3. This question is about ants

(a) i)) $6.0 \times 10^{-3} \times 0.5 \times 100 / 80 = 3.75 \times 10^{-3}$ cm^3 so accept 3.8×10^{-3} cm^3

ii) $1000 / 3.75 \times 10^{-3} = 2.7 \times 10^5$

(b) i) $HCOOH + NaHCO_3$? $HCOONa + H_2O + CO_2$

ii) $6.0 \times 10^{-3} \times 0.5 \times 1.2 / 46 = 7.8 \times 10^{-5}$ moles

iii) $7.8 \times 10^{-5} \times 84 = 6.6 \times 10^{-3}$ g = 6.6 mg

(c) 7.8×10^{-2} mol dm^{-3}

(d) 3.7×10^{-3} mol dm^{-3}

(e) $3.7 \times 10^{-3} / 7.8 \times 10^{-2} \times 100 = 4.8$ %

(f) $(3.7 \times 10^{-3})^2 / (7.8 \times 10^{-2} - 3.7 \times 10^{-3}) = 1.8 \times 10^{-4}$ mol dm^{-3} (also accept 1.9×10^{-4}). This means $pK_a = 3.73$.

1 mark for each part

Total: 9