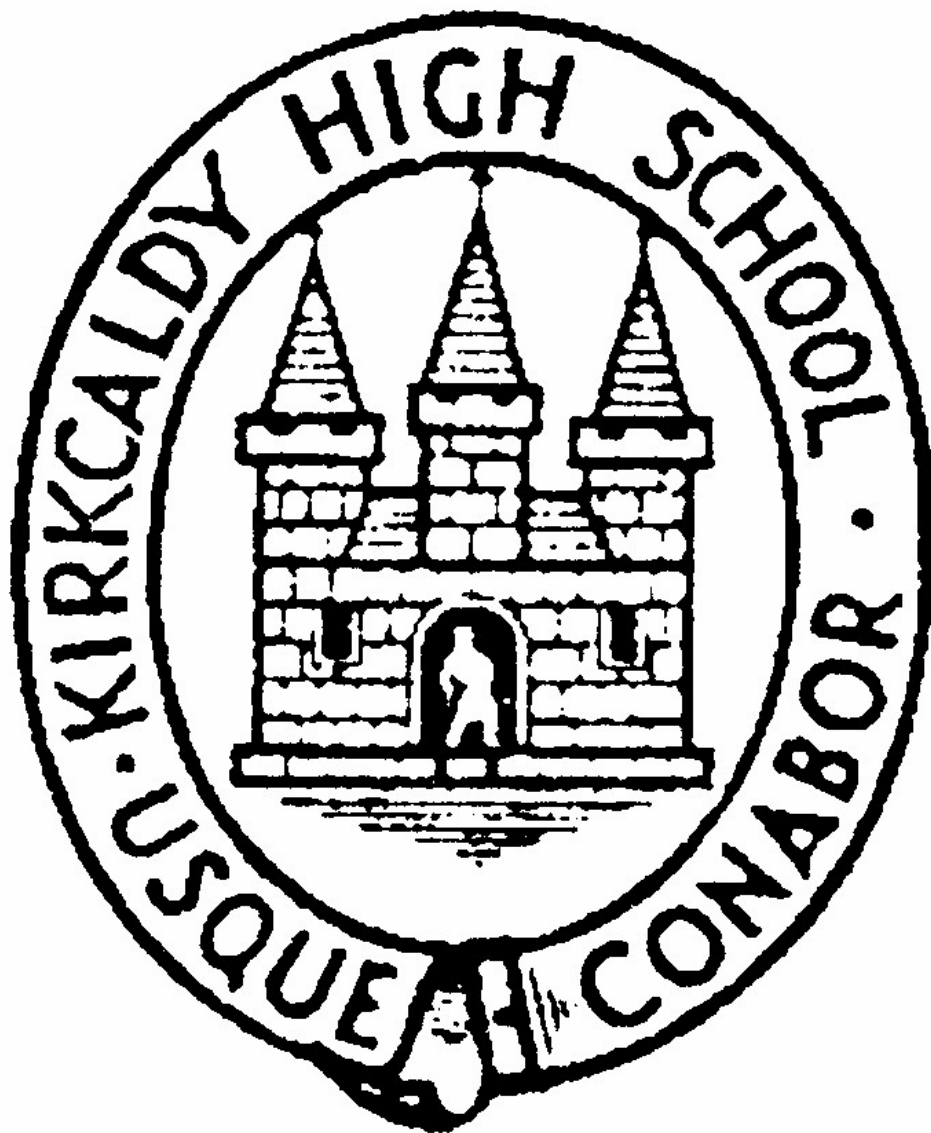


National 5 Chemistry

Past Paper Answers – Book 3



National 5 2019

2019

National 5 Chemistry 2019.

Multiple Choice.

1. C.

$$\begin{aligned} \text{rate} &= \frac{\Delta Q}{\Delta t} \\ &= \frac{2.5}{1} \\ &= 2.5 \text{ cm}^3 \text{ min}^{-1} \end{aligned}$$

2. B.

$$\begin{aligned} \text{rate} &= \frac{\Delta Q}{\Delta t} \\ &= \frac{\text{cm}^3}{\text{min}} = \text{cm}^3 \text{ min}^{-1} \end{aligned}$$

3. C

DB p6 - 7 outer electrons.

