**4.** A train of length  = 350 m starts moving rectilinearly with constant acceleration  = 3.0 ×10–2 m/s2; t = 30 s after the start the locomotive headlight is switched on (event 1), and  = 60 sec after that event the train signal light is switched on (event 2). Find the distance between these events in the reference frames fixed to the train and to the Earth. How and at what constant velocity V relative to the Earth must a certain reference frame K move for the two events to occur in it at the same point? **[Irodov Q. 1.14]**

yEckbZ  = 350 m dh ,d Vªsu fu;r Roj.k a = 3.0 × 10–2 m/s2 ls ljy js[kh; xfr izkjEHk djrh gS ; xfr izkjEHk djus ds t = 30 s i'pkr~ Vªsu ds batu dh gsMykbV pkyw dh tkrh gS ¼?kVuk 1), ,oa  = 60 s ij Vªsu ds vfUre Hkkx dh VsyykbV pkyw dh tkrh gS ¼?kVuk 2)A Vªsu ,oa i`Foh ij fLFkr funsZ'k rU=kksa esa bu ?kVukvksa ds e/; dh nwjh Kkr dhft,A i`Foh ds lkis{k fdlh ,d fu'pr funsZ'k ra=k K dks fdl fu;r osx V rFkk fdl izdkj ls pyuk gksxk fd nksuksa ?kVuk,sa ,d gh fcUnq ij ?kfVr gks\

**Ans :**  x1 – x2 = – w(t + /2) =  km, Towards the train with velocity v = 4 m/s

x1 – x2 =  – w(t + /2) =  km, jsyxkM+h dh vksj osx v = 4 m/s

**Sol.** In the frame of train, the distance between A and B remains constant which is equal to  = 350. Hence, in the frame of train the distance between two events is equal to AB =  = 350 m.



Distance between these points with respect to ground

d =  + x1 – x2

=  + t2 – (t + )2

=  –   ~ 240 m

Time between these two events =  = 60 sec.

Velocity of frame V =  = 4 m/s.

**gy** jsyxkMh ds funsZ'k ra=k esa A rFkk B ds chp dh nwjh fu;r jgrh gS tks fd  = 350 gSA blfy;s jsyxkMh ds funsZ'k ra=k eas nksuks ?kVukvks ds chp dh nwjh AB =  = 350 m gSA

/kjkry ds lkis{k bu nks fcUnqvksa ds chp nwjh

d =  + x1 – x2

=  + t2 –  (t + )2

=  –  ~ 240 m

bu nks ?kVukvksa ds chp le; vUrjky =  = 60 sec.

funsZ'k rU=k dk osx V =  = 4 m/s.