Iron and Steel: Questions

1. Equations for reactions taking place in the blast furnace include

$$C + O_2 \rightarrow CO_2$$
$$CO_2 + C \rightarrow 2CO$$
$$CaCO_3 \rightarrow CaO + CO_2$$
$$CaO + SiO_2 \rightarrow CaSiO_3$$
$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

(a) Limestone is added to the blast furnace with iron ore and coke.

Tick two reasons why limestone is added.

Reduces iron ore to iron

Produces carbon dioxide

Lowers the melting point of iron

Removes silicon(IV) oxide from the furnace [2]

(b) 48 tonnes of an iron ore is used in a blast furnace to produce iron. 11.2 tonnes of iron is produced. Assume iron(III) oxide is the only iron compound in the ore.

(i) Calculate the mass of iron(III) oxide containing 22.4 tonnes of iron.

(Relative atomic masses: Fe = 56, O = 16)

Mass of iron(III) oxide = _____tonnes [3]

(ii) What percentage of the ore is iron(III) oxide?

Percentage = _____% [2]