4. D

more protons (+) than electrons (-)

5. B

A - untrue. Critical temp below 40°C
B - true. Compare NH₃ and CO₂ to others
C - untrue. Compare NH₃ and O₂
D - untrue. Compare O₂ and He.

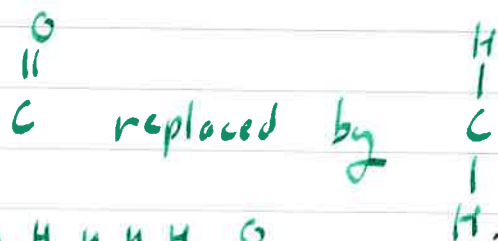
6. D



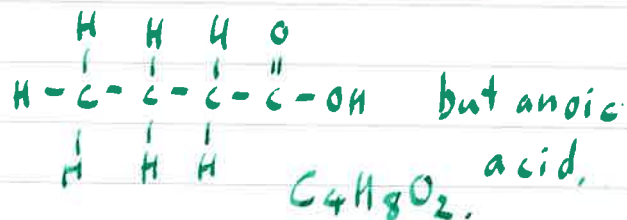
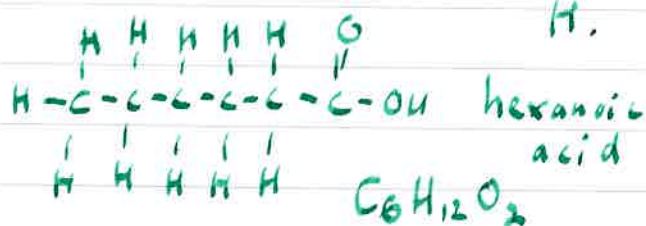
7. A

D.B p6.
A: Na⁺ 2, 8 O²⁻ 2, 8.
B: Li⁺ 2 F⁻ 2, 8.
C: K⁺ 2, 8, 8 Br⁻ 2, 8, 18, 7.
D: Mg²⁺ 2, 8 Cl⁻ 2, 8, 7.

16. B.



17. B.



formula mass ↓
solubility ↑ (longer chain less soluble)

18. D.

Zn & Cu closest together, lowest voltage.

19. C

z most reactive,
y least reactive.

20. C.

repeating units:



from but-2-ene

from propene



21. C.

Soluble in water \Rightarrow can't use water!
 \Rightarrow not B or A

More dense than air \Rightarrow sinks in air
 \Rightarrow C.

22. A

DB p. 6.

23. D

from notes.

24. C.

A: no - no. double bonds broken
B: no - no reaction with O_2 .
C: yes - solid formed from solutions.
D: no - no acid/base.

25. B

Na^+ and NO_3^- both aqueous on both sides.

Written Questions.

1a. Non metals only in compound, \Rightarrow covalent bonding likely.

High melting point \Rightarrow network structure

1b. Same no. protons but different mass = isotopes.

ii. There are different numbers of neutrons (mass number is protons + neutrons)

iii. 11 (10.8 closer to 11 than 10)

c. $\% \text{ mass} = \frac{\text{mass of lead oxide}}{\text{total mass}}$

$$\text{mass of lead oxide} = \% \times \text{total mass}$$

$$= 0.24 \times 500$$

$$= 120 \text{ g}$$

a. $-OH$ = hydroxyl group.

