- Answer all the following question.
- Any missing date may be reasonably assumed.
- Using design aids is allowed.

Question No. 1 (25%):-

Without any calculation:The following folded plate and cylindrical shell are supposed to cover a hall with *40x20* m^2. It is required to:-

a) *Without any calculation*, show the main steps of design for both.

b) With a suitable scale draw plan and cross section of RFT for one element (cross section with scale of (1:25).
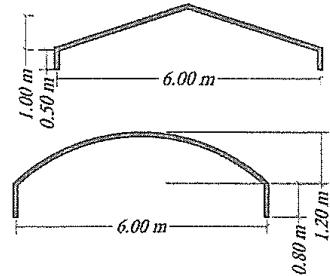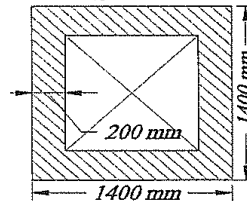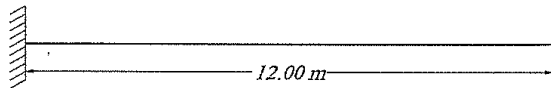
Question No. 2 (25%):-

The given cantilever with cross section shown below, it is required to calculate the follows assuming **fully pre-stressed**:

1-Estimate initial pre-stressing force (P_i)
2- Calculate A_{sp} for initial stage
3- Check stresses at service stage

Data: Losses = 15%, f_{cui} = 40 N/mm^2, f_{cu} = 50 N/mm^2, f_{up} = 2000 N/mm^2, f_{yp} = 1700 N/mm^2, e= 100 mm (from cover) D.L = 14 kN/m` (without O.W) and L.L = 9 kN/m`.

Question No. 3 (30):-

1-It is required to make a full design of the given tank, knowing that : (f_{cu} =35 N/mm^2 & f_y =360 N/mm^2).
2- With a scale of *1:50 draw plane* of reinforcement for each element, then with scale of *1:25 draw a half* cross section.
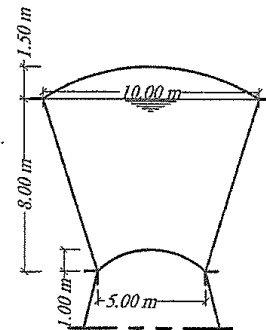
Question No. 4 (25):-

1-It is required to redesign the given *circular tank* when employing weak soil underneath. B.C = *60 kN/m^2*
Noting that: (f_{cu} =25 N/mm^2 & f_y =360 N/mm^2).

2-With a scale of *1:50 draw plane* of reinforcement for each element, then with scale of *1:25 draw a half* cross section.
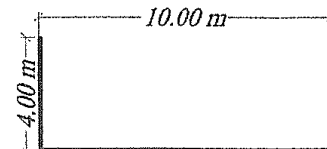
I wish you all the best
Ahmed Abd-ALLAH hamoda