

13 ශ්‍රේණිය
රසායන විද්‍යාව - භෞමික පරීක්ෂණ 2022
ලකුණු දීමේ පටිපාටිය .

B කොටස - රචනා .



$$\Delta G^\circ = \sum \text{ප්‍රතික්‍රියාවල} - \sum \text{ප්‍රතික්‍රියාවල}$$

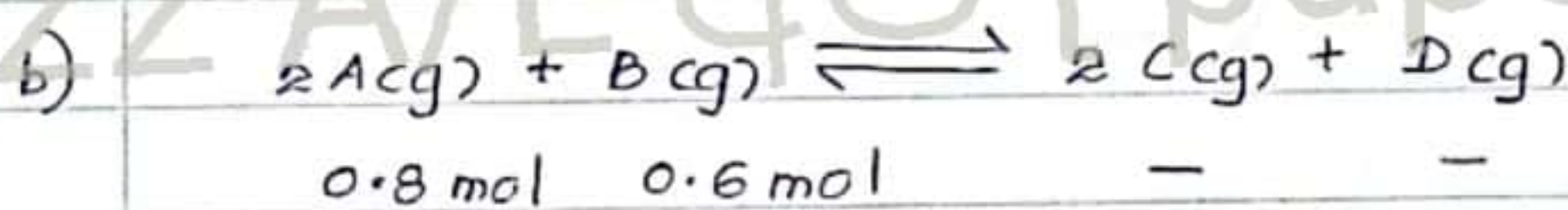
භෞමික ශක්තිය භෞමික ශක්තිය

$$\Delta G^\circ = (62.5 \times 2 + 39.3) - (123.5 \times 2 + 73.2) \text{ kJ mol}^{-1}$$

$$= 164.3 - 320.2$$

$$= -155.9 \text{ kJ mol}^{-1}$$

(5(a) - 15)



10 min ට පසු

0.6 mol 0.5 mol 0.2 mol 0.1 mol (05)

15 min ට පසු

0.2 mol 0.3 mol 0.6 mol 0.3 mol (05)

i) විනිශ්චය 15 නව පසු ගන්න සලකුණු. (05)

හේතුව : නිදර්ශන සංඝට්ටුවල මවුල සංඛ්‍යාව නොවෙනස්ව පවතී.

ii) 10 min දී ප්‍රතික්‍රියාව

$$PV = nRT$$

$$P \times 2 \times 10^{-3} \text{ m}^3 = 1.4 \text{ mol} \times 8.314 \text{ J K}^{-1} \text{ mol}^{-1} \times 298 \text{ K}$$

$$P = 1.734 \times 10^6 \text{ Pa} \quad (05)$$

$$Q_p = \frac{(P_C)^2 (P_D)}{(P_A)^2 (P_B)} \quad (05)$$

$$Q_p = \frac{\left(\frac{0.2 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)^2 \times \left(\frac{0.1 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)}{\left(\frac{0.6 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)^2 \times \left(\frac{0.5 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)} \quad (05)$$

$$= \underline{0.02} \quad (05)$$

$$Q_c = \frac{[C]^2 [D]}{[A]^2 [B]} \quad (05)$$

$$Q_c = \frac{\left(\frac{0.2 \text{ mol dm}^{-3}}{2}\right)^2 \left(\frac{0.1 \text{ mol dm}^{-3}}{2}\right)}{\left(\frac{0.6 \text{ mol dm}^{-3}}{3}\right)^2 \left(\frac{0.5 \text{ mol dm}^{-3}}{2}\right)} \quad (10)$$

$$Q_c = \underline{0.02} \quad (05)$$

ii)

$$PV = nRT$$

$$P_T \times 2 \times 10^{-3} \text{ m}^3 = 1.4 \text{ mol} \times 8.314 \text{ J K}^{-1} \text{ mol}^{-1} \times 298 \text{ K}$$

$$P_T = 1.734 \times 10^6 \text{ Pa} \quad (05)$$

$$K_p = \frac{(P_C)^2 (P_D)}{(P_A)^2 (P_B)} \quad (05)$$

$$= \frac{\left(\frac{0.6 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)^2 \left(\frac{0.3 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)}{\left(\frac{0.2 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)^2 \left(\frac{0.3 \times 1.73 \times 10^6 \text{ Pa}}{1.4}\right)} \quad (10)$$

