ag$ Zn acts as a reducing agent.	1 1 1
30	Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. Molar conductivity of $Ba(OH)_2 = \lambda^o_{Ba^{2+}} + 2\lambda^o_{OH^-}$ $= 127 + (2 \times 199)$ $= 525\ Scm^2/mol$ (deduct ½ mark if no or incorrect unit)	1 ½ ½ 1

31	$\Delta T_f = K_f m$ $=1.86 \times 31 \times 1000/ 62 \times 600$ $= 1.55\ ^oC$ **or** K $\Delta T_f = T_f^o - T_f$ $T_f = -1.55^oC$ **or** $T_f = 271.45K$ **or** 271.6K (deduct ½ mark if no or incorrect unit)	½ ½ 1 1
32	(a) the lone pair of nitrogen in aniline is in resonance or conjugation with the benzene ring. (b) Aniline forms salt with anhydrous $AlCl_3$. (c) As only alkyl halides undergo nucleophilic substitution.	1 1 1
33 33	(a) Potassiumhexacyanidomanganate(II) / Potassiumhexacyanomanganate(II) $t_{2g}^5\ eg^0$ (b) Increased stability of the complex due to presence of chelating or didentate or polydentate ligands. e.g.$[Cr(en)_3]^{3+}$ (or any other suitable example.) **OR** (i) d^2sp^3,diamagnetic (ii) sp^3d^2, paramagnetic (iii) sp^3, diamagnetic	1 1 ½ ½ ½ +½ ½ +½ ½ +½
34	a) ethyl chloride<isopropyl chloride<tertiarybutyl chloride Due to increasing stability of carbocation b) tertiarybutylchloride<isopropylchloride<ethylchloride Due to decreasing steric hindrance.	1 ½ 1 ½
	SECTION D	
35 35	a) A= S_8 B= SO_2, C= SO_3, D= $H_2S_2O_7$, E= H_2SO_4, F=$CuSO_4$ b) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$ c) dehydrating agent, oxidising agent, electrolyte and catalyst (any two) **OR** (a) (i) readily accept one electron to attain noble gas configuration (ii) due to weak dispersion forces / vander Waal forces. (iii) due to smaller size of oxygen as compared to chlorine / due to higher electron density on O than on Cl / due to larger size of chlorine as compared to oxygen. (b) (i) $\underset{\text{(cold, dil.)}}{2NaOH} + Cl_2 \rightarrow NaCl + NaOCl + H_2O$ (ii) $2I^-_{(aq.)} + H_2O_{(l)} + O_{3(g)} \rightarrow I_{2(s)} + O_{2(g)} + 2OH^-_{(aq.)}$	½ x 6 1 ½ x 2 1 1 1 1 1
36	a) A= $CH_3CH_2COCH_2CH_3$ / pentan-3-one $CH_3CH_2COCH_2CH_3 \xrightarrow{\text{Zn-Hg, HCl(conc.)}} CH_3CH_2C\ H_2CH_2CH_3$ b) i) $CH_3CH_2COOH + Br_2 \xrightarrow{\text{Red P}} CH_3CHBrCOOH$	1 1 1

	ii)  Benzoyl chloride Benzaldehyde	1
	c) On heating with NaOH / I_2, acetaldehyde will give yellow ppt of CHI_3 , while benzaldehyde doesn't. (or any other suitable chemical test)	1
	OR	
36	a) i) A = $(CH_3)_2CH(OH)\ CH_2\ COCH_3$, B = $(CH_3)_2CH{=}CH\ COCH_3$, C and D = CHI_3 and $(CH_3)_2CH{=}CH\ COONa$	½ x 4
	ii) 4-Hydroxy-4-methylpentan-2-one	1
	b) i) Propanone will give yellow coloured solution with 2,4-DNP but ethanol doesn't. (or any other suitable chemical test)	1
	ii) benzoic acid will give brisk effervescence with $NaHCO_3$ but phenol doesn't. (or any other suitable chemical test)	1
37	(a) (i) zero order	1
	(ii) slope = - k	1
	(iii) $molL^{-1}s^{-1}$	1
	(b) $k = \frac{2.303}{t} \log [A_0]/[A]$	½
	$= 2.303/25 \log 100/75$	½
	$= 2.303/25 \log 4/3$ $= 2.303/25(0.6021 – 0.4771)$ $= 0.0115\ min^{-1}$ $t_{1/2} = 0.693/k = 0.693/0.0115$	
	$= 60.26$ min or 60.2 min (or by any other suitable method) (deduct half mark for no or incorrect unit)	1
	OR	
37	(a) $t = 2.303/k \log [A_0]/[A]$	1
	$= 2.303/ 60 \log 1/1/16$	1
	$= 0.046$ s (or by any other suitable method) (deduct half mark for no or incorrect unit)	1
	(b) Concentration of reactants, Temperature, Pressure, surface area and catalyst (any two factors)	1
	(c) Proper orientation and energy should be equal to or greater than threshold energy.	1