

Subject: Gases, Liquids and Solids Code: 2815/05

Session: June Year: 2002

Final Mark Scheme

MAXIMUM MARK	45
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Question	Expected Answers	Marks
1	<p>(a) (i) The number of moles in KCl divided by the total number of moles in the mixture</p> <p style="text-align: center;">or $\frac{\text{moles } KCl}{\text{moles } KCl + \text{moles } H_2O}$ (1)</p> <p>(ii) $(1-0.088) = 0.912$ (1)</p> <p>(iii) $\frac{32.8/74.6}{32.8/74.6 + 100/18} = \frac{0.440}{5.555 + 0.440} = \frac{0.440}{5.995}$ (1)</p> <p style="text-align: center;">$= 0.073 \pm 0001$ (1)</p> <p>(b)</p> <p style="text-align: right;">Points (1) Line 0 \Rightarrow 0.053 (1) Curve 0.053 \Rightarrow 0.120 (1)</p> <p>(c) (i) ice (1) (ii) eutectic (1) (iii) KCl solid (1)</p>	<p>[4]</p> <p>[3]</p> <p>[3]</p> <p>Total [10]</p>

Question	Expected Answers	Marks
2	(a) Perfume is partitioned between the water in the plant and the fat (1) There is a chemical similarity between the perfume and the fat (1)	[2]
	(b) By dissolving in an organic solvent (1) and then evaporating the solvent (1)	[2]
	(c) The oils (are esters and) hydrolyse in water/react with water (1)	[1]
	(d)	
	(e) Mixture boils when total vapour pressure reaches atmospheric pressure (1) Since water is the major component this will be at $<100^{\circ}\text{C}$ (1)	[3] [2]
	(f) Oils are in contact with water/steam for shorter period of time / at lower temperature (1)	[1]
	Total	[11]

Question	Expected Answers	Marks
3	(a) $pV = nRT$ (or variants)	(1) [1]
	(b) They have no attractive forces between atoms/molecules They have negligible volume etc.	(1) (1) Any two [2]
	(c) Ammonia, nitrogen, helium	All three for (2) one error (1) [2]
	(d) High pressure force molecules together Allows dipole-dipole interaction to become significant	(1) (1) [2]
	(e) $p_1V_1 = P_2V_2$ $95 \times 500 = P_2 \times 25$ (1) $\frac{95 \times 500}{25} = P_2 = 1900 \text{ kPa}$ (1)	[2]
	(f) $pV = nRT$ $pV = \frac{m}{M_r} RT$ (1) therefore $95 \times 10^{-4} = \frac{0.186 \times 700 \times 8.31}{M_r}$ (1) therefore $M = \frac{0.186 \times 700 \times 8.31}{95 \times 10^{-4}} = 114$ (1)	[3]
	(g) Ethanol forms hydrogen bonds with the water (1)	[1]
	Total	[13]

Question	Expected Answers	Marks
4	<p>(a) (i) Alloy has a lower m.p. Plumber's solder solidifies over a range Electrician's solder has a sharp m p. (f.p.) Alloy is stronger than metals Melting point can be varied by changing composition</p> <p>(ii) Hardness/durability/resistance to wear Colour can be varied by composition Resistance to corrosion Difficult to forge</p>	<p>Any 3 points</p> <p>Any 3 points</p>
		<p>Quality of language (1) [7]</p>
	(b)	
		<p>Axes (1) m.p.'s (1) eutectic (1) [4] 3 areas (1)</p>
		<p>Total [11]</p>