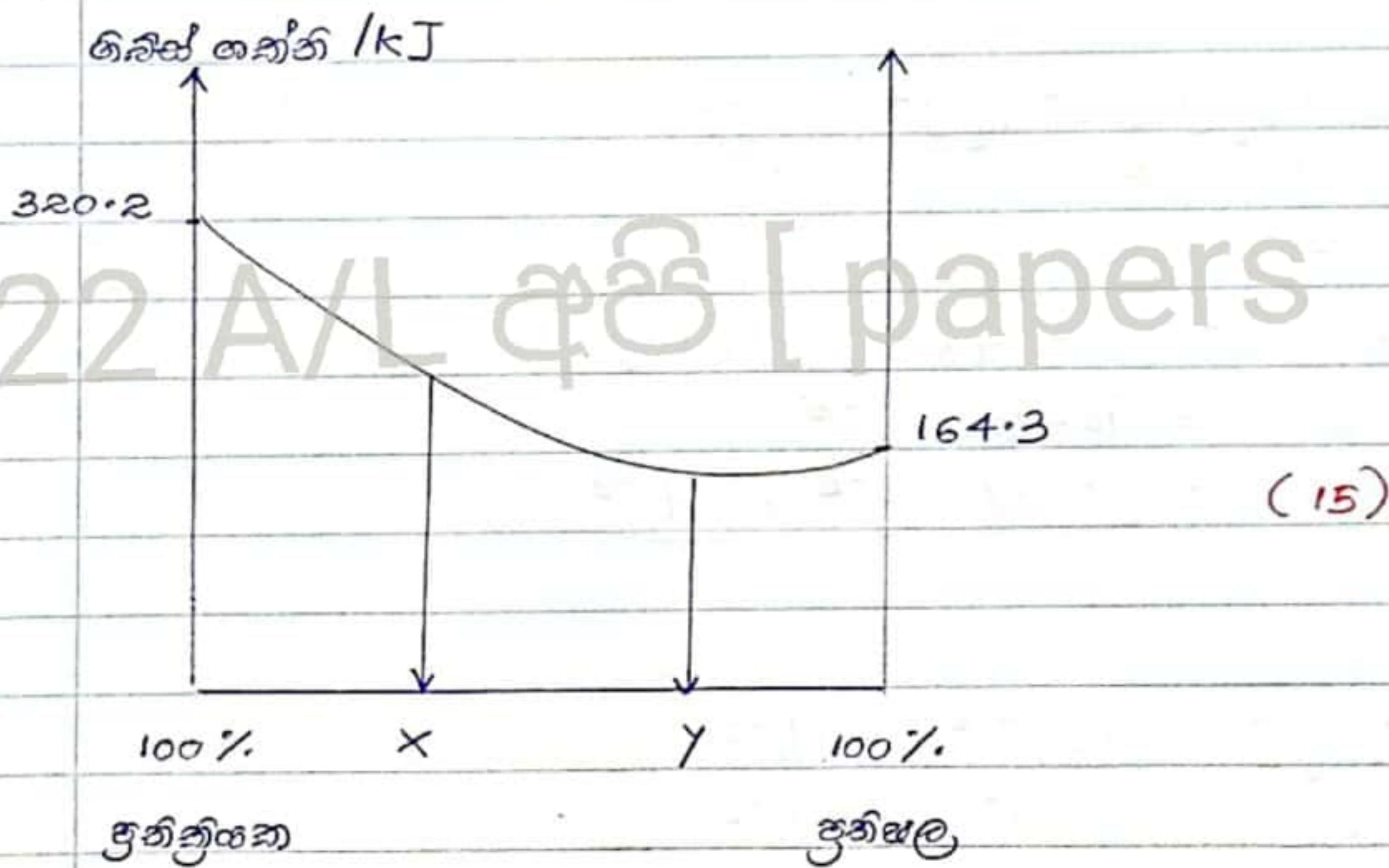
$$= \underline{9} \quad (05)$$

$$K_c = \frac{[C]^2 [D]}{[A]^2 [B]} \quad (05)$$

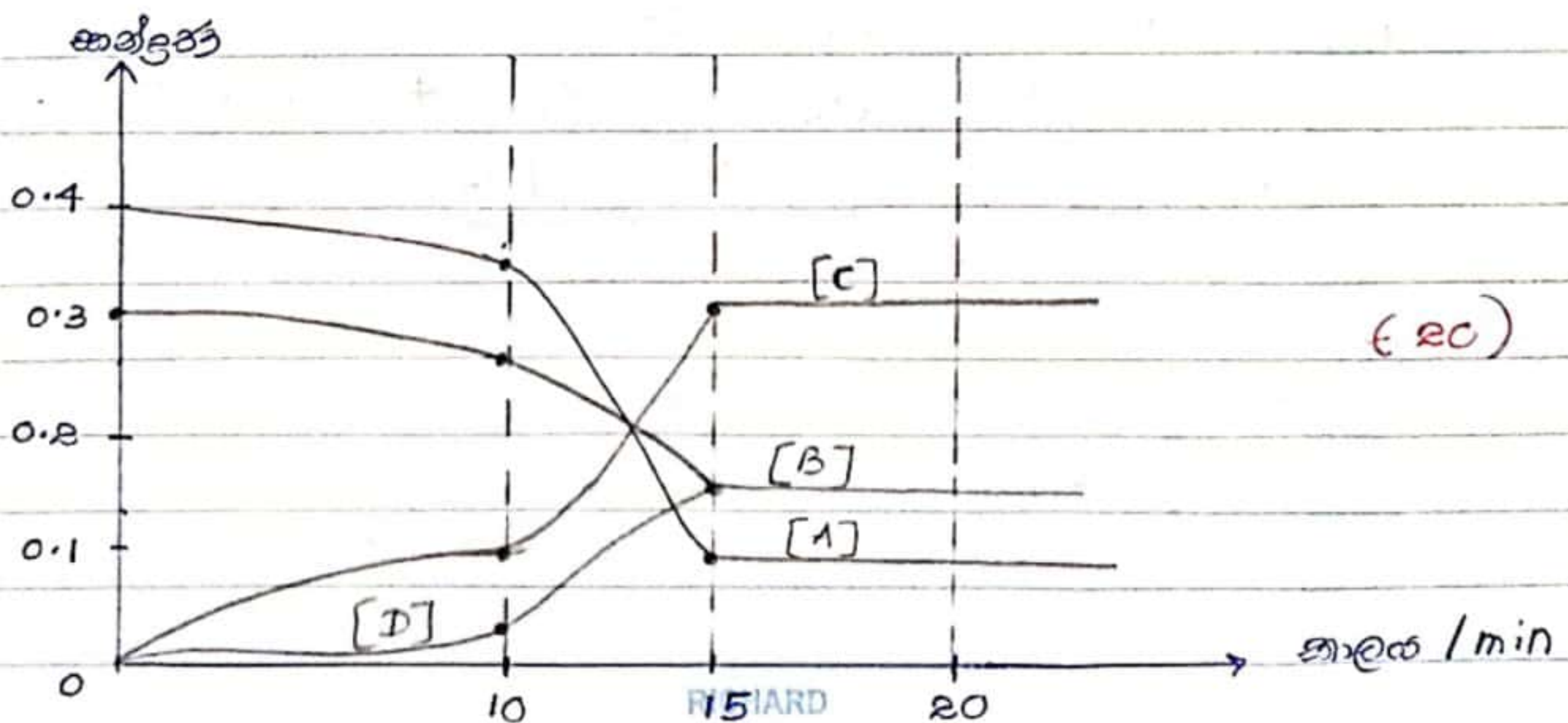
$$K_c = \frac{\left(\frac{0.6 \text{ mol dm}^{-3}}{2}\right)^2 \left(\frac{0.3 \text{ mol dm}^{-3}}{2}\right)}{\left(\frac{0.2 \text{ mol dm}^{-3}}{2}\right)^2 \left(\frac{0.3 \text{ mol dm}^{-3}}{2}\right)} \quad (05)$$

$$K_c = \underline{9} \quad (05)$$

iv)



v)

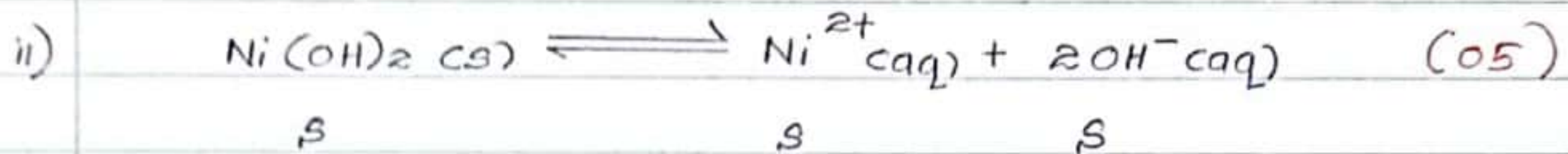


- vi) ഓക്സൻ പ്രാർ, അമാന അർ Z ഷമതു മൃഗർ കരച്ചുരിതനാശര ഹരപ്പുരർ തോരത. (05)

(5(b) - രൂപ 135)

⑥

- i) ട്രീർ മരയർ pH ഷുസരത ഷുസർതര ഷുസനാശ രെഷർ ഷിര. (05)



$$K_{sp} = [\text{Ni}^{2+} \text{ (aq)}] [\text{OH}^- \text{ (aq)}]^2 \quad (05)$$

$$K_{sp} = (s) (2s)^2$$

$$K_{sp} = 4s^3$$

$$2 \times 10^{-15} \text{ mol}^3 \text{ dm}^{-3} = 4s^3 \quad (05)$$

$$s = 1.25 \times 10^{-5}$$

$$s = 1.25 \times 10^{-5} \text{ mol dm}^{-3}$$

$$\text{ii) } \text{pH} = 12$$

$$[\text{H}_3\text{O}^+ \text{ (aq)}] = 1 \times 10^{-12} \text{ mol dm}^{-3} \quad (05)$$

$$[\text{OH}^- \text{ (aq)}] = 1 \times 10^{-2} \text{ mol dm}^{-3} \quad (05)$$

$$K_{sp} = [\text{Ni}^{2+} \text{ (aq)}] [\text{OH}^- \text{ (aq)}]^2$$

$$2 \times 10^{-15} \text{ mol}^3 \text{ dm}^{-3} = [\text{Ni}^{2+} \text{ (aq)}] (1 \times 10^{-2} \text{ mol dm}^{-3})^2 \quad (05)$$

$$[\text{Ni}^{2+} \text{ (aq)}] = \underline{2 \times 10^{-11} \text{ mol dm}^{-3}} \quad (05)$$

$$\text{pH} = 5$$

$$[\text{H}_3\text{O}^+ \text{ (aq)}] = 1 \times 10^{-5} \text{ mol dm}^{-3} \quad (05)$$

