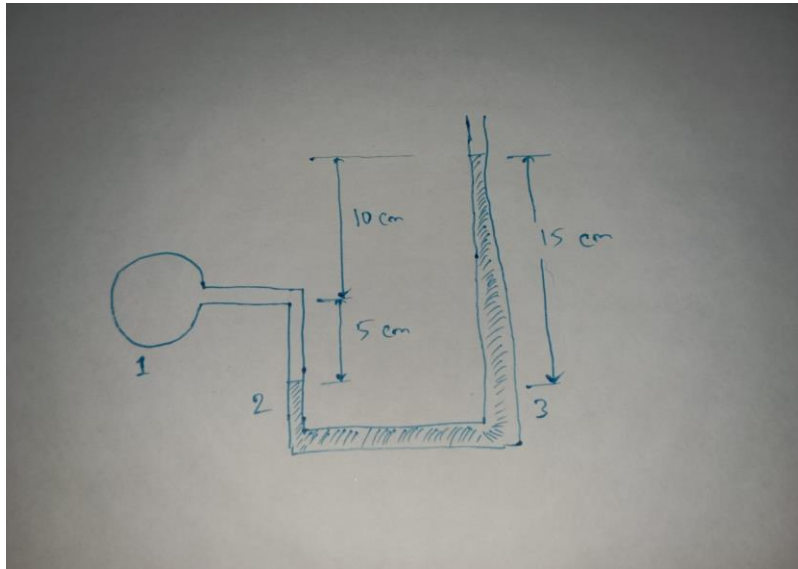


**Eastern Lubricants Blenders Limited (16/09/2022)**

1. Draw an Axial force diagram, SFD, and BMD



2. A RCC column 16-inch square,  $f'_c = 3$  ksi, reinforced with eight #7 bar of  $f_y = 60$  ksi, supported a total design load of 550 kips on 9 ft square footing with a depth of 24 inches. Calculate the punching shear stress that developed on the footing
3. Write the full meaning  
ETP, COD, UNICEF, SPT, ECR
4. Fill in the gaps  
=> the soil transported by wind is called .....  
=> porosity 0.6, void ratio .....  
=> plastic limit 20%, plastic index 30%. What is liquid limit = .....  
=>  $D_{10} = 0.1$ ,  $D_{60} = 0.3$ ,  $C_u =$  .....  
=> sand retained 100% on 100 no. sieve, F.M = .....
5. A circular cross-section sewer pipe dia 20" manning roughness coefficient = 0.013, laid on a grade = 0.0015. calculate velocity and discharge when the depth of flow is 5".
6. Why using a manometer is important?  
A U-tube manometer containing Hg (sp. gravity-13.6) has its right limb open to the atmosphere, the left limb is full of water & is connected to a pipe containing water under pressure. Find the pressure of water in the pipe above the atmosphere for the manometer reading below pic

