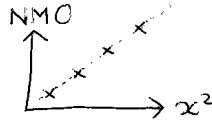


SOLUTION

1 (a) Plot graph



1 (b) $\text{slope} = \frac{1}{2v_1^2 t_1} \Rightarrow v_1 = 1699 \text{ ms}^{-1}$

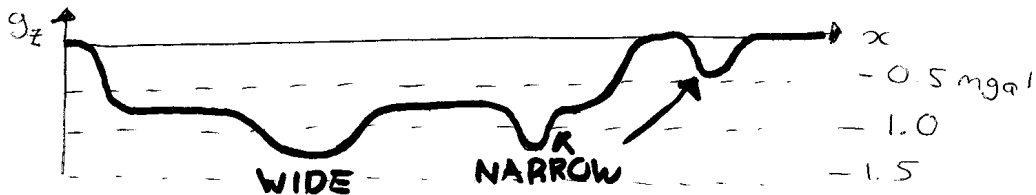
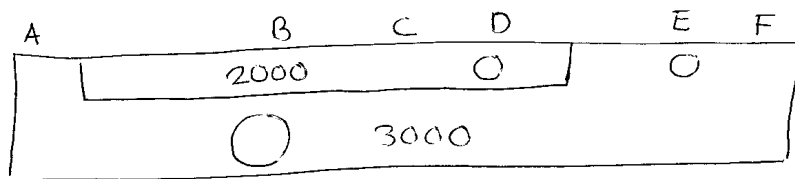
1 (c) $v = \frac{2z}{t_1} \Rightarrow z = 650 \text{ m}$

1 (d) $0.19 = \frac{v_2 - v_1}{v_2 + v_1} \Rightarrow v_2 = 2500 \text{ ms}^{-1}$

- 1 (e) Dynamite : Advantage : impulsive
 Disadvantage : not repeatable
- Vibroseis : Advantage : stackable ! Repeatable.
 Disadvantage : need road access, clear surface

1 (f) Compaction with depth increase rigidity (modulus) and density of rock. However, modulus rises faster than density, so $v \uparrow$ with depth

2



2004

$$\begin{aligned} \textcircled{B}: \quad g &= g_{\text{slab}} + g_{\text{big cylinder}} \\ &= -2\pi G \Delta \rho \Delta z - \frac{2G\pi a^2 \Delta \rho}{z} \\ &= -0.83817 - 0.20954 \text{ mgals} \\ &= -1.048 \text{ mgals} \end{aligned}$$

$$\textcircled{C} \quad g = g_{\text{slab}} = -0.83817 \text{ mgals}$$

$$\begin{aligned} \textcircled{D} \quad g &= g_{\text{slab}} + g_{\text{small cylinder}} \\ &= -0.83817 - 0.20954 \quad \left(\begin{array}{l} \text{cylinder at D is} \\ \text{smaller but} \\ \text{shallower} \end{array} \right) \\ &= -1.048 \text{ mgals} \end{aligned}$$

$$\textcircled{E} \quad g = g_{\text{cylinder}} = -0.3143 \text{ mgals}$$

2(c) MINERAL EXPLORATION
DEPTH TO BEDROCK
HYDROCARBON EXPLORATION

2(d) see notes

2(e) Density not known
Slab only approximates the topography