

Note: write the laws wherever needed

Q1/ Fill the below table:

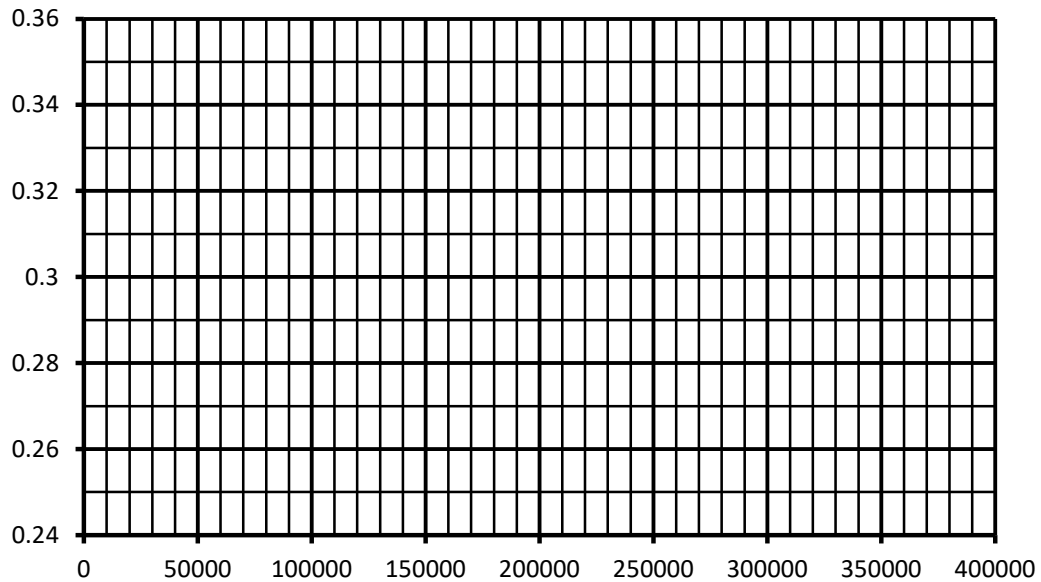
depth (m)	2-way time (sec)	1-way time (sec)	V_i (m/sec)	V_a (m/sec)
500	0.8			
2000	1.6			

Q2/ A P-wave strikes an interface with an angle of incident 350^0 ; calculate reflected and refracted angles for both primary and secondary waves then construct the possible ray-diagram. If you know that $V_{p1} = 2200$ m/sec, $V_{s1} = 1500$ m/sec, $V_{p2} = 2600$ m/sec, $V_{s2} = 1900$ m/sec.

Q3/ In a seismic reflection exploration by center point shooting, a set of 12 geophones had been applied, where 6 detectors were located east and the others west of the shoot point. The geophone separation and arrival times for signals reflected back to the surface are given in the table below; required:

- a) Calculate the velocity.
- b) Calculate the depth.

X (m)	T (sec)	X^2 (m ²)	T^2 (sec ²)
600	0.583		
500	0.559		
400	0.539		
300	0.522		
200	0.510		
100	0.502		
0	0.500		



Q4/ Fill the below table:

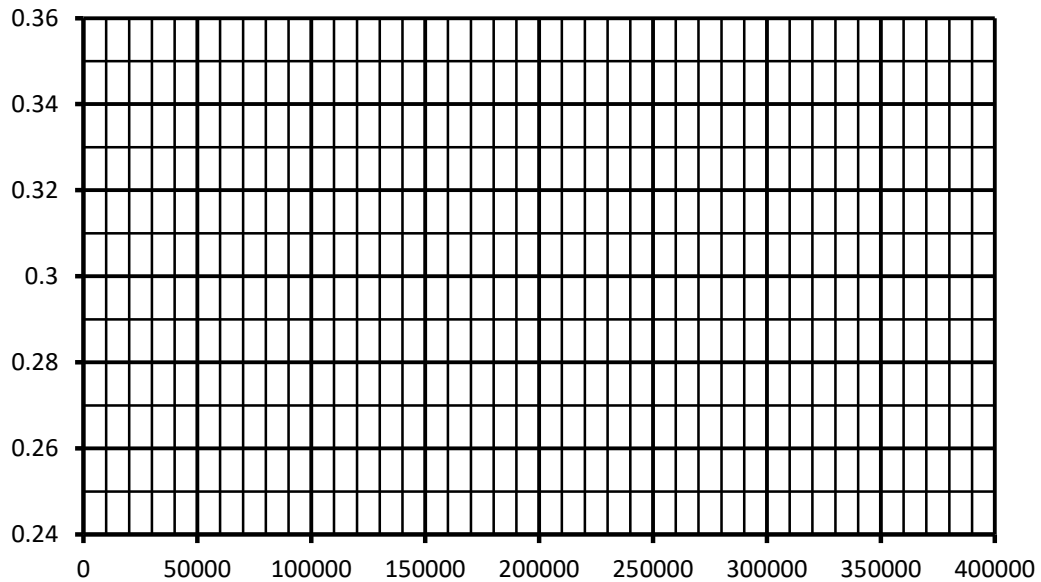
depth (m)	2-way time (sec)	1-way time (sec)	V_i (m/sec)	V_a (m/sec)
1200	1.2			
2400	2			

