**EXAM**

**CHEM F4 MARKING SCHEME 2021**

1. (a) (i) T2 and T3 / T2 and T4/T3 any other order

(ii) T5

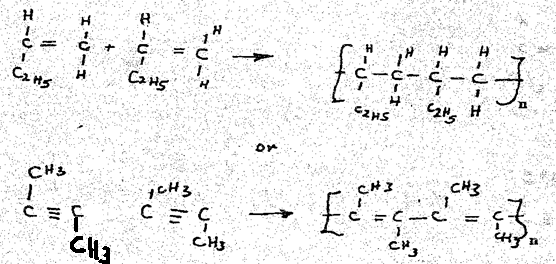
(iii) T3

(b) T4

(c) (i) T5 or T6

(ii) Reason: it is unsaturated

(iii) Polymerization



(iv) (I) Process: Esterification

(II) Compounds

1. Butanoic acid (CH3CH2CH2COOH)
2. Ethanol (C2H5OH)

2. i) Alkali metals

ii) Noble gases

b) H - Metals

M - Non-metals

c) A - Air balloons

N - Prevention of oxidation of filament.

d) G has a bigger atomic radius than H .There

is an increase in nuclear charge

e) R forms an ion by gaining an electron.

The negative charge is bigger than the

positive.

f) I2X3

g) E .It has the biggest E0 value / Has high

tendency to gain electrons.

h) i) P - 2 .8.8.2

ii) Ion of E ==> 2.8

i) H or P

j) The second ionization energy of H is bigger than the 1st .2nd ionisation energy involves the removal of an electron from charged particle.

3. i) Cooling curve

ii) BC

1. The kinetic energy of the molecules decrease as heat energy is lost to the surrounding leading to a drop / decrease in temperature.

b. (i) 1000cm3 = 0.1mol

25 cm3  = 0.0025mol.

ii) H2X (aq) + 2 NaOH (aq) Na2X(aq)  + H2 O(l)

Mole ratio 1 : 2

Moles of acid = 0.0025

2

= 0.00125mol.

Molarity = 1000 x 0.00125

18.7

= 0.0668M

4a) Add excess Zinc powder to Nitric (V) acid

Zn(s) + 2HNO3(aq) Zn(NO3)2(aq) + H2O(l)

Dissolve solid sodium carbonate in water

Na2CO3(s) + waterNa2CO3(aq)

Mix the resulting mixture with zinc nitrate solution

Na2CO3(aq) + Zn(NO3)2(aq) ZnCO3(s)  + 2NaNO3(aq)

Filter out zinc carbonate and dry it.

b)

|  |  |  |
| --- | --- | --- |
|  | Advantage | Disadvantage |
| R – COO – Na + | They are cheaper compared to soapless detergent | Forms scum with hard water |
| R – SO3 – Na + | They don’t form scum with Mg2+ & Ca2+ | Made from petroleum products or vegetable oils which are expensive |

(c) B = R – OSO3 – Na+ - Because it does not form scum with hard water

(i) Pb 2+

(ii) (Cl -)

() Ag + (aq) + Cl – ( aq)  Ag Cl (s)

(NH2)2CO = RMM = 60

2NH3 (g) + CO2 (g)  (NH2)2 CO (aq) + H2O (l)

620kg 1 mole

36, 470.588 moles

Mass = 620 x 1000

= 620,000g

Moles = 620,000 = 36,470.588 moles √1

17

Moles of (NH2)2 CO = 36,470.588

2

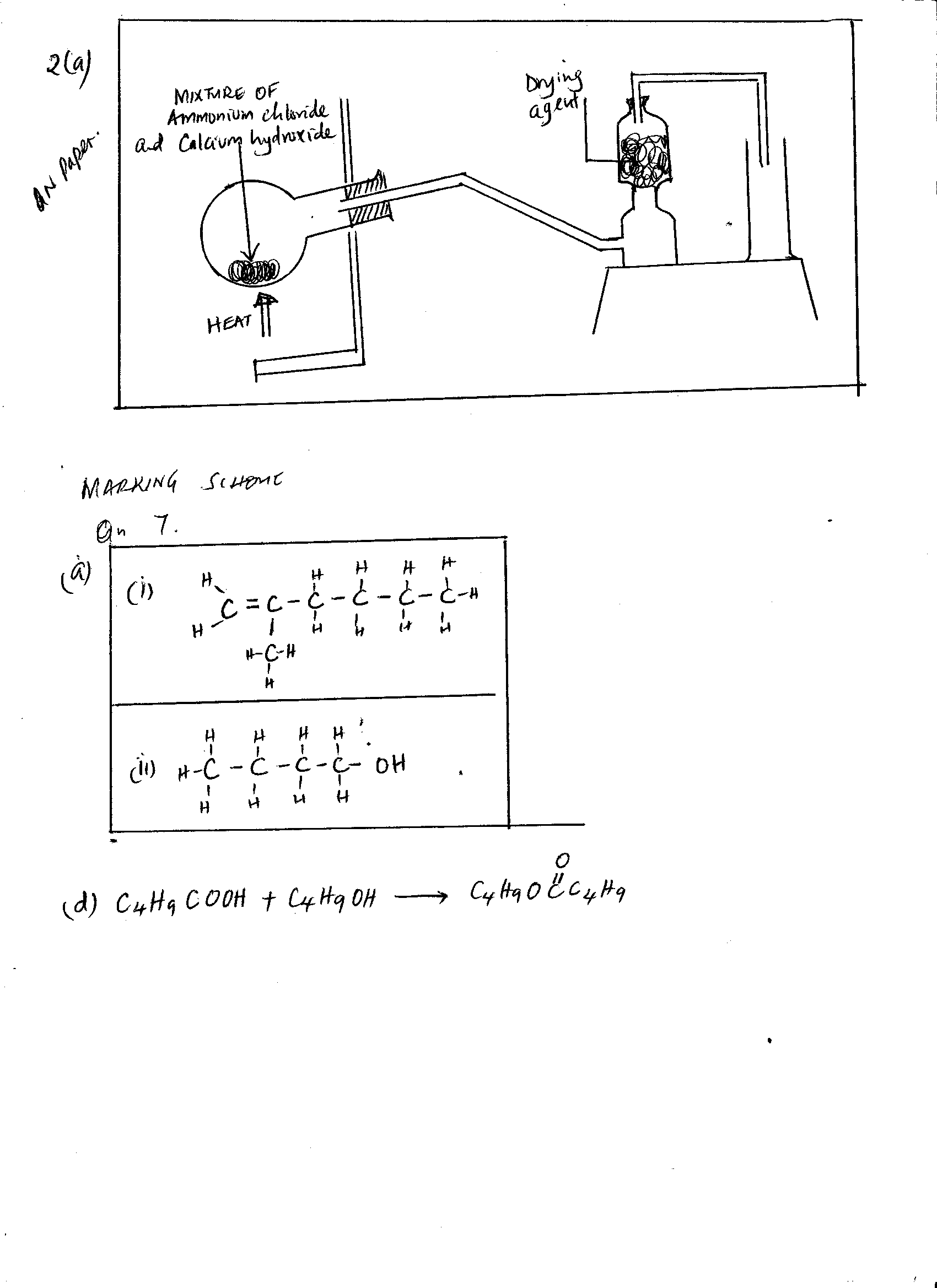
= 18,235.29 moles

Mass = moles x RMM

= 18,235.29 x 60

= 1,094,117.65g accept alternative method

5.a)



(b) (i) Dehydration

(ii) Cracking