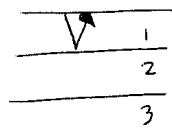


GEOPHYSICS 224 - MID-TERM EXAM 2005

SOLUTION

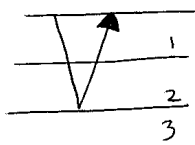
1(a) 1st arrival



$$t = 1.6 \text{ s}$$

$$R = -0.25$$

2nd arrival

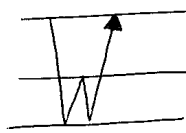


$$t = 2 \text{ s}$$

$$\text{amp} = T_{12}^{\downarrow} R_{23} T_{12}^{\uparrow}$$

$$= \frac{15}{64} = 0.234$$

3rd arrival

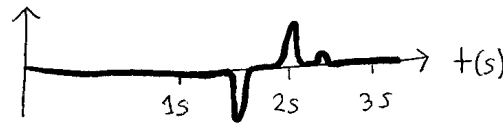


$$t = 2.4 \text{ s}$$

$$\text{amp} = \frac{15}{1024} = 0.0146$$

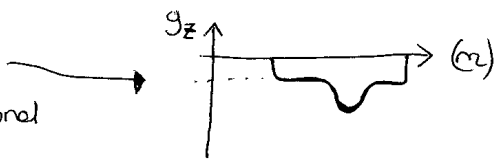
(transmits twice, reflects 3 times)

1(b)



1(c)

$$\phi = 0.111 = 11\%$$

2(a) Look at level 

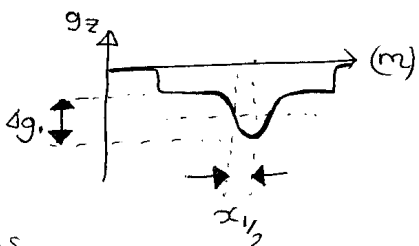
This is due to channel

$$\Delta g = -0.026 \text{ mgals}$$

$$= 2\pi G \Delta \rho \Delta z$$

$$\Rightarrow \Delta z = 2.07 \text{ m}$$

(b) Now look at depth of minimum due to tunnel
(relative to effect of channel)



$$\Delta g_1 = 0.0821 \text{ mgals}$$

$$x_{1/2} = 10 \text{ m}$$

depth of tunnel is 10 m

(c) This depth places the tunnel in BEDROCK

(d)
$$\Delta g_1 = \frac{2G\pi a^2 \Delta \rho}{z}$$

$$\Delta \rho = 2200 \text{ kgm}^{-3}$$

$$z = 10 \text{ m}$$

$$\Rightarrow a = 3 \text{ m}$$

2005