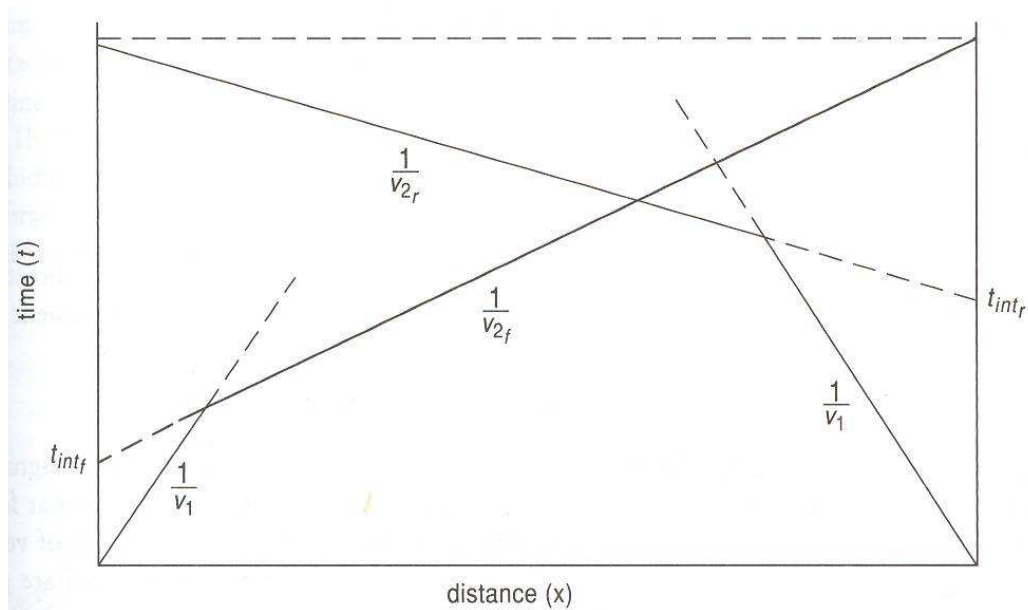


## Memo for Practical 6

### Seismic Survey

The figure below is an illustration of a schematic travel-time diagram of seismic reflection data.



- a. How many geological layers can be distinguished based on the diagram?

Motivate your reasoning

*The diagram depicts two possible geological layers:*

*There are two lines with different gradients,  $\text{slope}_1 = 1/v_1$  for layer<sub>1</sub> and  $\text{slope}_2 = 1/v_2$  for layer<sub>2</sub>* [3]

- b. How is it possible to recognize dipping layers in seismic refraction? [3]

*Two shot end points namely: forward and reverse depending on which one was taken first are needed.*

*Different time intercepts. The time intercept for the forward refracted ray is less than that of the reverse refracted ray.*

*The slopes of forward and reverse refracted rays do not intersect at the middle.*

*The forward and reverse travel-time curves do not mirror one another.*

*The first seismic boundaries for both the forward and the reverse refracted rays are not located at the same positions.*

- c. The diagram is an illustration of dipping geological strata. Discuss this statement. [4]

*Refer to question (b) above for an explanation.*

- d. What conditions for seismic velocity should be achieved to effect reflection and refraction? [2]

*There must be an abruptly change of the velocity from layer<sub>1</sub> to layer<sub>2</sub> to achieve refraction.*

*Conversely, for reflection to occur, the ray from layer<sub>1</sub> must encounter a change in physical properties of layer<sub>2</sub> for it to bounce back to layer<sub>1</sub>.*

- e. Explain the importance of “contrast” in geophysics. [2]

*Detectability of a causative body is possible only if there are differences of the physical properties between the target of interest and the surrounding bodies.*

- f. How many shot points were taken during they survey? [1]

*Two end points were taken.*