$$[\text{OH}^- \text{ (aq)}] = 1 \times 10^{-9} \text{ mol dm}^{-3} \quad (05)$$

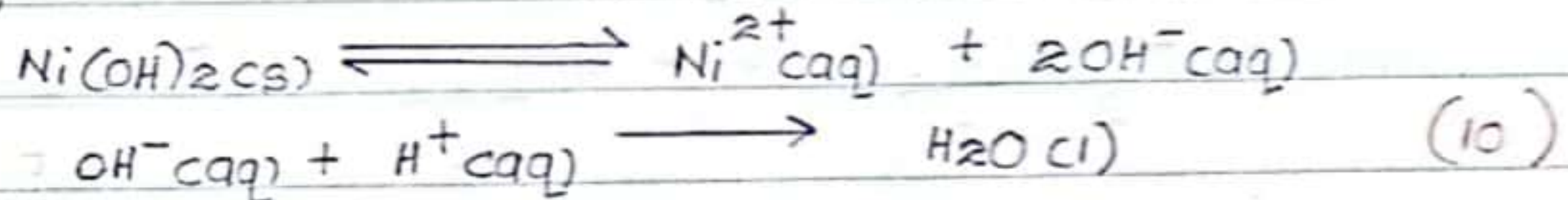
$$K_{sp} = [Ni^{2+}_{(aq)}] [OH^{-}_{(aq)}]^2 \quad (05)$$

$$2 \times 10^{-15} \text{ mol}^2 \text{ dm}^{-3} = [Ni^{2+}_{(aq)}] (1 \times 10^{-9} \text{ mol dm}^{-3})^2$$

$$[Ni^{2+}_{(aq)}] = 2 \times 10^{-3} \text{ mol dm}^{-3} \quad (05)$$

ආම්ලික ප්‍රදේශයේ තුළ ප්‍රතික්ෂේප වන අවස්ථාව.

සඳහන් කළ;



OH^{-} සමතුලිතයෙන් වෙන්වීම නිසා සමතුලිතය වැඩිපමණ තරමක් වෙනස් වීමක් ප්‍රතික්ෂේප වේ.

(b(a) - ලකුණු 70)

b) i) $P_A = P_A^* X_A$

$$P_A = 200 \text{ Pa} \times \frac{2}{10}$$

$$P_A = 40 \text{ Pa}$$

$$P_B = P_B^* X_B$$

$$P_B = 75 \text{ Pa} \times \frac{8}{10}$$

$$P_B = 60 \text{ Pa}$$

$$P_A + P_B = P_T$$

$$P_T = 100 \text{ Pa}$$

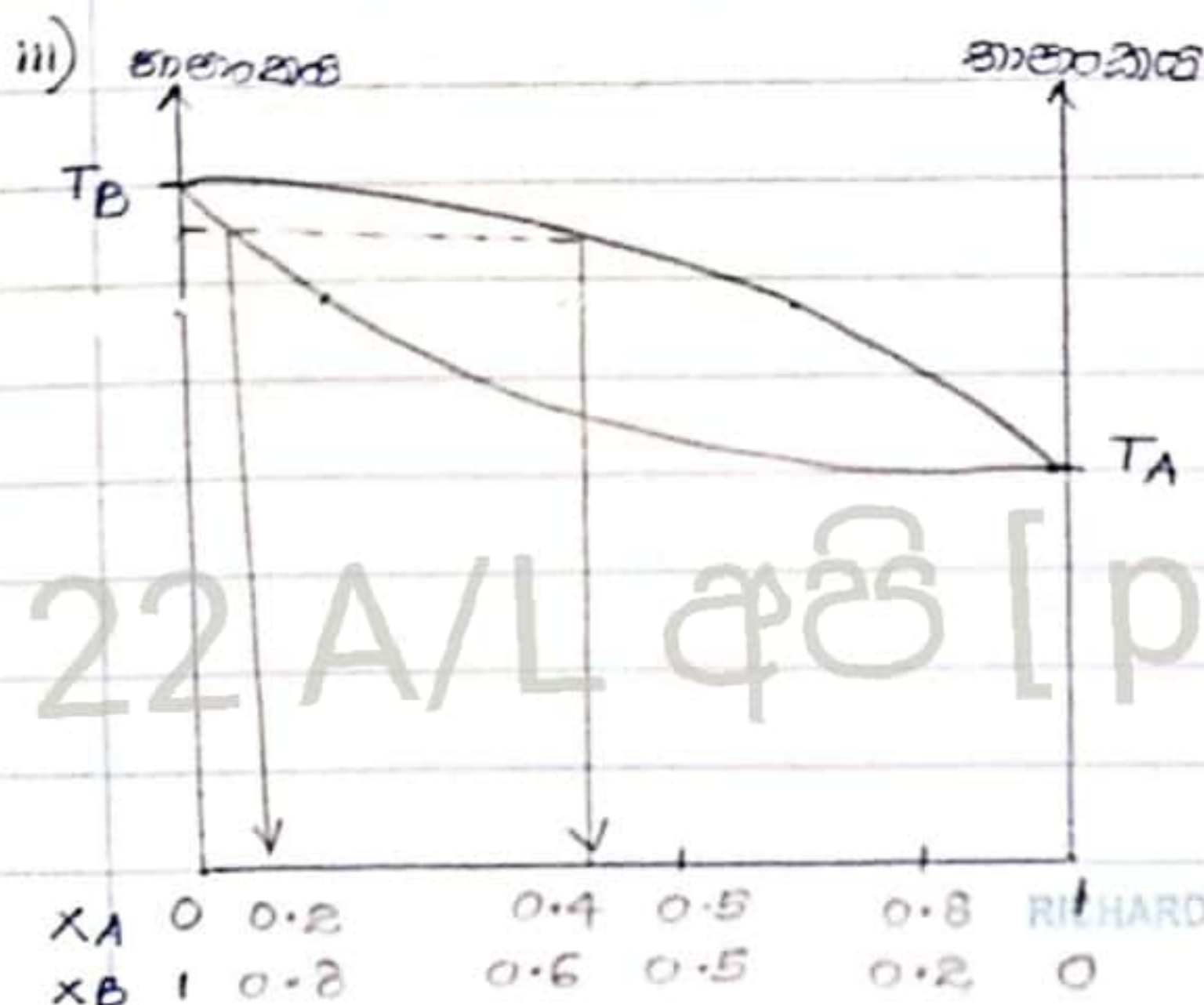
ii) $P_A = P_T X'_A$

$$X'_A = \frac{40}{100} = 0.4$$

$$X'_B = \frac{60}{100}$$

$$X'_B = 0.6$$

(25)



22 A/L අපි [papers grp]

- v) විශ්ලේෂණය ප්‍රදානය කරන විස්තරයක් ඇත.
විශ්ලේෂණය කරන විස්තරයක් ඇත.

