

Marks
3

- Explain, with the aid of a diagram labelling all the key components, how sodium stearate ($C_{17}H_{35}COONa$) can stabilise long-chain non-polar hydrocarbons (“grease”) in water.



- Consider the complex $K_4[Mn(CN)_6]$. Describe and contrast the origin, strength and directionality of the chemical bonds in this compound (a) between C and N; (b) between the manganese and cyanide ions; and (c) between the complex and the potassium counterions.

Marks
2

- In the spaces provided, explain the meaning of the following terms. You may use an example, equation or diagram where appropriate.

(a) covalent bond

(b) electronegativity

(c) free radical

(d) band gap

- From the list of molecules below, select all the polar molecules and list them from left to right in order of increasing molecular dipole moment.

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BF_3 , CH_3Cl , CH_3F , CO_2 , CF_4 , NF_3

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- Describe one consequence of molecular shape involving *non-polar* molecules.

2

- Which molecule in each of the following pairs has the greater dipole moment? Give reasons for your choice.

3a) SO_2 or SO_3 b) SiF_4 or SF_4 c) H_2S or H_2Te