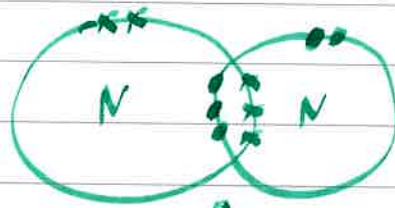
b. enzyme. (in text)

c. calcium oxalate (oxalic acid = acid
calcium = base)

d. 74g

lactic acid = $C_3H_6O_2$
 $\begin{array}{l} \rightarrow 3 \times 12 = 36 \\ \rightarrow 6 \times 1 = 6 \\ \rightarrow 2 \times 16 = 32 \\ \hline 74 \end{array}$

3a. N: 5 outer electrons

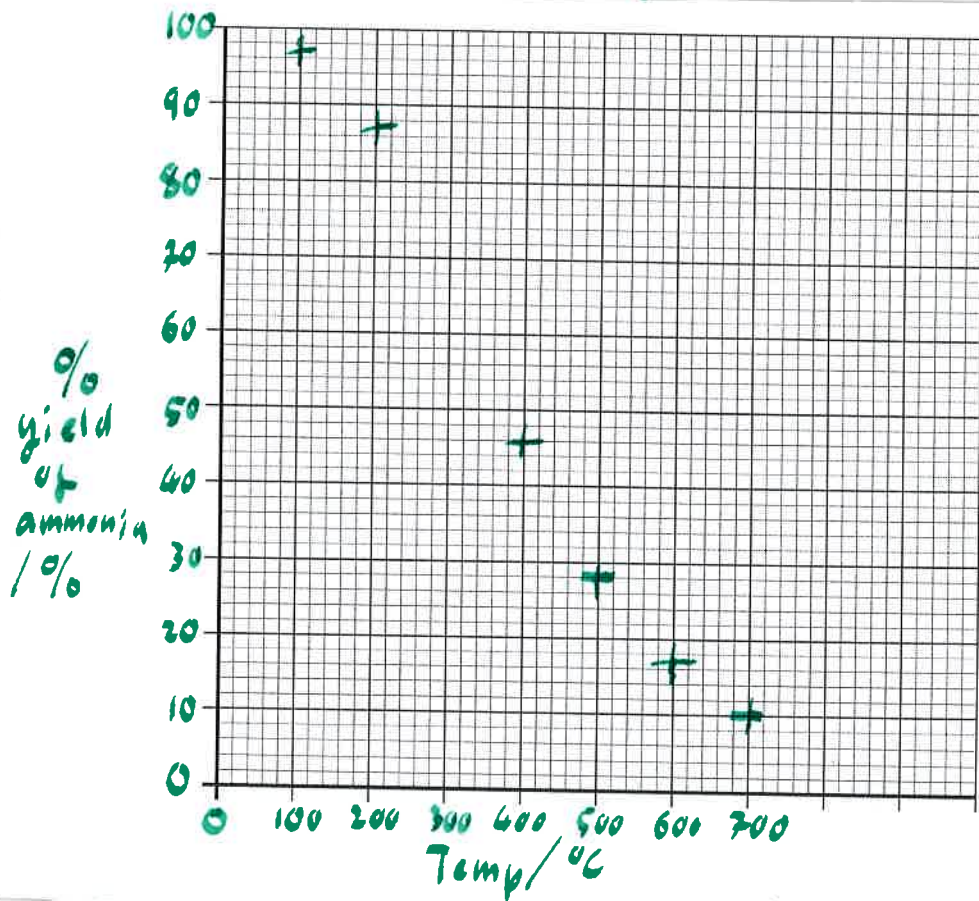


↑
must share
3 pairs to
make 8 in total
for each atom.

b. Blue or purple (ammonia is a base)

ci. % yield decreases as temperature increases.

ii.



di.

electrolysis

lithium nitride

from ↓ ext.

