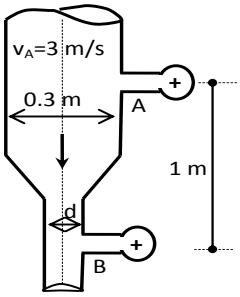
Kinematics

Question 1: A flow field is given as $\vec{V} = -x.\vec{i} + 2y.\vec{j} + (5 - z).\vec{k}$. Find the equation of the streamlines on the projections of x-y, y-z, x-z planes and calculate the x, y and z components of the acceleration field.

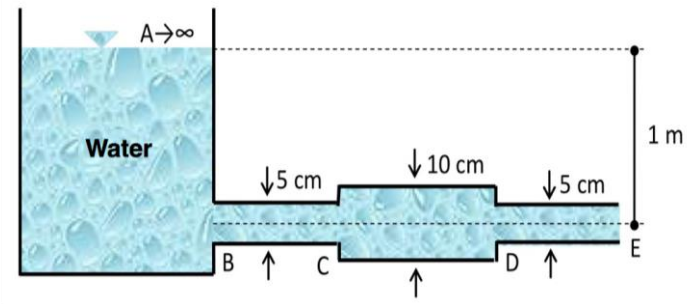
Question 2: A velocity field is given as velocity components u=V.cosθ, v=V.sinθ, w=0 . Find the equation of the streamline by taking V and θ as constants.

Question 3: Velocity components of a 2-dimensional (2-D) steady (permanant) flow field is given as $u=x^2-y^2$, v=-2xy. Find the equation of the streamline.

Question 4: Find the diameter (d) of pipe B by neglecting energy losses and if the manometers given in the figures show the same pressure value. (It should be considered that the pipe is horizontal).



Question 5: Calculate the discharge of the chamber-pipe system by considering the liquid as ideal (inviscid). Draw the gage energy and gage piezometer lines.



Question 6: For the reservoir–pipe system shown in the figure given below, find:

a- The discharges in the pipes,

b- Velocities and the pressures at points A, B, C and D.

c- Draw the gage and absolute energy and piezometer lines of the system.

d- Since the absolute vapor pressure of water is 2.26 kN/m^2, what should be the maximum value of h?