(05)

(6(b) - මුද්‍රා 40)

c) i) $\text{Rate} = k [X]^a [Y]^b [Z]^c$ හි

$$\text{Rate} = -\frac{1}{2} \frac{\Delta [X]}{\Delta t} = -\frac{\Delta [Y]}{\Delta t} = -\frac{\Delta [Z]}{\Delta t} \quad (10)$$

ii) $1 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1} = k (0.05 \text{ mol dm}^{-3})^a (0.05 \text{ mol dm}^{-3})^b (0.05 \text{ mol dm}^{-3})^c \quad \text{--- ①}$

$3 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1} = k (0.15 \text{ mol dm}^{-3})^a (0.05 \text{ mol dm}^{-3})^b (0.05 \text{ mol dm}^{-3})^c \quad \text{--- ②}$

$9 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1} = k (0.15 \text{ mol dm}^{-3})^a (0.15 \text{ mol dm}^{-3})^b (0.05 \text{ mol dm}^{-3})^c \quad \text{--- ③}$

$9 \times 10^{-3} \text{ mol dm}^{-3} \text{ s}^{-1} = k (0.15 \text{ mol dm}^{-3})^a (0.15 \text{ mol dm}^{-3})^b (0.5 \text{ mol dm}^{-3})^c \quad \text{--- ④}$

(20)

$$\frac{\text{①}}{\text{②}} \quad \frac{1}{3} = \left(\frac{1}{3}\right)^a$$

$$\frac{\text{②}}{\text{③}} \quad \frac{1}{3} = \left(\frac{1}{3}\right)^b$$

$a = 1$

$b = 1$

$$\frac{\text{④}}{\text{③}} \quad 1 = \left(\frac{1}{10}\right)^c \quad (05)$$

$c = 0$

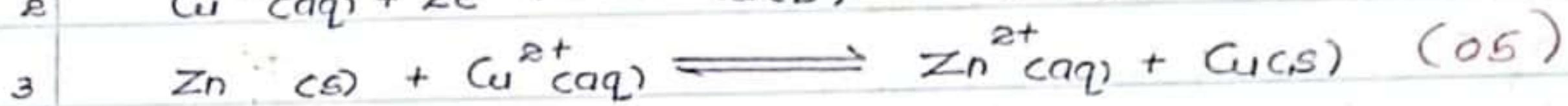
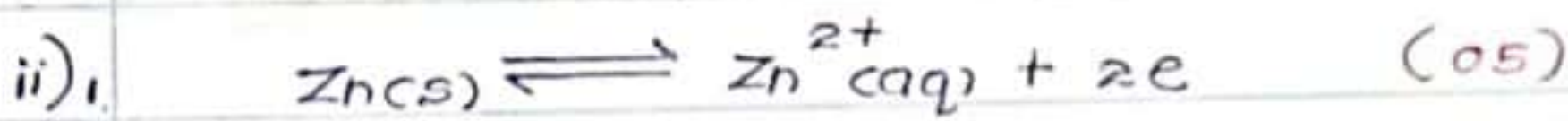
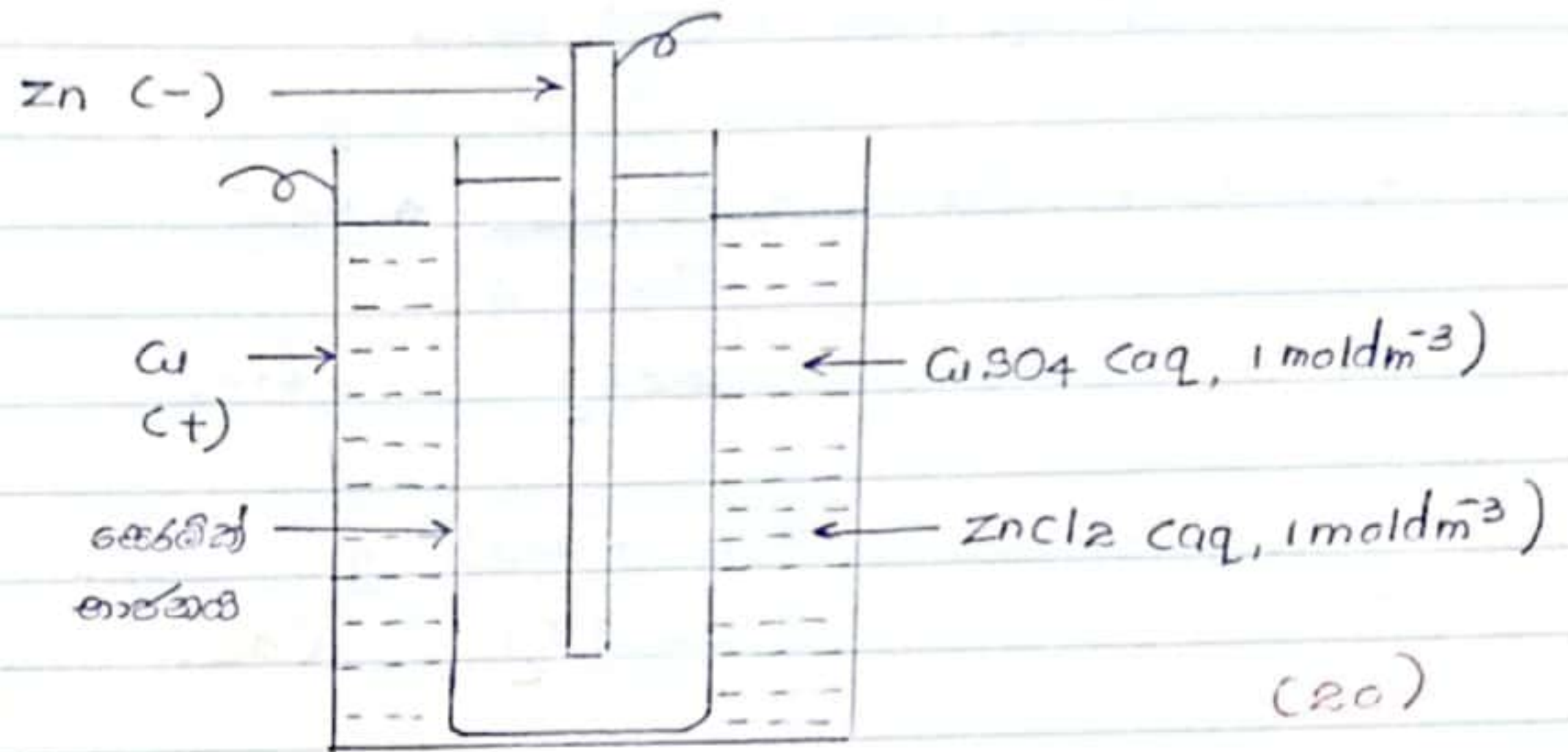
22 A/L අපි [papers grp]

iii) නිශ්පාදන = 2

(05)

(6(c) - මුද්‍රා 40)

7) a) i)



4 $E^\ominus_{\text{cell}} = E^\ominus_{\text{cathode}} - E^\ominus_{\text{anode}}$

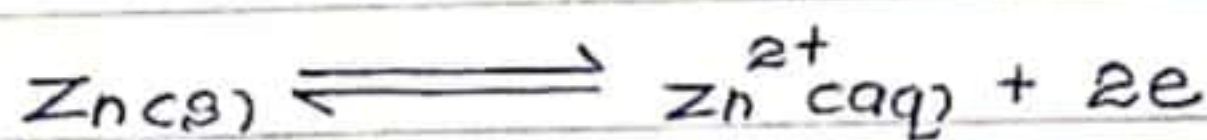
$= 0.34 \text{ V} - (-0.76 \text{ V})$

$= 1.1 \text{ V}$ (10)

iii) $q = It$

$q = 1.1 \times 60 \times 60 \times 2 \text{ s}$

$q = 7200 \text{ C}$ (10)

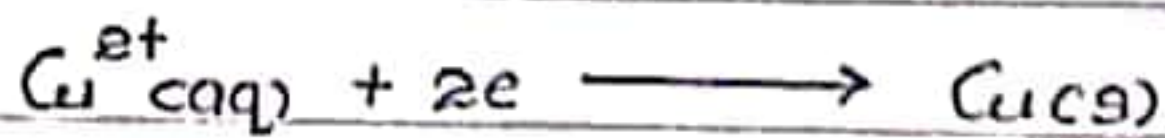


മുഖ്യ Zn കത്തോഡ് = $\frac{7200 \text{ C} \times 65 \text{ g mol}^{-1}}{96500 \text{ C mol}^{-1} \times 2 \text{ mol}}$

$= 2.42 \text{ g}$ (10)