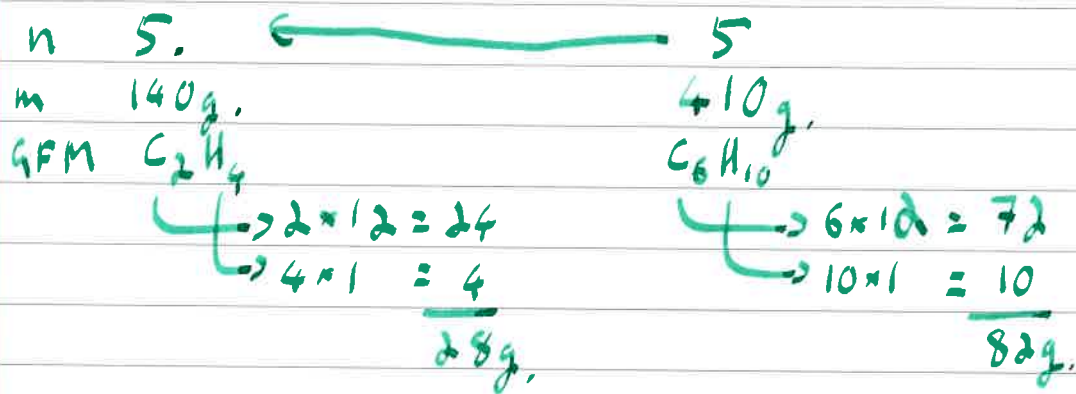
ii. loop showing recycling of water.

5a. Add bromine water - decolourises,

bi. Hydrogenation (addition of hydrogen)

ii. Chlorine (Cl_2)

iii. Polypropene,



$$m = n \times \text{RFM}$$

$$= 5 \times 28.$$

$$= 140\text{g.}$$

$$n = \frac{m}{\text{RFM.}}$$

$$= \frac{410}{82}$$

$$= 5.$$

ii. The forces between the molecules are weaker.

6. Open question. Could mention,

- formation of oxides (reactions with oxygen)
- metal oxides as bases
- non-metal oxides as acids
- solubility of metal oxides (DB p8)
- writing formulae for metal & non-metal oxides (valencies, prefixes etc.)

7a. A group of molecules with similar properties that share a general formula.

bi. Alkanes (fits $C_n H_{2n+2}$).

ii. $C_{72} H_{146}$

c. $394^\circ C$

20	343)13
21	356)13
22	369)12
23	381)12
24	394.	

8a. Supernova explosions (from text)

b. Beryl = beryllium aluminium silicate
 \Rightarrow Be, Al, Si, O

c. $\text{BeCl}_2 + \text{K} \rightarrow \text{Be} + \text{KCl}$ (from text, 3rd paragraph)

d. reduction $\text{Be}^{2+} + 2\text{e}^- \rightarrow \text{Be}$ gains electrons.

