Mansoura University Faculty of Engineering Structural Engineering Dep.	**Reinforced concrete (3)** الورقة الأولي	Design of Concrete Structures 4th year civil Final-Term Exam: 2012-2013

Time allowed: 4.0 hour

** Any missing data may be reasonably assumed **

Problem (1) 30 points

Fig.(1) shows an open channel water structure resting on the columns

It is required to:

1-Carry out a complete design for all elements, f_{cu}=300 kg/cm^2 and f_y = 3600 kg/cm^2 .

2- Draw to a convenient scale the reinforcement details.

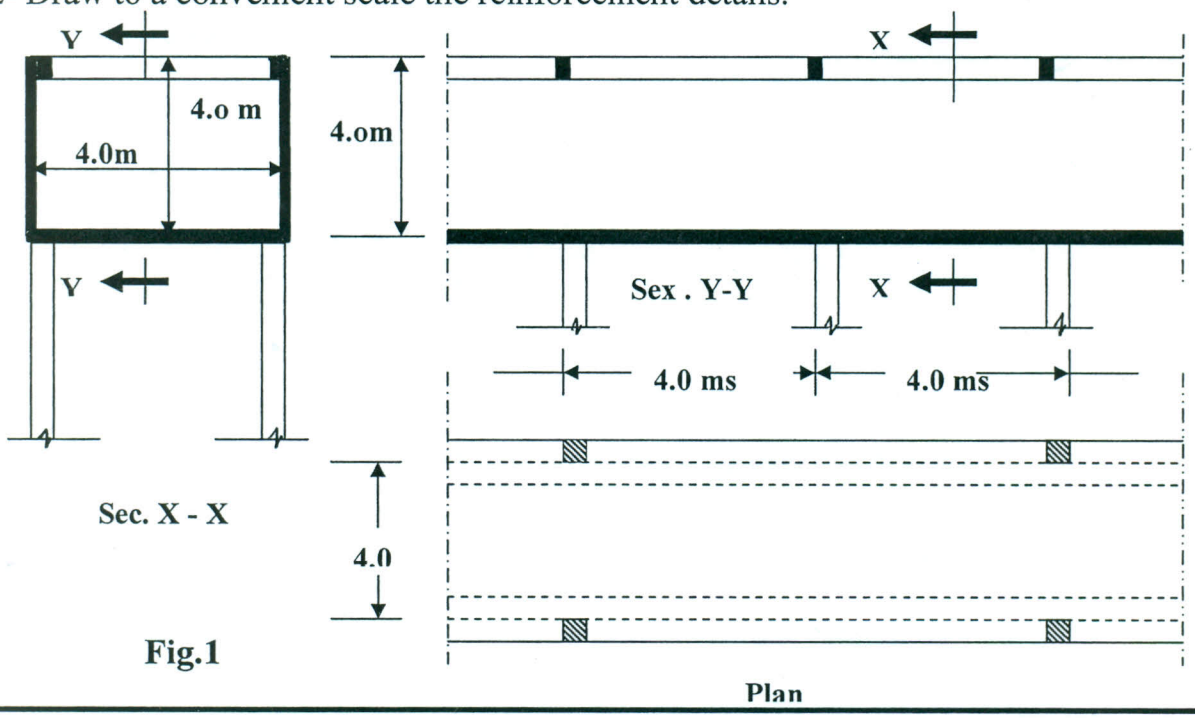

Fig.1

Problem (2) 30 points

Fig.(2) shows a ground circular water tank supported on a good soil with an allowable bearing capacity is 1.3 kg / cm^2 and covered with spherical dome with thickness = 10 cm , covering material = 50 kg/m^2 and live load = 50 kg/m^2. . **It is required to:**

1- Design the tank and the dome if f_{cu} = 300 kg/cm^2 and f_y = 3600 kg / cm^2

2-With an appropriate scale show the reinforcement details for both the tank and the dome..