Zn ഓക്സൈഡേഷൻ മൂലമുള്ള കത്തോഡ് = $(100 - 2.42) \text{ g}$

$= 97.58 \text{ g}$ (05)



$$\begin{aligned} \text{മലിവി Cu പിണ്ഡം} &= \frac{7200}{96500 \times 2} \times 63.5 \\ &= 2.37 \text{ g} \quad (10) \end{aligned}$$

$$\begin{aligned} \text{മുഖമ Cu പിണ്ഡം} &= (100 + 2.37) \text{ g} \\ &= 102.37 \text{ g} \quad (05) \end{aligned}$$

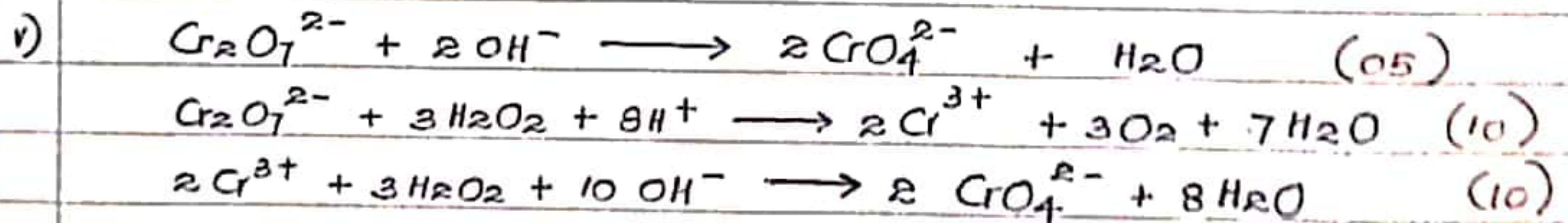
22 A/L പേപ്പർ [papers grp 1] (7(a) രേഖ 85)

b) i) $\text{Cr}_2\text{O}_7^{2-}$ - തരിളി തവ (05)

ii) CrO_4^{2-} - തവ തവ (05)

iii) $\text{Cr}^{3+}_{\text{aq}}$ / $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ / $[\text{Cr}(\text{SO}_4)(\text{H}_2\text{O})_5]^+$ (05)
തോള തവ തരിളി തവ തവ (05)

iv) ത്രവ തവ തരിളി തവ തവ (05)



vi) $\text{K}_2\text{Cr}_2\text{O}_7$ - potassium dichromate

$(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ - ammonium dichromate (05)

vii) ത്രവ ത്രവ തരിളി തവ തവ

തരിളി തവ തരിളി തവ

ത്രവ തരിളി തവ

ത്രവ തരിളി തവ തരിളി തവ (05)

viii) ത്രവ തരിളി തവ (05)

(7(b) രേഖ 65)

RICHARD

C നോക്ക - രാജാ

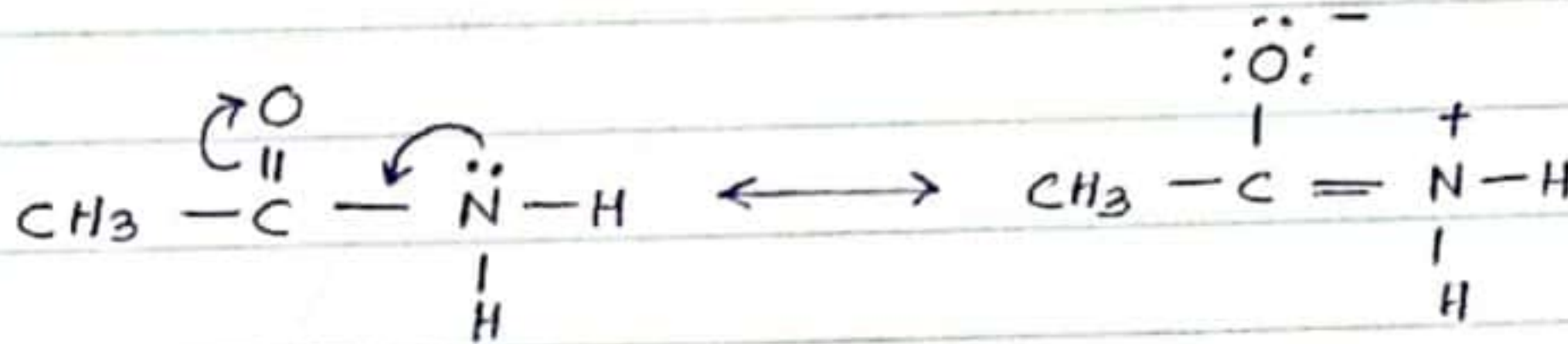
(a)

- i) $\text{CH}_3\text{CH}_2\text{OH}$ ന്റെ ഏറ്റവും കൂടുതൽ CH_3OH ന്റെ ഏറ്റവും കൂടുതൽ ഓക്സീജൻ അറ്റം ഉള്ളതാണ്. CH_3OH ന്റെ ഓക്സീജൻ അറ്റം O ഉള്ളതാണ്. CH_3OH ന്റെ ഓക്സീജൻ അറ്റം O ഉള്ളതാണ്.

$\text{CH}_3-\text{O}-\text{H}$ ൽ $\text{O}-\text{H}$ ബന്ധം ദുർബ്ബലാണ്.

H^+ ഉപയോഗിച്ച് CH_3OH ൽ അലിയിക്കുന്നു. (10)

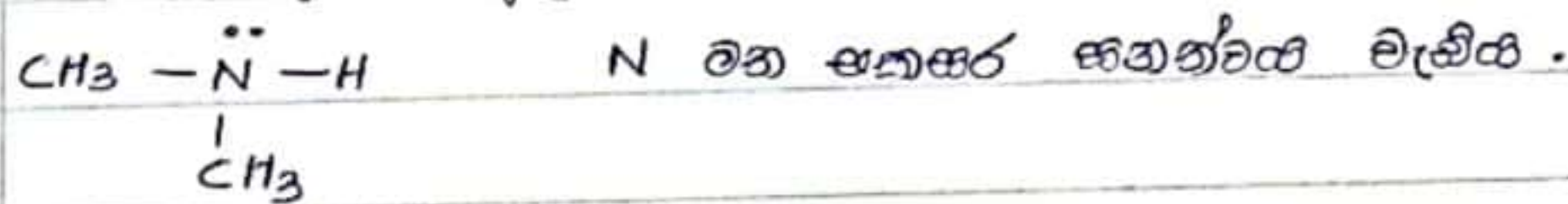
ii)



കാർബണിക് അമ്ലത്തിൽ N ന്റെ അമ്ലതയെക്കുറിച്ച് C ഉള്ളതാണ്.

N ന്റെ അമ്ലതയെക്കുറിച്ച്.

അലിയിക്കുന്നു.

