Agric. Eng. Dept.
3rd level exam
Final Exam. 2013/2014
Hydraulics of Modern
Irrigation Networks
2nd Semester
Mansoura
University
Total Marks: 60

Agric. Eng. Program
Irrigation and Drainage
Engineering Division
Code No. Eng 335
Exam Date: 4/6/2014
Time allowed: Two hours

Faculty of
Agriculture

This exam consists of one page
Answer all of the following questions

Question (1): *(15-Marks)*

(A) Draw the Specific Energy Curve? *(5-Marks)*

(B) **Complete:** *(5-Marks)*

1- Sub-critical Flow Occurs when Depths of flow .... critical depths and Froude number is ....

2- Supercritical Flow Occurs when the velocity of flow is ....

3- .... Valve for use when flow is only in one direction.

(C) Draw Diaphragm (Saunders) Valve? *(5-Marks)*

Question (2): *(20-Marks)*

(A) Find the pipeline friction head loss using Hazen-Williams equation for a 200 m long plastic pipe (C = 150) that has an inside diameter of 160.1 mm and is to convey a water flow rate of 25.0 L/s. *(8-Marks)*

(B) A siphon of diameter 200 mm connects two reservoirs having a difference in elevation of 20 m. The length of the siphon is 500m and the summit is 3 m above the water level in the upper reservoir. The length of the pipe from upper reservoir to the summit is 100 m. Determine the discharge through the siphon and also pressure at the summit. Neglect minor losses. The co-efficient of friction, f=0.005 . *(12-Marks)*

Question (3): *(25-Marks)*

(A) In Hardy Cross method, Prove that $\Delta Q = \dfrac{-\sum r \times Q_0^2}{\sum 2 r \times Q_0}$ *(10-Marks)*

(B) The rate of flow of water pumped in to a pipe ABC, which is 200 m long, is 20 liters/s. The pipe is laid on an upward slope of 1 in 40. The length of the portion AB is 100 m and its diameter 100 mm, while the length of the portion BC is also 100 m but its diameter is 200 mm. The change of diameter at B is sudden. The flow is taking place from A to C, where the pressure at A is 19.62 N/cm² and end C is connected to a tank. Find the pressure at C and draw the hydraulic gradient and total energy line. Take f=0.008. *(15-Marks)*

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With my best wishes

Prof. Dr. Mahmoud Hany Ramadan
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