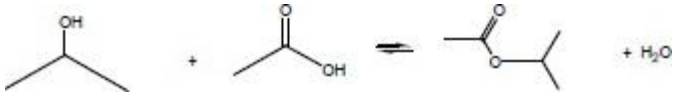
Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

(a) **M1** $CH_3CH(OH)CH_3 + CH_3COOH \rightleftharpoons CH_3COOCH(CH_3)_2 + H_2O$

M2 Methyl ethyl ethanoate.



Allow ECF from incorrect 5 carbon ester

Allow other valid names
1-methylethyl ethanoate
Isopropyl ethanoate
2-propyl ethanoate
Propan-2-yl ethanoate

2

(b)

This question is marked using Levels of Response. Refer to the Mark Scheme Instructions for Examiners for guidance.	
Level 3 5-6 marks	All stages are virtually complete (virtually complete means one from stage 1 and two from stages 2 and 3). Answer communicates the whole explanation, including equations, coherently and shows a logical progression through all three stages.
Level 2 3-4 marks	All stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies (covered means one from a stage) **OR** two stages virtually complete (virtually complete means one from stage 1 or two from stages 2 and 3). Answer is coherent and shows some progression through all three stages. Some steps in each stage may be incomplete.
Level 1 1-2 marks	Two stages are covered (covered means one from a stage) but the explanation of each stage may be incomplete or may contain inaccuracies **OR** only one stage is virtually complete (virtually complete means one from stage 1 or two from stages 2 and 3). Answer shows some progression between two stages.
0 mark	Insufficient correct chemistry to gain a mark.

Indicative Chemistry Content

Stage 1
1a Measuring cylinder(s) for the propan-2-ol and ethanoic acid (size not required but if specified should be between 10 - 100 cm^3)
Allow 10cm^3 / graduated pipette or burette

1b (Dropping/teat) pipette for sulfuric acid (NOT graduated or other qualification for pipette)

Stage 2 Diagram e.g. below to include
2a Labelled condenser shown vertical and open at top and bottom i.e. in cross section

2b Labelled water in at the bottom and water out at the top of the vertical condenser

2c Labelled reaction flask recognisable as either pear shaped or round bottomed

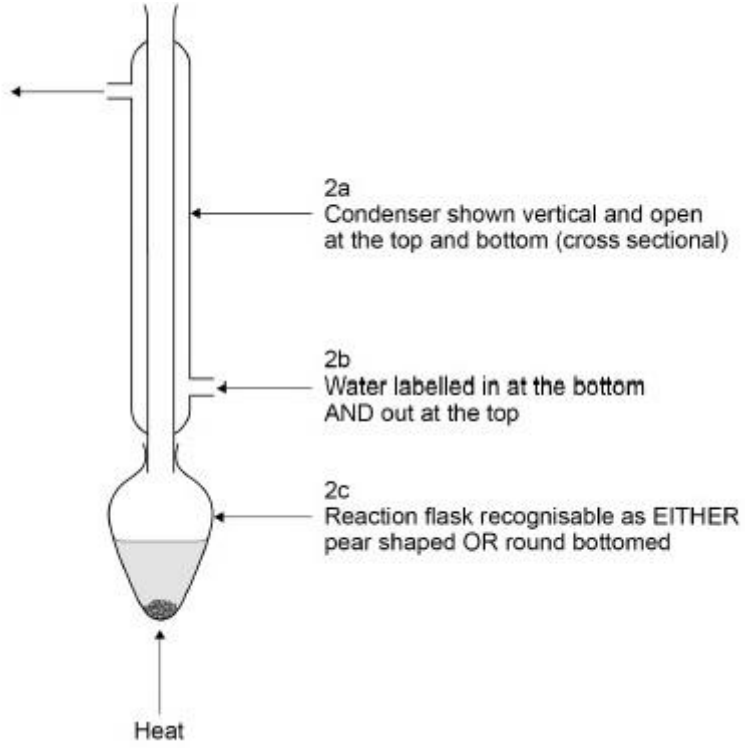
Stage 3 Safety
Needs precaution AND reason for each suggestion

3a Use a fume cupboard/fume hood/well-ventilated lab space
AND to avoid breathing in harmful/toxic/corrosive compounds

3b Wear gloves
AND as compounds are corrosive

3c Add glass beads/chips (to the mixture before heating)/labelled as anti-bumping granules/chips
AND to ensure smooth boiling/reduce size of bubbles

3d Use an electric heater/water bath
AND as compounds are flammable



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(c) **M1** To neutralise/remove/react with (excess) acid

M2 Remove stopper/bung OR tip the funnel upside down and open the tap

M3 There will be a build up of pressure/gas/carbon dioxide

M3 must be linked to their precaution in M2

OR

M2 Allow add stopper

M3 To prevent spillage

3

(d) Drying agent/To remove water

Not dehydrating agent

1

(e) Compare boiling point to a data book/known value

Boils at sharp boiling point/over a narrow temp range

1

[13]

Q2.

(a) **M1** CH_3NH_2 Shown as displayed or abbreviated structural formula

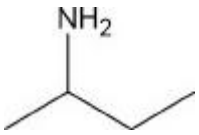
M2 N-methyl ethylamine or N-methyl ethanamine

For **M2** allow alkyl groups reversed

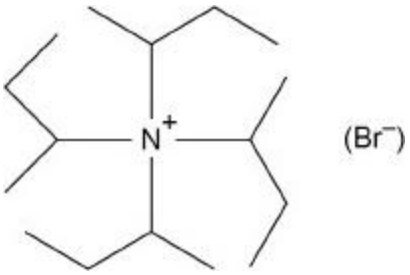
For M2
Allow N-methyl aminoethane
OR
N-methyl N-ethylamine
OR
Methyl ethylamine
OR
Methyl ethanamine.

2

(b) **M1**



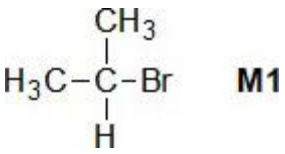
M2



Note: If answers are non-skeletal penalise once only

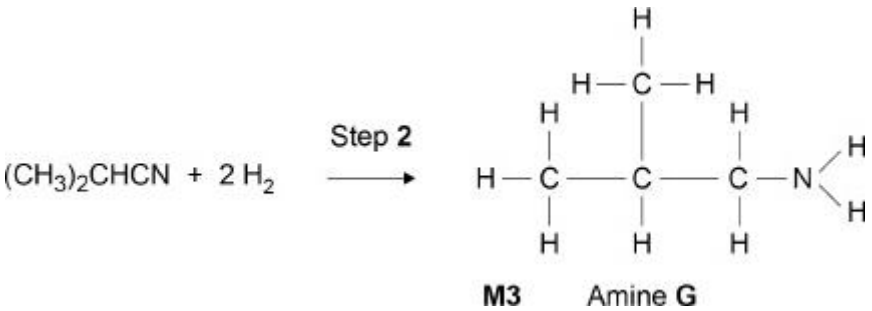
2

(c) **M1** For structure of 2 bromo propane



M1

M2 For TWO correct curly arrows



M3 Amine G has a <u>fully displayed</u> structure of Amine G

3

(d) **M1** The lone pair on nitrogen in P is more available or more able to accept protons/H^+

M2 More alkyl groups are electron releasing/donating
OR
greater (positive) inductive effect (of the alkyl groups).

2

[9]