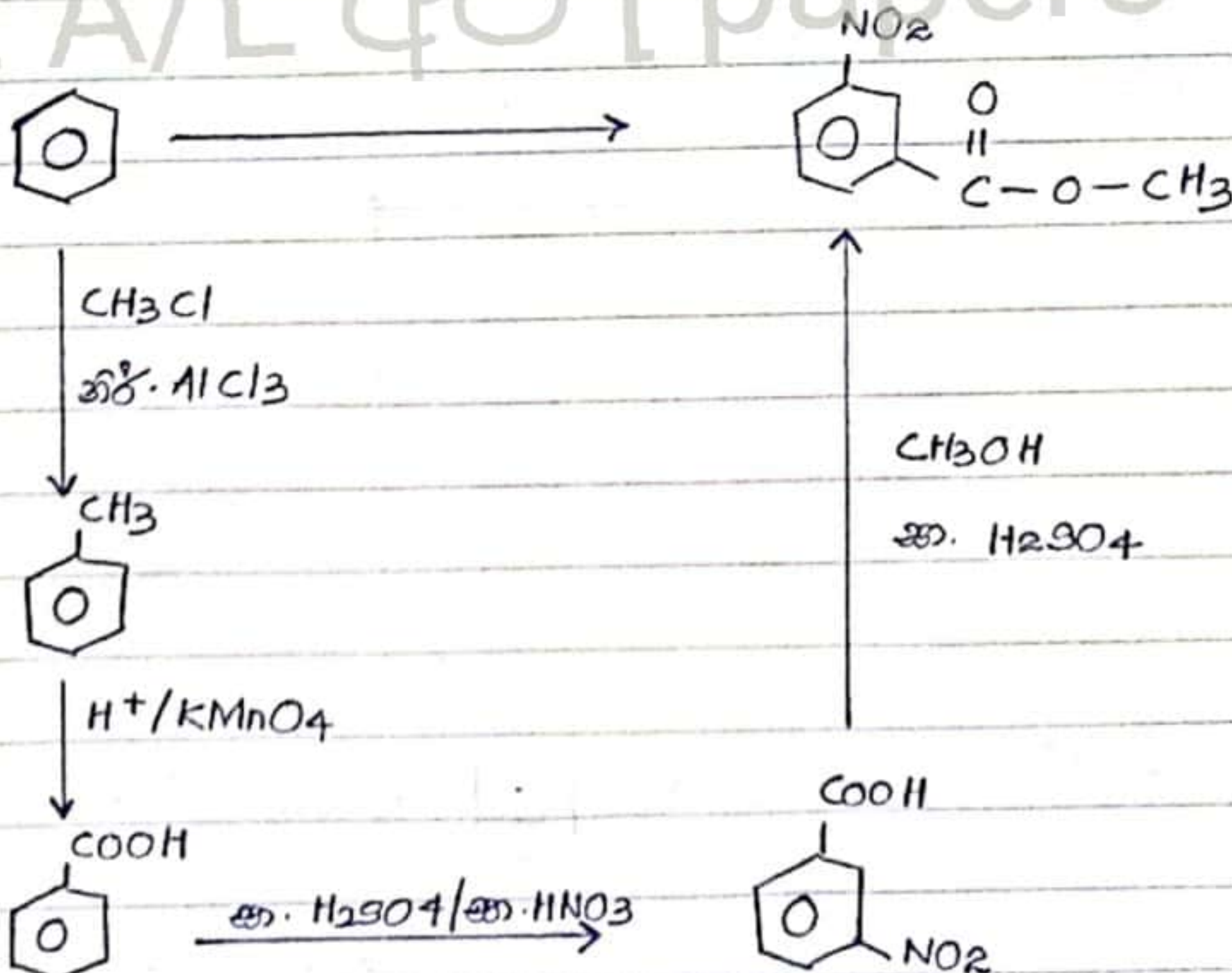


$\therefore$ അലിയിക്കുന്നു.

(10)

(8(a) - രാജാ 20)

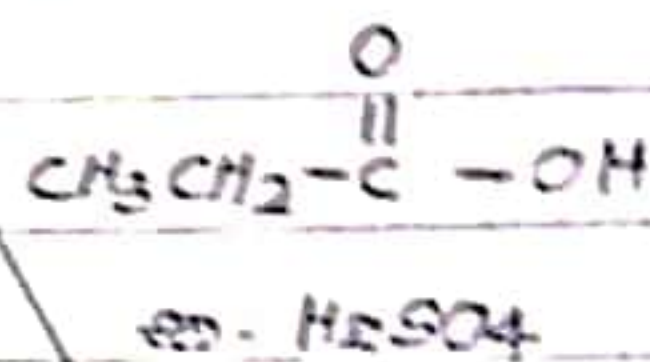
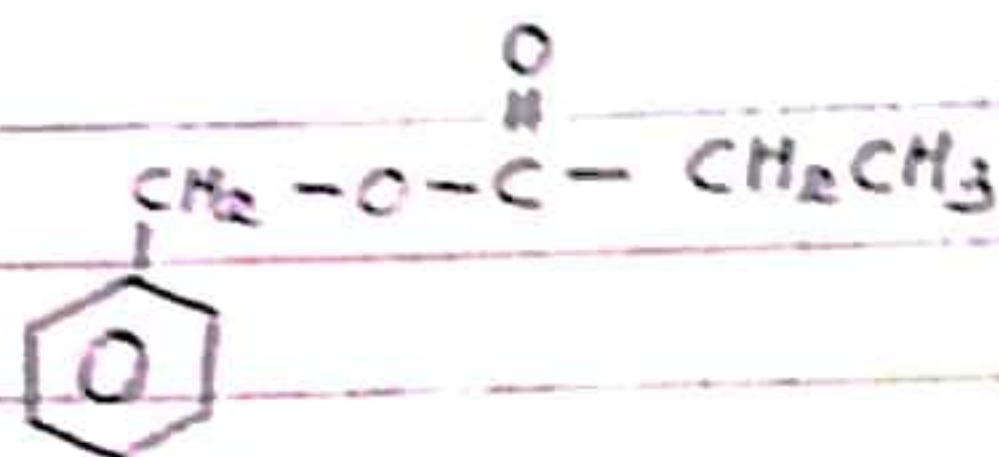
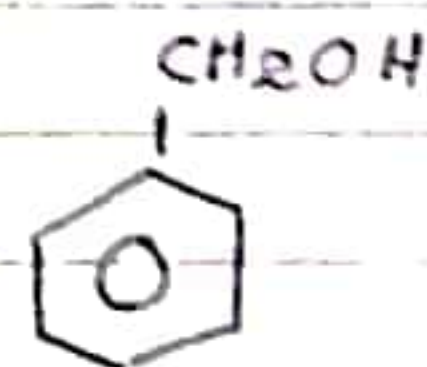
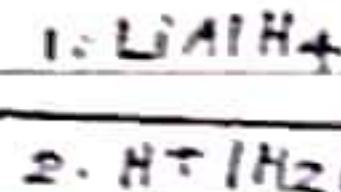
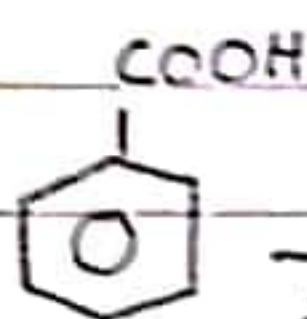
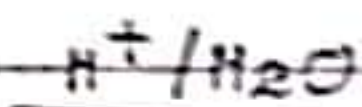
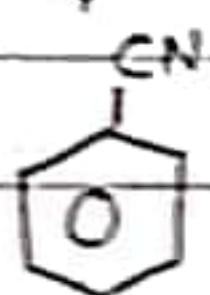
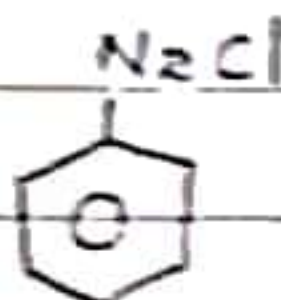
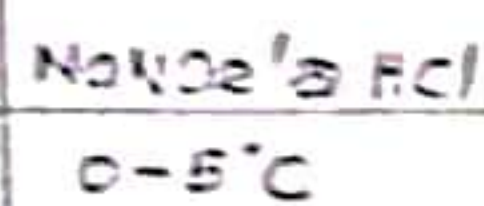
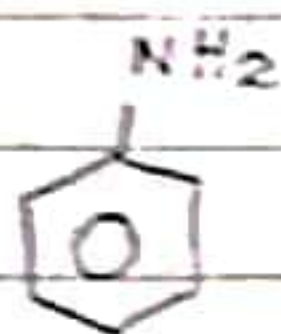
b) i)