Q5/ A P-wave strikes an interface with an angle of incident 30° ; calculate reflected and refracted angles for both primary and secondary waves construct the possible ray-diagram. If you know that $V_{p1} = 2500$ m/sec, $V_{s1} = 1800$ m/sec, $V_{p2} = 2700$ m/sec, $V_{s2} = 2000$ m/sec.

Q6/ In a seismic reflection exploration by center point shooting, a set of 12 geophones had been applied, where 6 detectors were located east and the others west of the shoot point. The geophone separation and arrival times for signals reflected back to the surface are given in the table below; required:

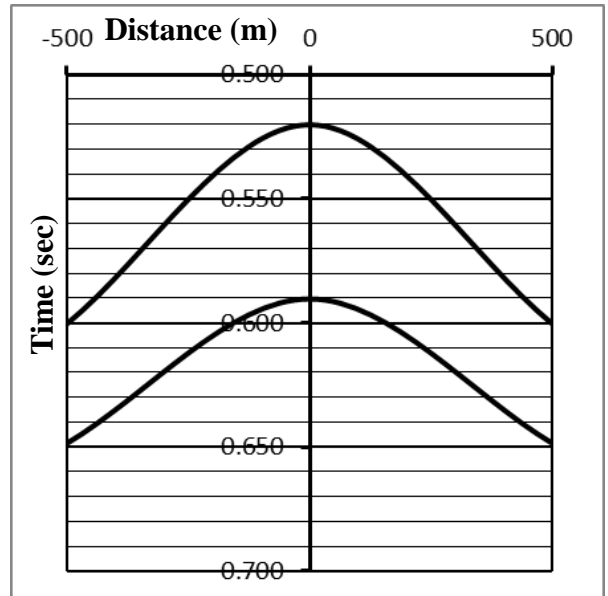
- c) Calculate the velocity.
- d) Calculate the depth.

X (m)	T (sec)	X ² (m ²)	T ² (sec ²)
600	0.601		
500	0.572		
400	0.547		
300	0.527		
200	0.512		
100	0.503		
0	0.500		

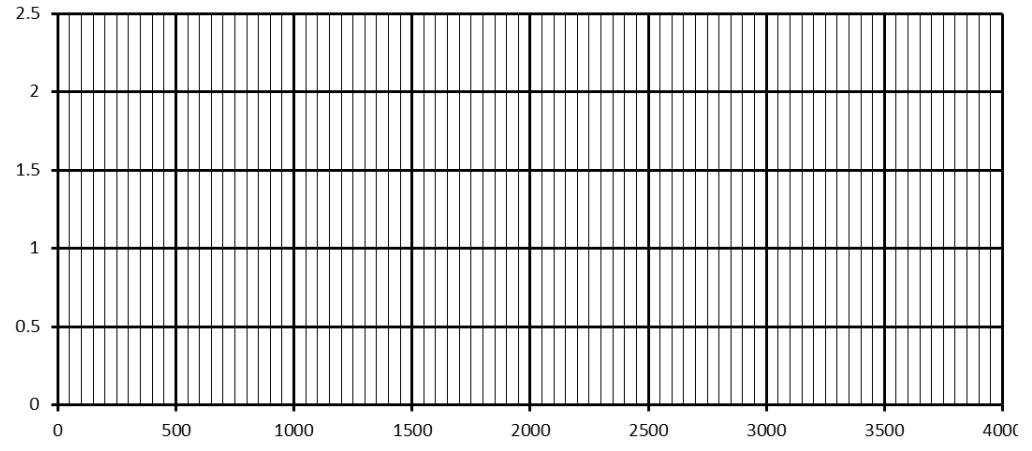


Q7/ Fill the table from the information of below time-distance curve if (x=500m).