e. ${}^1_0\text{n}$, mass = 1 \Rightarrow neutron
charge = 0

9a, Exothermic,

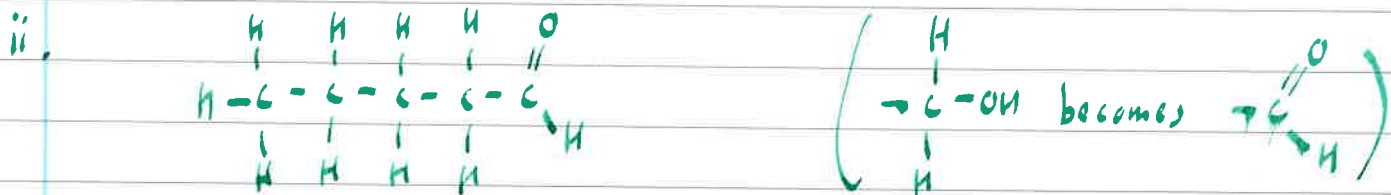
bi, $E = cm\Delta T$

$$m = \frac{E}{c\Delta T}$$
$$= \frac{8.36}{4.18 \times 40}$$

$$= 0.05 \text{ kg}$$

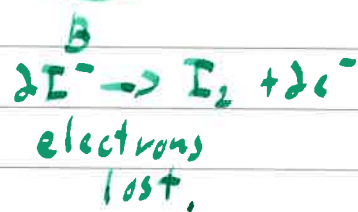
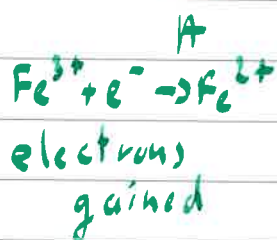
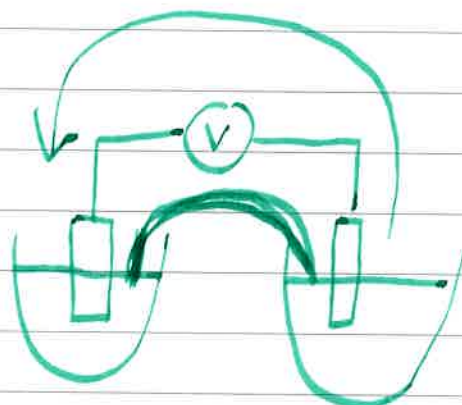
- ii, • Copper is a better conductor of heat than glass.
• Less heat energy is lost to the surroundings.

ci, when OH group is on the end carbon, an aldehyde is formed.

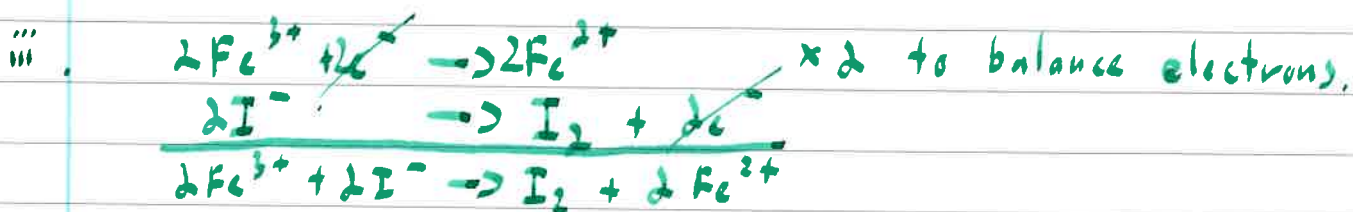


10a. Salt bridge or ion bridge.

b.i.



ii. Electrons lost \rightarrow oxidation.



c. It is a good conductor of electricity.

11a.



cancel
→



metal (+)
valency 2

DB PB.

b. propanoic acid.

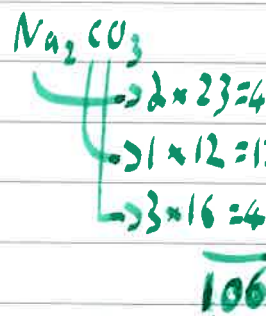
c. ... no more reacts - fizzing stops.

d. • Filter excess calcium carbonate.
• evaporate water.

12a) Standard solution,

ii. $n = CV$ \leftarrow 200 cm³ in litres
 $= 1.0 \times 0.2$
 $= 0.2$

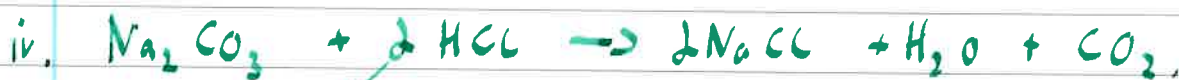
$$m = n \times \text{GM}$$
$$= 0.2 \times 106$$
$$= 21.2 \text{ g}$$



bi. Student should read burette at eye level

ii. To determine the end-point (when the solution is neutral)

iii. Concordant,



n	0.015	$\xrightarrow{\times 2}$	0.03
C	1.0 mol L^{-1}		1.5 mol L^{-1}
V	15.0 cm^3		20 cm^3
	0.015 L		0.02 L

$$n = CV$$
$$= 0.015 \times 1$$
$$= 0.015$$

$$C = \frac{n}{V}$$
$$= \frac{0.03}{0.02}$$
$$= 1.5 \text{ mol L}^{-1}$$

13. Open question. Could mention:

- Atomic structure (protons, neutrons + electrons)
- Electrolysis
- Ionic bonding
- Covalent bonding
- Metallic bonding.