**Q1 - Suggested solution**

Retention time 3.5min i.e. 210s. Water production 40 000 bbl/d \* 0.159m3/bbl / 24h/d = 265m3/h = 0.07361 m3/s

Water flow area (cross sectional area of separator for water), inner radius 1m, water level 0.8m

From the exercise given during the semester, the area up to level, *h*, for a vessel of inner diameter r is,

Thus, the horizontal plug flow velocity for water is

Water plug flow velocity =

Separator length, *L*, to weir plate:

L/D = 6.6

6.6 a bit high, it is often selected between 3 and 5. The diameter and water level should be increased.