Layers no.	t_o	t_x	NMO	V_{rms}	V_i	Thickness
1						
2						

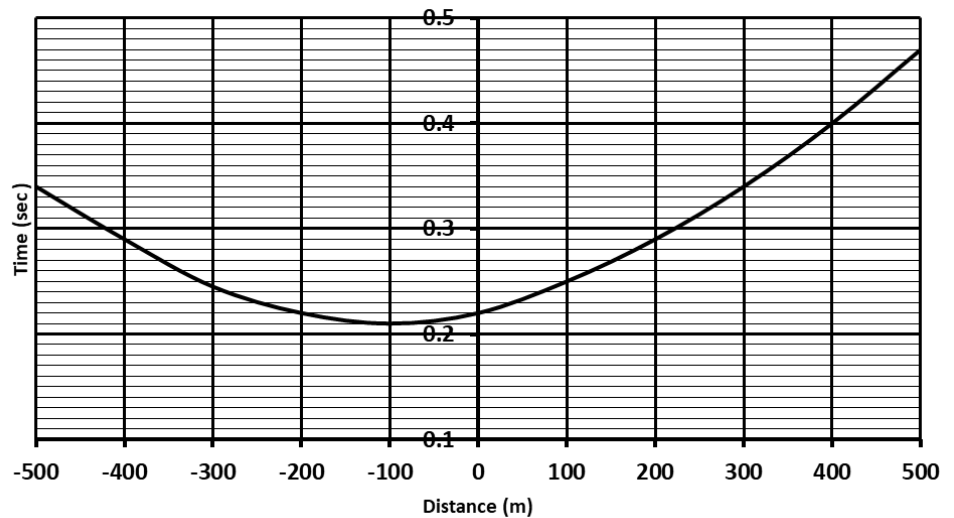


Q8/ If the velocity of direct and refracted waves are (1000 m/s and 1500m/s) respectively, and the intercept time is 0.5 sec. Calculate the depth and cross over distance and plot all data on the time-distance diagram.



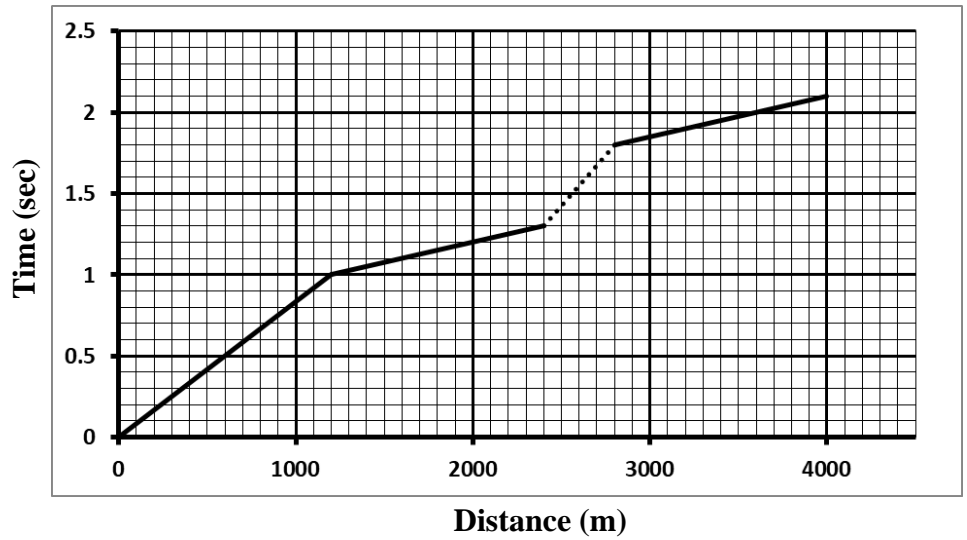
Q9/ In a seismic reflection exploration by center point shooting, a set of 10 geophones had been applied, where 5 detectors were located east and the others west of the shot point. Required:

- a) Calculate the dip angle of the reflector.
- b) Calculate the average velocity and depth to the reflector under shotpoint.



