Making Medicines: Questions

1. In combinatorial chemistry, organic compounds are made while attached to a resin and then released from the resin using a strong acid.

   a) What properties must the material of the resin have to make it suitable for this purpose?

   _____[2]

   b) A chemist was comparing the suitability of poly(ethene) and Nylon for use as the basis of a resin in combinatorial chemistry. Part of the formula of poly(ethene) may be written

   $–CH_2CH_2CH_2CH_2–$

   and part of the formula of Nylon

   –RCONHR'NHCOR– (where R and R' represent alkane groups).

   Explain why Nylon would be less suitable than poly(ethene) for this purpose. You may find that is helps to first draw out the displayed formulae (formulae showing all the atoms and all the bonds) of the two polymers.

   _____

   _____

   _____[2]

   c) Suggest an organic functional group that has a bond that is easily broken in strong acid and which could therefore be used to attach compounds to the resin.

   _____[1]

2. A chemist requires a sample of the ester pentyl propanoate, which she intends to make by the reaction of propanoic acid with pentan-1-ol.

a) Write the molecular formulae of each of these compounds and calculate their relative molecular masses.

_____

_____[4]

b) Write an equation for the reaction of propanoic acid with pentanol.

_____[1]

c) If the chemist requires 144 mg of the ester, what is the minimum mass of propanoic acid that she needs to start with?

_____[1]

d) Explain why she will need significantly more than this in practice.

_____[1]

e) Suggest an alternative reaction that will produce pentyl propanoate in a better yield.

_____[1]