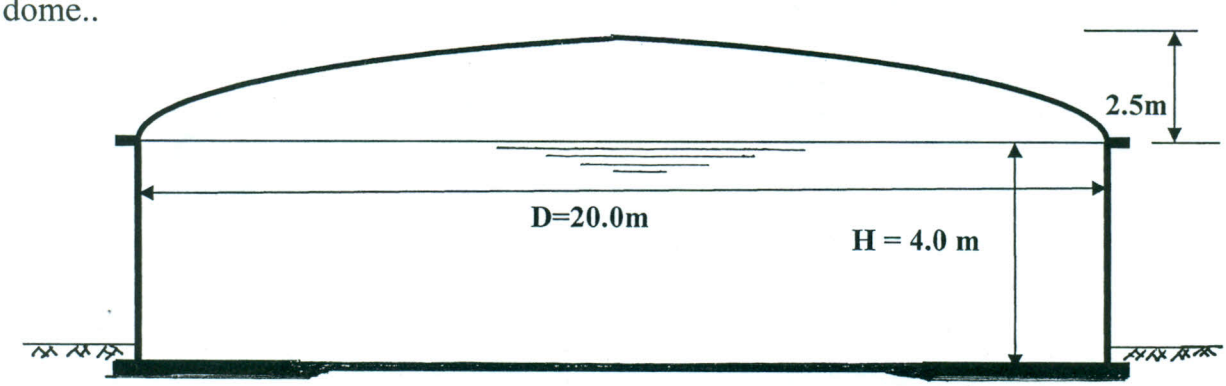

Fig. 2

Mansoura University Faculty of Engineering Structural Engineering Dep.	**Reinforced concrete (3)** الورقة الثانية	Design of Concrete Structures 4th year civil Final-Term Exam: 2012-2013

Problem (3) 15 points

For the post tensioned prestressed concrete simple beam shown in Fig. 3, the allowable compressive stresses at final =-140 kg/cm^2, at transfer=-135 kg/cm^2, the allowable tensile stresses at final=+ 26 kg/cm^2, at transfer = +12 kg/cm^2. If the losses =15%, the beam is subjected to dead load g = 1.5t/m\ and live load p = ? t/m\ .

It is required to :

1-Find the initial prestressing force F_0 and the allowable live load p = ? .
2-Find the stresses distribution at support and at mid-span section for the final stage
3-Check the shear and principal stresses due to dead load and F_o.

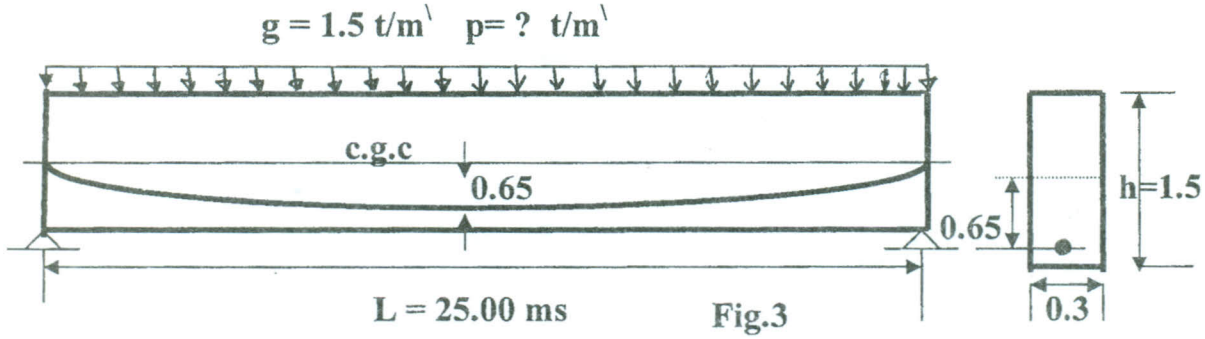

Fig.3

Problem(4) 15 points

A continuous post-tension prestressed concrete beam ABC carries a total load of 5 t/m\ as shown in Fig.4. The prestressing force F∞= 200 ton.

It is required to

1. Find the bending moments due to prestressing force only.
2. Determine the resulting moments due to prestressing force and external loads .
3. Find the depth if K_1=1.8, b=25 cm, f_{ctop}= 120 kg/cm^2 and check of the normal maximum stresses.

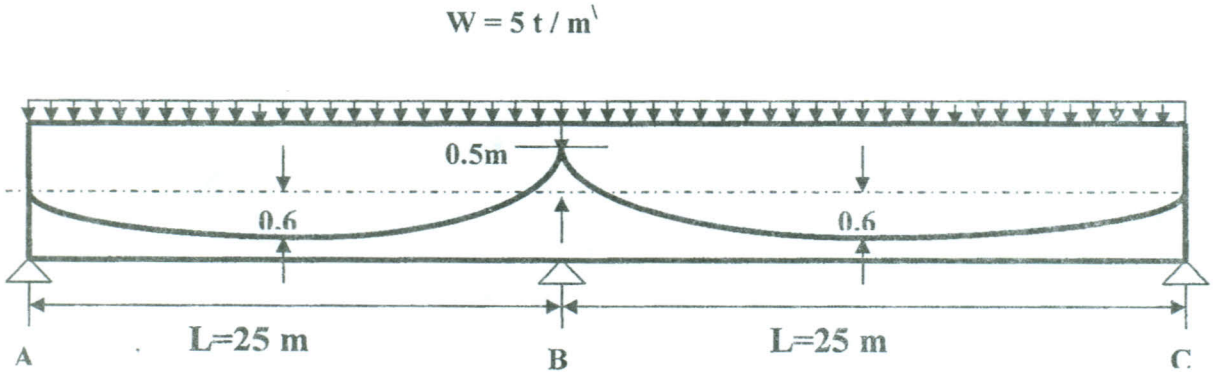

Fig. 4