Q10/ From the T-X diagram below answer and calculate the questions below:

- 1- Define the seismic survey.
- 2- Define the structure
- 3- Calculate the velocities of the layers.
- 4- Calculate the depths of the layers.



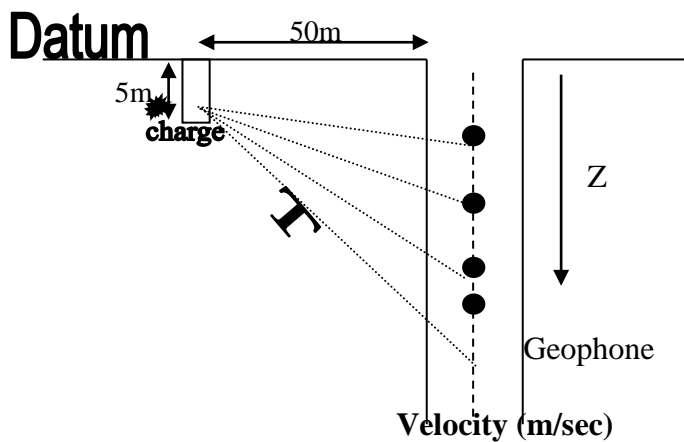
Q10/ The data in the table below are related with the diagram bellow which represents a bore hole check shot surveying.

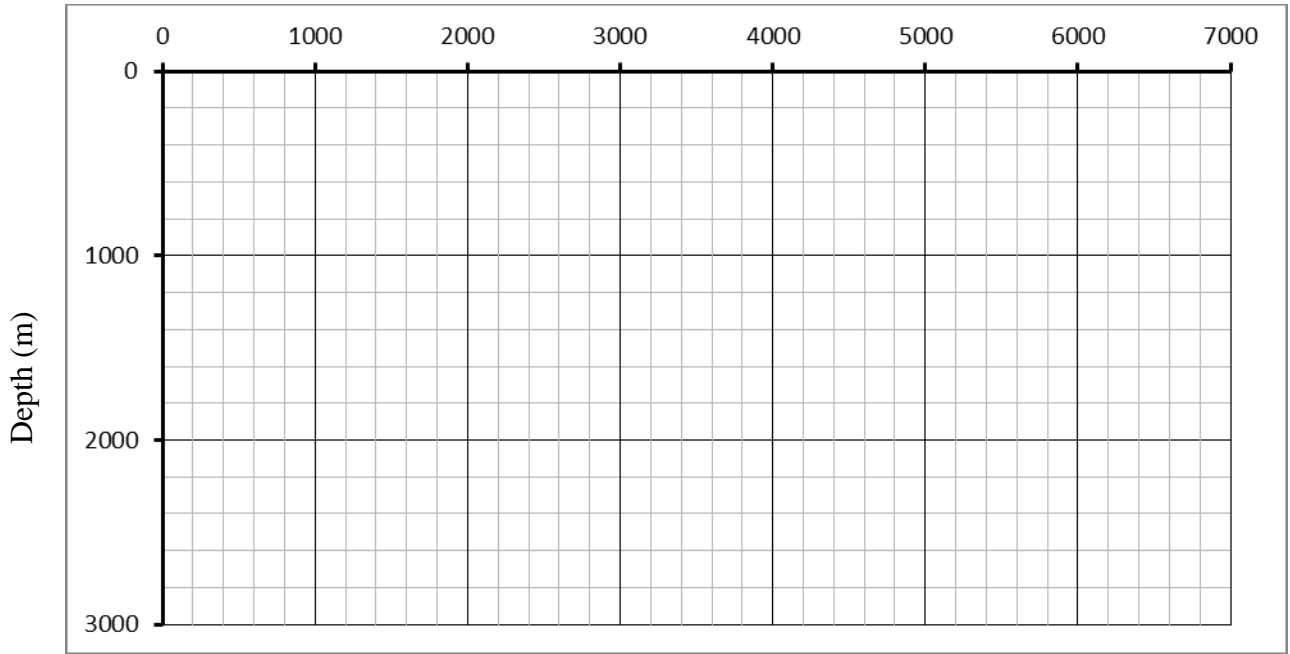
A: calculate;

- 1- The interval velocities (V_i).
- 2- The average velocities at different depth.

