A manufacturing plant consists of three machines, $A$, $B$ and $C$, which fabricate electronic components. Machine $A$ is responsible for 20% of the components, machine $B$ is responsible for 30%, and machine $C$ is responsible for 50%.

The manufactured components are supposed to be identical but it is known that 3 in every 1000 made by machine $A$ are faulty, 1 in every 125 made by machine $B$ is faulty, and 1 in every 250 made by machine $C$ is faulty.

(a) An inspector selects a newly-manufactured component at random and does not know which machine fabricated it. What is the probability that it is faulty? [5 marks]

(b) A faulty component is drawn at random from a pile of rejects. Use Bayes’s Theorem to determine the probabilities that the faulty component was fabricated by machines $A$, $B$ and $C$ respectively. Express your answers as fractions. [9 marks]

(c) Six faulty components are drawn at random from a pile of rejects. What is the probability that two were fabricated by machine $A$, two by machine $B$, and two by machine $C$? Your answer should be written as an expression which may incorporate the values determined in part (b). [6 marks]