

٥٩ ع حدى

Kafr El-Sheikh University
Faculty of Engineering
Civil Engineering Department
Fourth Year Civil
Examiner: Dr. Ayman Allam



First Term Exam
Design of Irrigation Works (II)
Course Code: (CES 4124)
Date: January, 2017
Time allowed: 4 Hours
Full mark: 100

- Systematic calculations and neat sketches are very important.
- Any other required data may be reasonably assumed

الإمتحان مكون من صفتين

Question No. (1): [50%]

An **intermediate** regulator is to be constructed across a main channel according the following data:

- The regulator consists of **3 vents** each of span **5m**, pier thickness = 1.75m
 - U.S.W.L. & D.S.W.L. = (14.25) & (13.50); respectively,
 - Water duty = 40 m³/fadd./day & area served = 160000 faddan,
 - Canal bed width = 25m & Canal bed level = (10.00),
 - Side slope from bed to berm =3:2 & Bligh coefficient = 14,
 - Bridge width=10m+ 2 sidewalks each of width = 1m, road level = (15.75),
 - Spacing between main girder of the bridge = 2m,
 - D.L. & L.L of the bridge = 1.5t/m² & 2.5t/m²; respectively,
 - The regulator vents are provided with double gates, the number of horizontal beams for the upper and the lower gates are 3 and 4; respectively,
 - The pier lengths **upstream and downstream** of the **bridge** are 5.5 m and 2.50 m; respectively.
- a) Design the floor **length** and **thickness** to be safe against **scour, undermining and uplift** according to **Bligh's** theory. [15%]
- b) Check the stability of the pier for the case of max. **Normal** force. [10%]
- c) Determine the **positions** and the modulus section (**Z**) of the horizontal beams and the **thickness** of the skin plate of the **lower gate** [$t= c(\mu.p/2f)^{0.5}$] [10%]
- d) Draw to suitable scale **sec. elevation** of the regulator showing all dimensions and levels. [15%]

(باقي الأسئلة في الخلف)

٥٩

Question No. (2): [25%]

A **symmetric** lock has to be constructed according to the following data:

U.S.W.L. & D.S.W.L. = (11.00) & (10.00); respectively, bed levels U.S. and D.S. = (8.00) and (7.00); respectively, berm level = (12.00), lock length = 150 m, lock width = 14 m, $\gamma_{\text{soil}} (\text{dry}) = 1.8 \text{ t/m}^3$, $\gamma_{\text{soil}} (\text{submerged}) = 1.1 \text{ t/m}^3$, ϕ for soil = 30° , L.L. = 0.8 t/m^2 , $W_{\text{gate}} = 0.25 \text{ t/m}^2$, $T = t_c / 2 + 2 A H / (cd a (2gh)^{0.5})$.

It is required to:

- a) Design the method of filling and emptying the lock. [10%]
 b) Check the stresses at **P.C.** thrust wall for the **case of repair**. [15%]

Question No. (3): [25%]

- a) Discuss the main purposes of constructing dams. [2%]
 b) Discuss the classification of dams. [2%]
 c) Discuss the required investigations to construct dams. [2%]
 d) State the main forces affecting upon dams. [2%]
 e) Discuss of the cases of loading of the main girder of the lifting device structure. [17%]

إنتهت الأسئلة ،،،،، مع أطيب التمنيات بالتوفيق والنجاح ،،،،،

د. أيمن خليفة علام
 أرمه للم