

## Mark schemes

## Q1.

- (a) giant structure  
     *allow macromolecular*  
     *allow (giant) lattice*  
     1
- covalent (bonds)  
     1
- four bonds per carbon / atom  
     1
- (b) (covalent) bonds are strong  
     1
- (and many covalent) bonds must be broken  
     1
- (so) a lot of energy is required  
     1
- (c) fullerene  
     1
- (d) any **one** from:  
     • (C<sub>70</sub> is) hollow  
         *allow (C<sub>70</sub>) acts as a cage*  
         *allow (C<sub>70</sub>) traps the drug*  
     • (C<sub>70</sub> is) unreactive  
     • (C<sub>70</sub> is) not toxic  
     • (C<sub>70</sub> has) a large surface area to volume ratio  
         *ignore references to ease of movement around the body*  
     1
- (e)  $\left( \text{moles of C}_{70} \text{ molecules} = \frac{1}{70} = \right) 0.0142857$   
     1
- (molecules =)  $0.0142857 \times 6.02 \times 10^{23}$   
     *allow correct use of an incorrect attempt at the calculation of*  
     *the number of moles of C<sub>70</sub> molecules*  
     1
- =  $8.6 \times 10^{21}$   
     1

[11]