B: Draw the results on the same page.

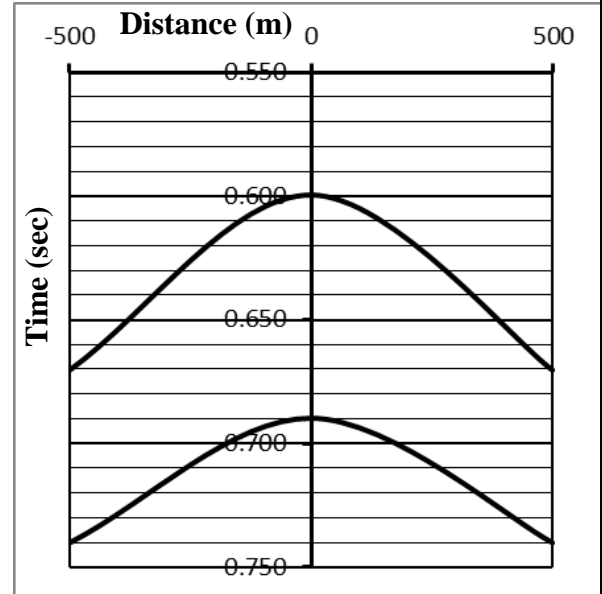
T(s)	Z(m)	Z (m) new	V_i	V_a
0.466	2000			
0.573	2500			
0.680	3000			
0.780	3500			
0.863	4000			



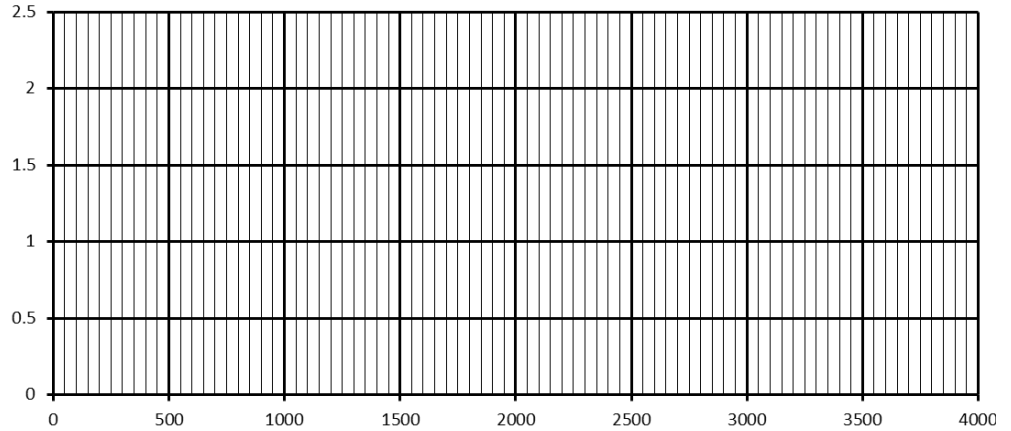


Q11/ Fill the table from the information of below time-distance curve if (x=500m).