(40)

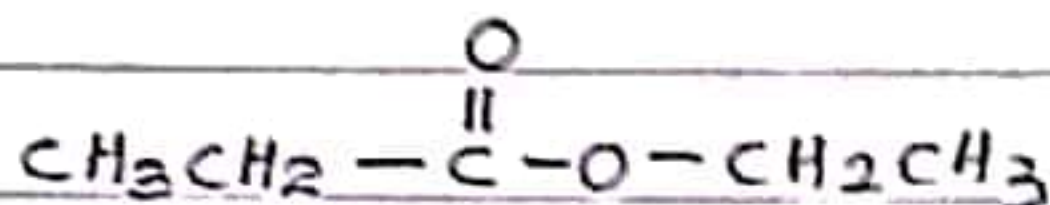
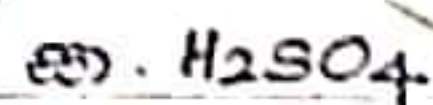
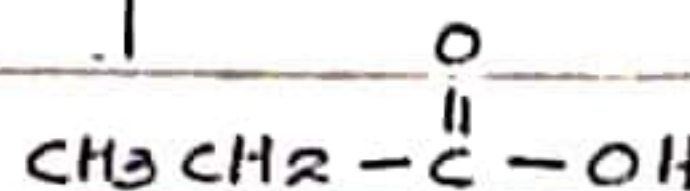
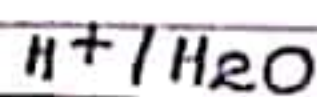
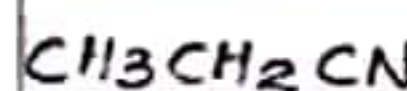
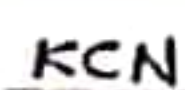
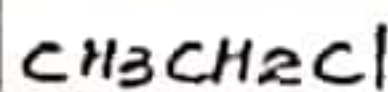
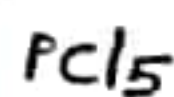
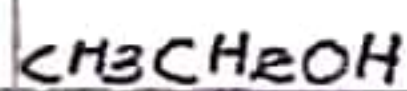
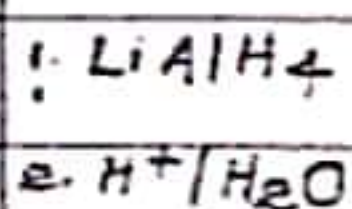
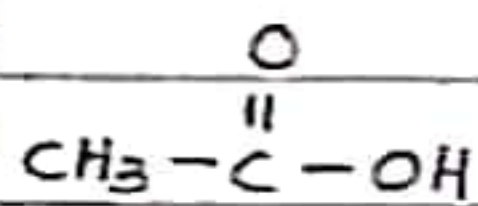
RICHARD

ii)



(40)

iii)



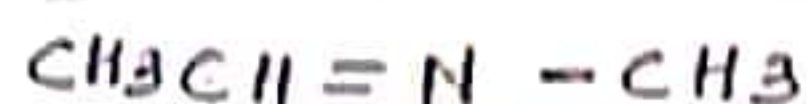
(30)

(8(b) 2003 110)

RICHARD

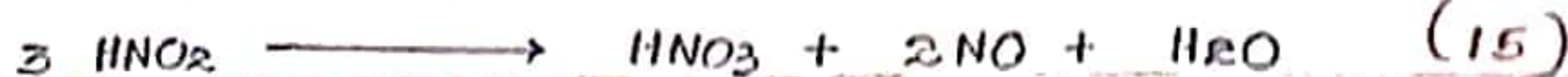
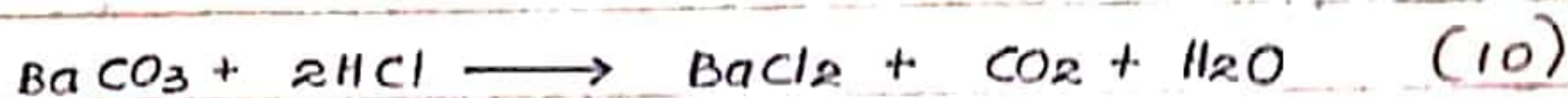
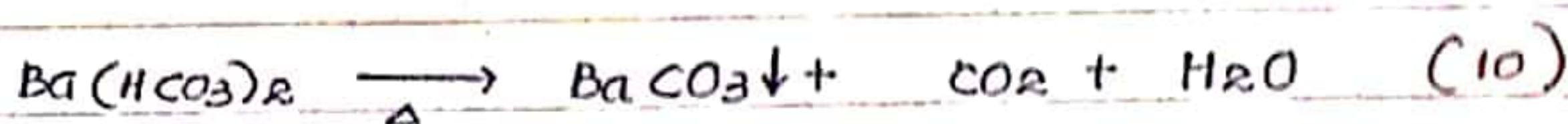
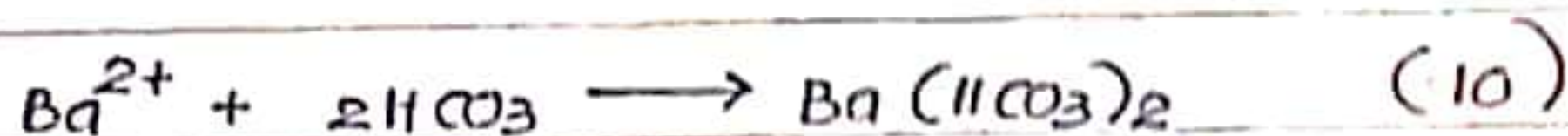
$$\text{CH}_3 - \overset{\text{O}}{\parallel} \text{C} - \text{H} \quad \xrightarrow{\text{H}-\ddot{\text{N}}-\text{CH}_3} \quad \text{CH}_3 - \overset{\text{O}-\text{H}}{\underset{\text{H}}{\mid}} \text{C} - \underset{\text{H}}{\mid} \text{N}(\text{CH}_3) - \text{CH}_3$$

(2c)

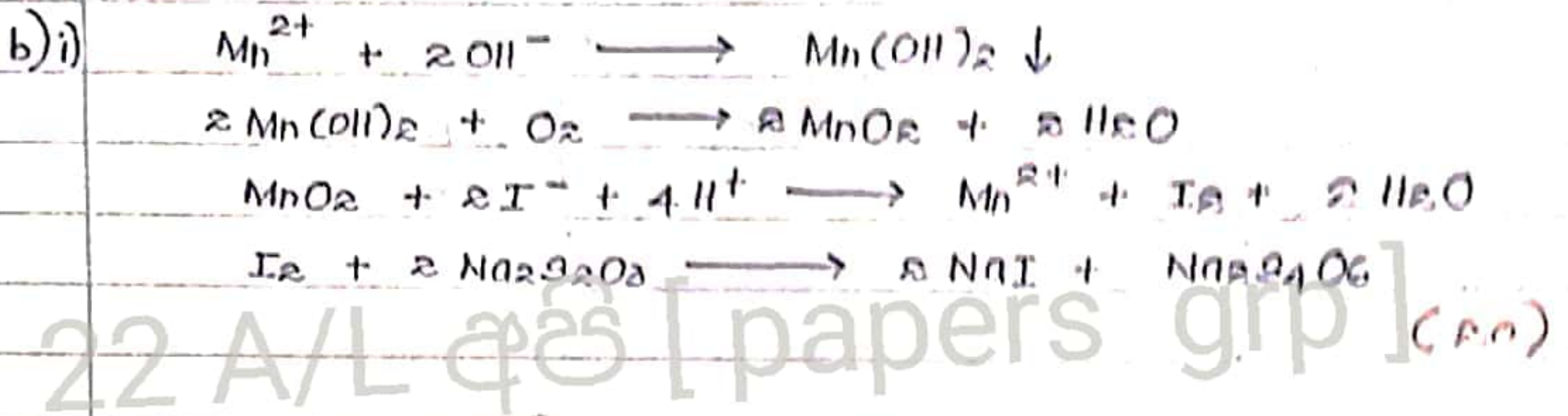


(8(c) - 20)

i $\text{SO}_4^{2-} / \text{HCO}_3^- / \text{I}^- / \text{NO}_2^-$ (20)



