

Any missing data can be assumed .

Try in all question .

**Question NO ( 1 )**

a)-A natural soil deposit has a bulk density of 1.88 gm/cm<sup>3</sup> and water content of 5% calculate the amount of water required to be added to one cubic meter of soil to raise the water content to 15% .assume the void ratio remain constant what will then be the degree of saturation .assume the value of specific gravity .

b)-Proof that .

$$(1 - (1/G_s)) \cdot \gamma_{dry} + \gamma_w = (G_s - n (G_s - 1)) \cdot \gamma_w$$

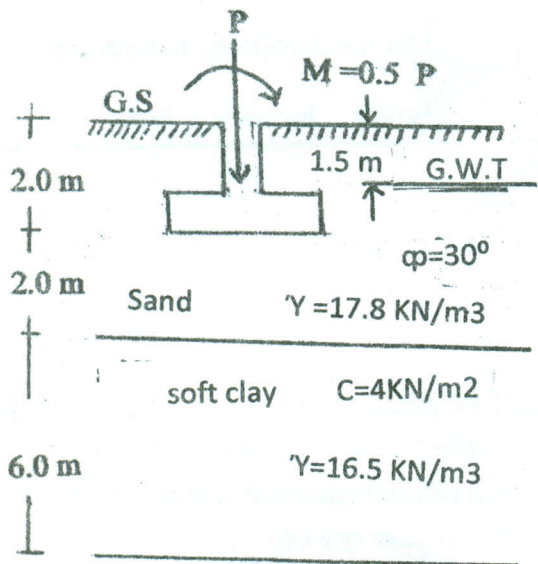
**Question NO ( 2 )**

Fig (1) shows the rectangular foot 2.5 m x 3 m founded on the layers soil . for the upper layer the saturated unit weigh of sand soil is 17.8 KN / m<sup>3</sup> and the angle of internal friction is 30 degree . for the lower soft clay layer the cohesion strength has 4 KN/m<sup>2</sup> and the saturated unit weigh has 16.5 KN / m<sup>3</sup> . if the foundation level equal 2.0 m and the G.W.T at 1.5 m under G.S find out the vertical load ( P ) and bending moment using factor of safety equal 3.0 .

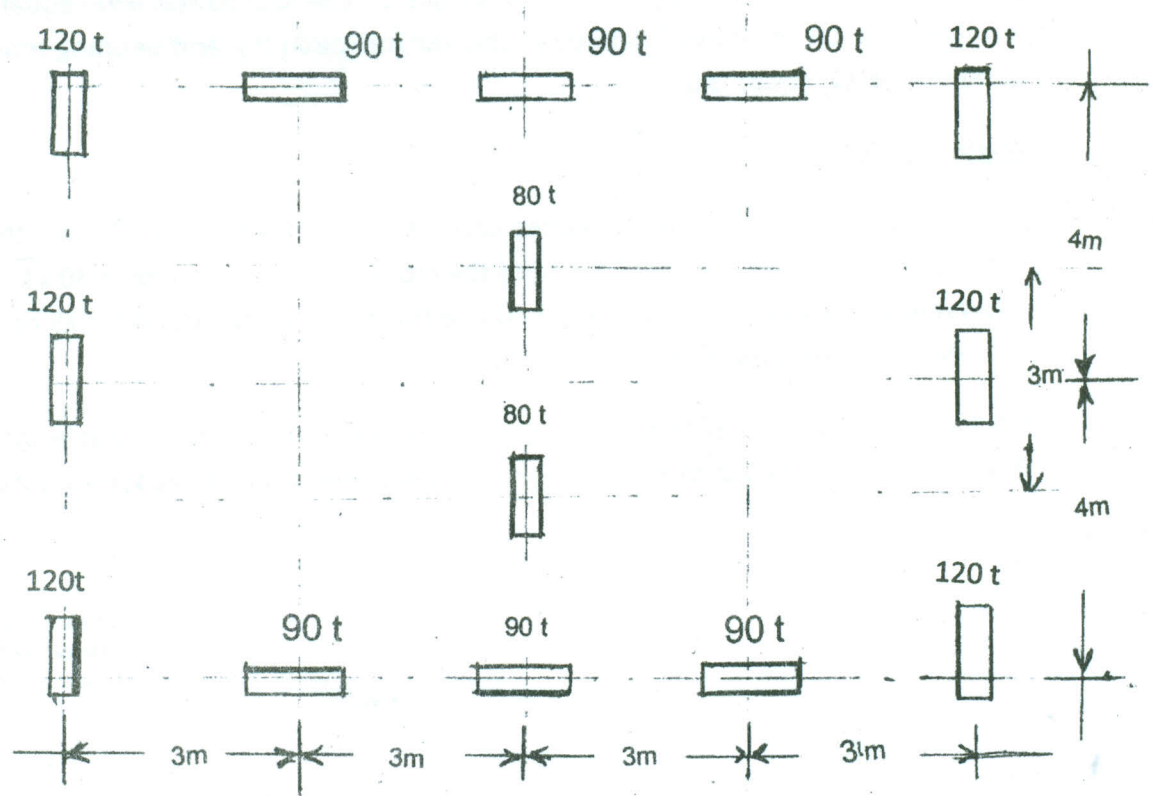
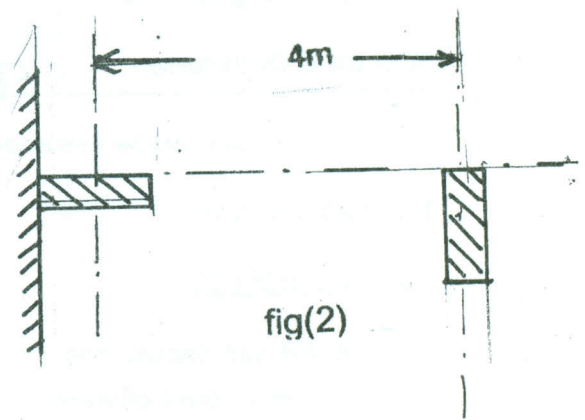
**Question NO ( 3 )**

a )- Fig ( 2 ) show two equally columns each of them carrying load 175 ton .the distance between them CL to CL equal 4.0 m and the cross section of column is 30 x120 cm if the allowable bearing capacity is 2.0 Kg/ cm<sup>2</sup>and the depth of foundation 1.75 m design with detail the suitable foot .

b )- Fig ( 3 ) show the location of construction columns .design the suitable column foundations and draw it with detail take the allowable bearing capacity 1.0 kg / cm<sup>2</sup> .



Fig(1)



fig(3)