ADDITIONAL PAGE FOR ANSWERING QUESTION 3.

ii. Vol. of H_2O released

$0.0212\ mol \times 3 = 0.0636 = mol\text{-}H_2O$

$PV = nRT$

$V = nRT/P$

$V = (0.0636\ mol)(0.0821)(220°C + 273) / (736\ mmHg)$

$(0.0636\ mol)(0.0821)(493\ K) / (0.968\ atm)$

$\boxed{V = 2.66\ L}$

c. i. [illegible]

As the carbon in $C_2O_4^{2-}$ goes from an oxidization state of +3 to +4, it loses an electron, or is oxidized. Thus $C_2O_4^{2-}$ is the reducing agent.

ii. # of moles that reacted

- MnO_4^- → 0.0150 M at 17.80 mL to equiv. point.

  $V \cdot M = mol$ → $0.0150\ M \cdot 0.01780\ L = \boxed{2.67 \times 10^{-4}}$

- $C_2O_4^{2-}$ $\frac{2}{5}$ ratio $\frac{MnO_4}{C_2O_4} = \frac{2}{5} = \frac{2.67 \times 10^{-4}}{x}$

$\boxed{x = 6.68 \times 10^{-4}\ mol}$

iii. since 20 mL of soln was used, $5 \times 6.68 \times 10^{-4}\ mol$ or $\boxed{0.00334\ mol}$ of $C_2O_4^{2-}$ were present in the 100 mL sol'n

iv. mass percent = $0.00334\ mol\ (97.03\ g/mol) = 0.324\ g$

$0.324\ g / 0.345\ g = \boxed{93.9\ \%}$

STOP

If you finish before time is called, you may check your work on this part only.
Do not turn to the other part of the test until you are told to do so.