(7(a) - ഭൂമി 85)



ii) $\text{Na}_2\text{S}_2\text{O}_3$ මවුල = $\frac{0.01}{1000} \times 12 \text{ mol}$ (05)

I_2 මවුල = $\frac{0.01}{1000} \times 12 \times \frac{1}{2} \text{ mol}$ (05)

MnO_2 මවුල = $\frac{0.01}{1000} \times 12 \times \frac{1}{2} \text{ mol}$ (05)

O_2 මවුල = $\frac{0.01}{1000} \times 12 \times \frac{1}{2} \times \frac{1}{2} \text{ mol}$ (05)

$[\text{O}_2] = \frac{0.01}{1000} \times 12 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1000}{25}$ (05)

= $1.2 \times 10^{-3} \text{ mol dm}^{-3}$

O_2 ඔක්සිජන් ppm = $1.2 \times 10^{-3} \times 32 \times 1000 \text{ ppm}$ (05)

= 38.4 ppm (05)

iii) O_2 හි ඉහතතර ද්‍රව්‍යමය බව රළු වන්නී. (05)

$[\text{O}_2]$ ද්‍රව්‍යමය බව රළු වන්නී.

iv) හිමින ඉහත ඔක්සිජන් ගුණිතය. (05)

(9(6) - අනුග්‍රහ 65)

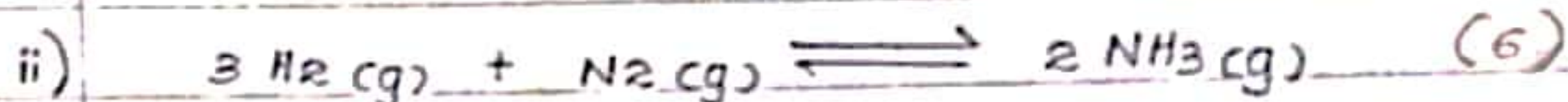
(10) a)

i) NaCl ക്ഷീകരണം

2 ലക്ഷക്കോടി ടൺ ഏകദേശം

3 ലക്ഷം ടൺ NH_3 ക്ഷീകരിച്ചിട്ടുണ്ട്.

(9)



iii) A - NaCl (aq)

B - NaOH അല്ല Cl_2

C - Cl_2 അല്ല NaOH

D - H_2

E - CO₂

F - CaO

G - N_2

H - NH_3

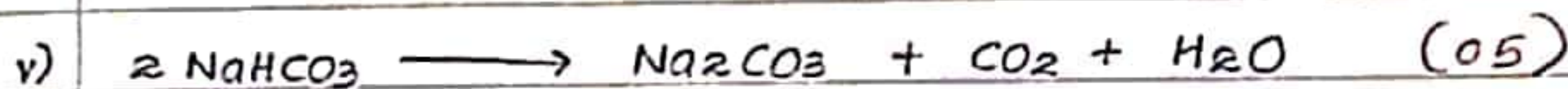
I - NaHCO₃

(22)

J - Na₂CO₃

- CO₂ + H₂O

iv) ലൂട്ടിയം / ഓക്സൈഡ് / ക്ലോറൈഡ് / ബ്രോമൈഡ് (03)



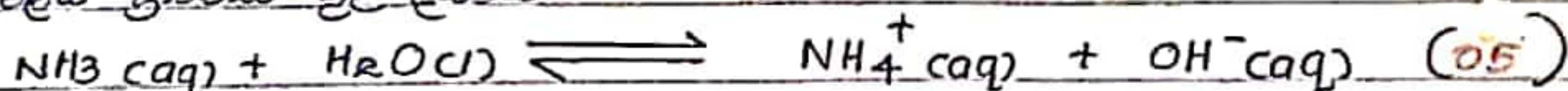
vi) ഉൽപ്പാദനം 450°C

ദ്രവത $250 - 300 \text{ atm}$

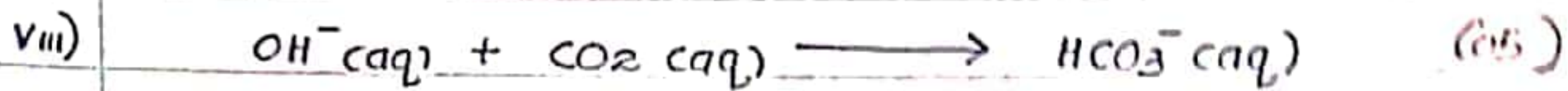
ഉൽപ്പാദനം Fe

ഉൽപ്പാദന വാതകം $\text{K}_2\text{O} / \text{Al}_2\text{O}_3$ (10)

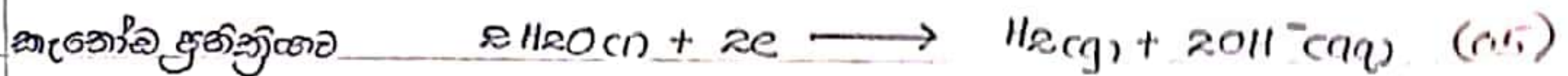
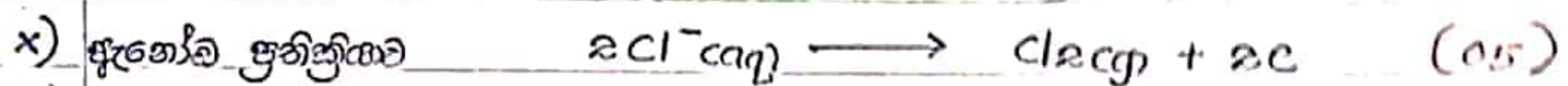
vii) NH_3 ജലീയ ലായനയിൽ ഇലക്ട്രോലൈറ്റ്.



RICHARD



ix) J - විදුරු නිපදවීම
නිපදවීම (05)
යෙදීමේ ආර්ථිකයට දෙනු ලබන හේතූන්



(10 (a) - ඉන්ද්‍රි 30)

b) i) N_2 අණුවල ඇති න්‍යූන් සන්ධාන බිඳීමට ඉහළ ඔක්සිජන් සාන්ද්‍රණයක් අවශ්‍ය වේ. (10)

ii) NO , NO_2 (10)

iii) අධික රසායනික පොහොර භාවිතය
අධික ලෙස ජෛව පාලන භාවිතයේ ප්‍රතිඵලයක් ලෙස
(HNO_3 නිපදවීම)
අනුරූප වේ. (05)

iv) ප්‍රධාන රසායනික වූත්තය
අම්ල පිළි (10)
 O_3 විෂම භාගයන්

v) ප්‍රධාන රසායනික වූත්තය අඩු ප්‍රතික්‍රියා හෝ O_3 භාගයන් අඩු ප්‍රතික්‍රියා. (10)

vi) රසායනික නොහොර භාවිතය අත්හිට

මානව ජීවිත ප්‍රදේශය නිසි ආකාරයට නිවැරදි වීම

• හොඳ ප්‍රතිචාරය .

(05)

(10 (b) - මුද්‍රා 60)

22 A/L අපි [papers grp]