Answers to practice exam questions for Chapter 8 Alcohols and their derivatives

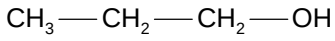
Question 1

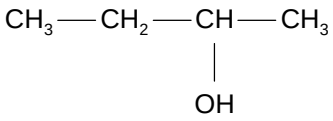
a i Using Fehling's / Benedict / Tollens / ammoniacal silver nitrate / Cu^{2+} / Ag^{+} / other suitable oxidising agent (eg MnO_4^- or $H^+/Cr_2O_7^{2-}$) A

ii If Fehling's or Benedict: Initial colour = blue Final colour = red / orange / green 'yellow
If Tollens Initial colour = colourless Final colour = silver mirror / black 'silver' specks
[N.B. If alternatives eg. $H^+/Cr_2O_7^{2-}$, then alternative colour changes.]
A = **correct colours before and after**

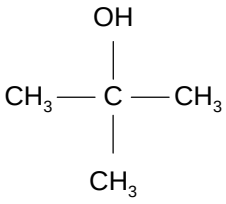
Question 2

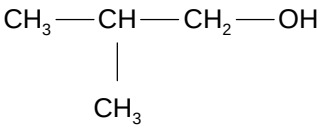
a

1 

2 

Butan-1-ol Butan-2-ol

3 

4 

2-methylpropan-2-ol 2-methylpropan-1-ol

A = 3 correct structures and names, M = all structures and names correct

b i 3 A
ii tertiary A

c i aldehyde; carboxylic acid A
ii Use Fehling's / Benedict's / Tollen's / ammoniacal silver nitrate / Cu^{2+} / Ag^{+} / other suitable oxidising agent.
If Fehling's or Benedict's (Cu^{2+}): Initial colour = blue Final colour = red / orange / green 'yellow
If Tollen's ($[Ag\{NH_3)_2]^+$): Initial colour = colourless Final colour = silver mirror / black 'silver' specks
[N.B. If alternatives eg. acidified $Cr_2O_7^{2-}$, then alternative colour changes.]
A = correct test, M = correct test, reagent and observation

d PCl_5 or PCl_3 or $SOCl_2$ A

e **i** $CH_3CH_2CH=CH_2$ A
ii elimination A
iii 2, butan-2-ol A

Question 3

a Shake a few drops of the hydrocarbon with 1 or 2 mL of bromine water (**or** acidified dilute $KMnO_4$).
The kerosine does not decolourise the orange colour of the bromine water (or decolourises it very slowly), or decolourise the permanganate, while the vegetable turps decolourises the orange colour rapidly (or the purple/pink colour of the permanganate).

b Add a few drops to a couple of mL of water. The antifreeze (polar) mixes and forms one layer. The oil (non-polar) does not mix and forms two layers.
Alternatively, heat with acidified dichromate solution. The diol turns the orange dichromate a green/blue colour (Cr^{3+}), while the oil has no effect.

c Add a few drops to a couple of mL of water. The meths (polar) mixes and forms one layer. The dichloromethane (non-polar) does mot mix and forms two layers.
Alternatively, heat with acidified dichromate solution. The meths turns the orange dichromate a green/blue colour (Cr^{3+}), while the dichloromethane has no effect.
(Meths also burns with a clean blue flame, while dichloromethane is difficult to combust and has a yellow, sooty flame.)

A = 2 correct tests and partial observations, M = 2 correct tests with full observations, E = 3 completely correct including full observations