layers no.	t_o	t_x	NMO	V_{rms}	V_i	Thickness
1						
2						

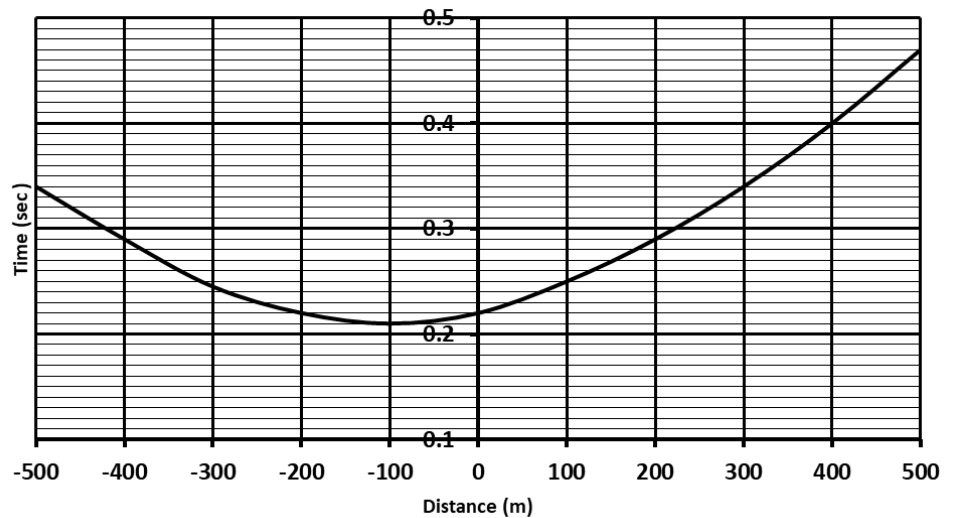


Q12/ If the velocity of direct and refracted waves are (1300 m/s and 2600m/s) respectively, and the intercept time is 0.5 sec. Calculate the depth and cross over distance and plot all data on the time-distance diagram.



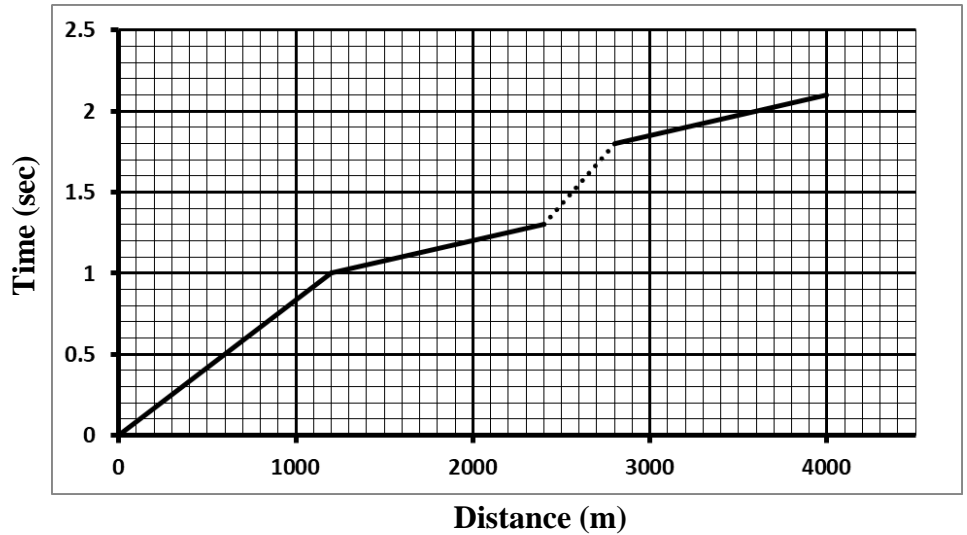
Q13/ In a seismic reflection exploration by center point shooting, a set of 10 geophones had been applied, where 5 detectors were located east and the others west of the shot point. Required:

- a) Calculate the dip angle of the reflector.
- b) Calculate the average velocity and depth to the reflector under shotpoint. (22 marks)



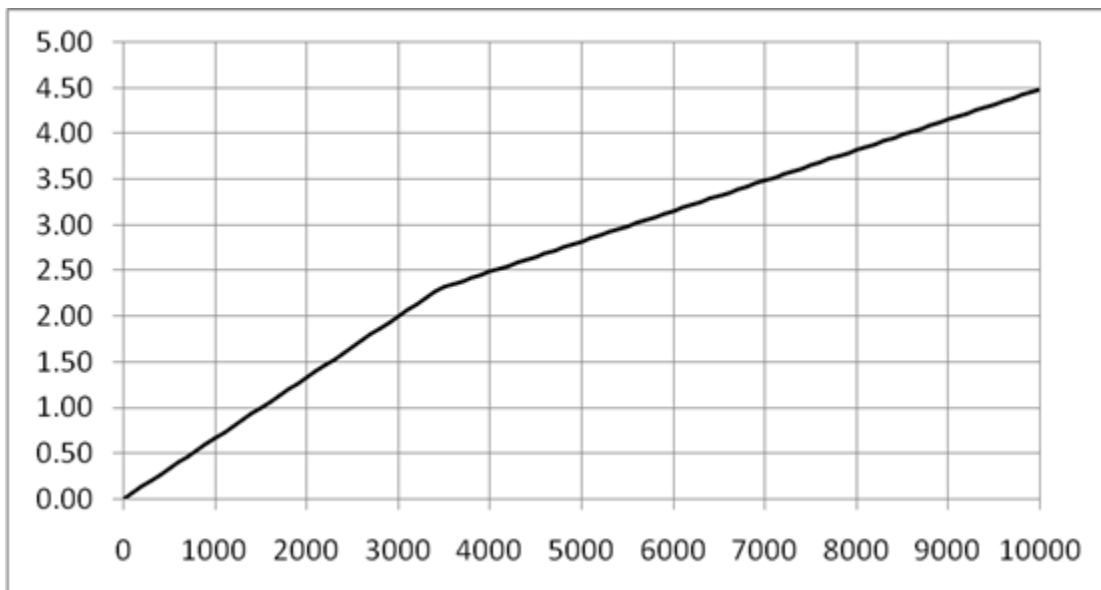
Q14/ From the T-X diagram below answer and calculate the questions below:

- 1- Define the seismic survey.
- 2- Define the structure
- 3- Calculate the velocities of the layers.
- 4- Calculate the depths of the layers.



Q15/ From this time distance curve Find

- The wave velocities in both media.
- The angle of incident at which the wave travels with the velocity of the second media along the interface.
- The vertical depth.
- The distance at which the arrival times for the waves in both media are equal.



Q16/ What is the difference between interval and average velocities?

Q17/ Draw the geometrical situation of seismic waves.

Q18/ For a seismic survey, what we need?

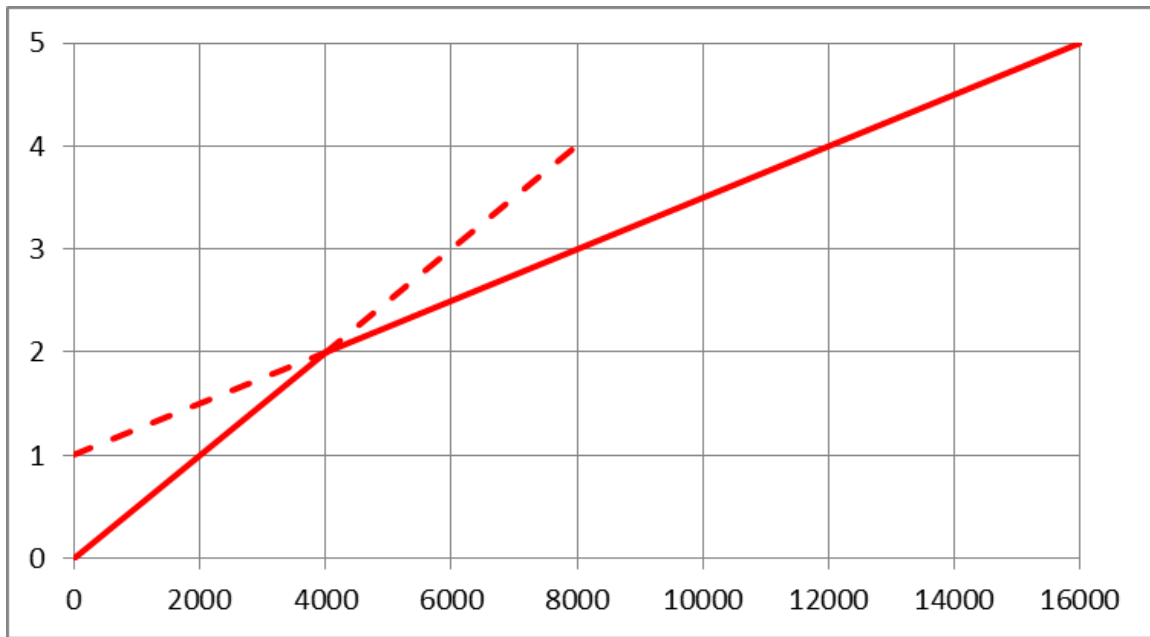
Q19/ Calculate the velocity by Dix formula?

Q20/ Describe the t-X diagram for dipping reflector?

Q21/ Describe the subsurface model for dipping layer?

Q22/ What is the difference between t_m and t_x in asymmetrical hyperbola?

Q23/ Calculate the Xcross from the diagram below:



Q24/ What is the critical angle and how calculate it?

Q25/ How can you calculate the throw of the fault?

Q26/ What is the difference between T_i and T_u in refraction survey diagram?

Q27/ Calculate the dip angle from a single inclined layer by refraction survey?

