

4. This question is about vaping

Mark

(a)	(i)	Nitrile	Alcohol	Ester	Ketone	Ether	Carboxylic Acid
				✓		✓	

One mark each. Minus one for each incorrect answer down to zero.

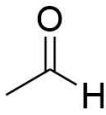
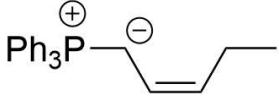
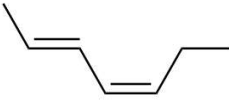
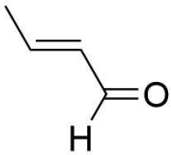
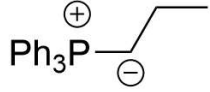
(ii) 31
Full formula is $C_{31}H_{52}O_3$.

Structure	Is this structure consistent with the data from...		
	... mass spectrometry?	... 1H NMR?	... ^{13}C NMR?
	✓	×	✓
	✓	✓	✓
	×	✓	✓
	✓	✓	×

One mark for each fully correct column.

aldehyde/ketone	phosphonium ylide	major alkene product

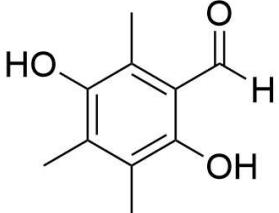
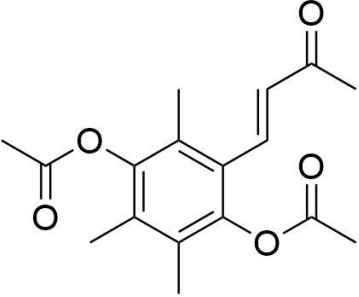
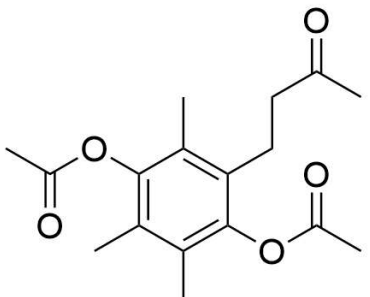
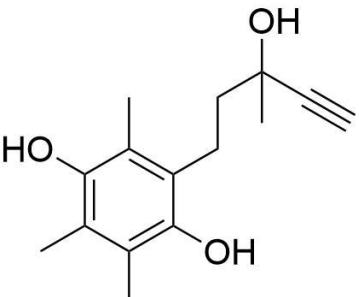
One mark each. For the first alkene product there is no difference between *E* and *Z* isomers. For the second alkene product the stereochemistry must be correctly *E* for all three double bonds to get the mark. The student does not have to write explicitly that the alkene is *E*.

aldehyde/ketone	phosphonium ylide	major alkene product
		
OR		
		



One mark each. The first row and the second row can be either way around. The two answers containing C=C bonds must have the correct stereochemistry to get the mark. The student does not have to write explicitly that the alkene is E or Z.

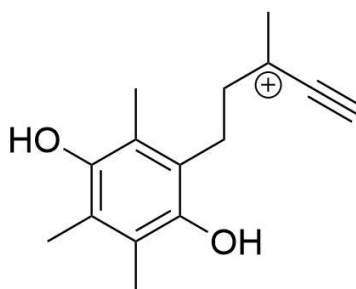
(d)

A 	B 
C 	D 



One mark each. In **B** the alkene must be drawn with E stereochemistry for the mark. ECF can be awarded for **C** and **D** if trivial errors propagated but transformation correct.

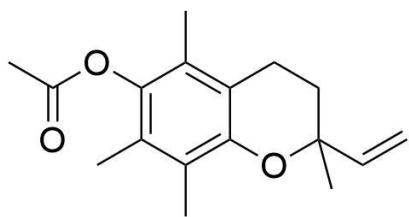
(e)



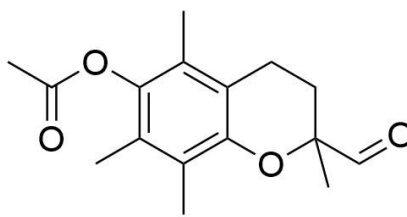
ECF can be awarded if trivial errors propagated but cation must be tertiary.

(f)

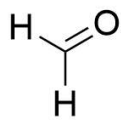
W



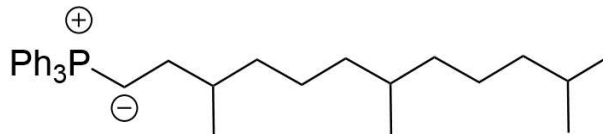
X



Y



Z



One mark each. No ECF as students have enough information to work backwards.



Total out of 21

21