Modified Mercalli intensity scale

This task is about using scale and information to measure the damage caused by earthquakes.
The Modified Mercalli intensity scale measures the actual effect an earthquake has on people, buildings, and the environment.

Magnitude	Effect
I	Only felt by a very few.
II	Felt by persons at rest.
III	Felt indoors. Some hanging objects swing.
IV	Vibration like heavy traffic passing, or like the jolt of a heavy object falling.
V	Generally felt outside. Most sleepers awakened. Small, unstable objects move, some glassware and crockery broken.
VI	Felt by all. Difficulty in walking steadily. Objects fall from shelves. Slight damage to badly constructed buildings.
VII	General alarm. Difficulty in standing. Some damage to buildings not designed to withstand earthquakes. Furniture moves. Unreinforced chimneys, roofing tiles and water tanks broken.
VIII	Alarm may approach panic. Steering of motorcars greatly affected. Some damage to earthquake-resistant buildings. Serious damage to less well-designed building types. Monuments and elevated tanks brought down.
IX	Heavy damage to buildings and bridges. Houses not secured to foundations shifted off. Landslides widespread on steep slopes. Cracking of ground conspicuous.
X	Severe damage to many buildings and bridges, even those of most recent design.

a) Read the following descriptions of peoples' experiences of earthquakes,
   and use the Modified Mercalli scale to work out there intensity.

> **A.** The house waved to and fro. Books, glass, and china on the shelves came crashing down, along with the chimney. I rushed to open the door, but it was some time before I could open it. I was thrown down. Our house, though somewhat out of perpendicular, was not down. The roof however was entirely dislodged. However, less well constructed houses had collapsed.

i) What is the intensity according to the Modified Mercalli scale? *I/ II/ III/ IV/ V/ VI/ VII/ VIII/ IX/ X*

> **B.** My bedroom was covered with everything – books, toys, felts; the wardrobe door was off its hinges and my fish had come out of the bowl. There was water all over the floor from the fishbowl. We could hardly move in there.

ii) What is the intensity according to the Modified Mercalli scale? *I/ II/ III/ IV/ V/ VI/ VII/ VIII/ IX/ X*

> **C.** We thought it was a truck coming down the road, but when the lights started swaying gently, we knew it was an earthquake.

iii) What is the intensity according to the Modified Mercalli scale?   *I/ II/ III/ IV/ V/ VI/ VII/ VIII/ IX/ X*

> The epicentre of an earthquake can be located by measuring the time between the arrival of P and S waves from the earthquake epicentre. If you count the time in seconds between these two waves and then multiply this by 8 it will tell you how far away in kilometres the epicentre was.
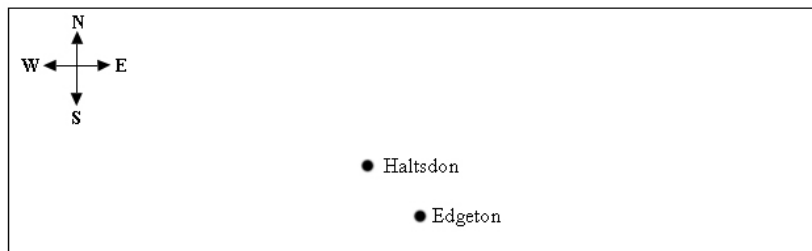
b) Two friends were talking on the telephone when an earthquake occurred. Sally who lived in Edgeton counted 5 seconds between the waves,
while Atawhai who lived in Haltsdon counted 6.5 seconds.

   i)   How far away was each person from the epicentre?

   Sally ☐ kilometres

   Atawhai ☐ kilometres

This map shows the location of the two towns.

   ii) From which direction did the earthquake come from? ☐

c) Here is some data about two different earthquakes.

   A 01/08/00 at 00:30 (30 minutes after midnight). 540 km south of the Fiji islands with a magnitude of 4.6, and 500 km deep.

   B 01/08/00 at 21:33 (9:33 p.m. in the evening). 170 km northwest of Vancouver City, Canada with a magnitude of 4.8, and 10 km deep.

Which earthquake would have been likely to cause the most damage?   *A/ B*

Give **three** reasons why this earthquake would be likely to cause more damage.

1. ☐   2. ☐   3. ☐