Kafrelsheikh University
Faculty Of Engineering
Department Of Civil Engineering
Forth Year, Design of irrigation works (II)

Date 13/01/2020
Time Allowed: 4 Hours
Full Mark: 100 Marks
1 pages

ANSWER AS MUCH AS YOU CAN *(ILOS a-1, a-3, b-1, b-2, c-2, c-6)*

Q1) A clear over-fall Fayom type weir is constructed across a canal according to the following data:

Bed level = (10.00) , W.L.U.S. = (13.00) , W.L.D.S. = (11.90) , Discharge = 27 m^3/sec, Bed width = 15 m, Bligh´s coeeficient = 15, Weir equation: $q = 1.956\ H^{1.72} + 0.014$

It is required to:

a- Give the hydraulic design of the weir

b- Design the length and thickness of the weir floor to safeguared against scour, undermining and uplift. . (30 Marks)

Q2) An intermediate regulator is constructed across a canal of according to the following data:

Canal: Bed width = 16m , Bed level = (10.00), Side slopes = 1:1 and 3:2, U.S.W.L = (13.50) , D.S.W.L = (12.50) , Berm level = (14.00) , Road level = (15.00) , Road width = 8m.

Regulator : Number of vents = 3, span of vent = 4m, P.C. pier thickness = 1.25m. A bridge of width = 10m including two side walks each of 1m is constructed over the regulator, spacing between main beams = 2m, L.L. on the bridge = 3t/m^2 , D.L. of the bridge = 2 t/m^2

Gates: single gates each has 4 horizontal beams (ribs).

It is required to:

a- Check the stability of the pier for the case of max normal force, where the X axis is parallel to the water flow direction.

b- Design the horizontal beams of the gates.

c- Draw to reasonable scale a plan H.E.R. of the regulator. (50 Marks)

Q3) A symmetric lock of dimensions 18m* 120m is constructed across a diverted canal where canal bed level = (15.00), W.L.U.S = (18.00) , W.L.D.S = (17.00), angle between gates 140°, time of filling or emptying the lock (T) = 10 minutes. It is required to:

a- Design the method for emptying and filling the lock.

b- Check the stress at the base of a P.C. thrust wall of a lock for the case of just after construction. . (20 Marks)

& With my best wishes &

DR. Galal Elsamak