Menoufiya University **Faculty of Engineering** **Shebin El-Kom** **Second Semester Examination** **Academic Year: 2013-2014**	**Department: Civil Eng.** **Year: 3rd Civil Date 14/6/2013** **Subject/Code: IRRIGATION STRUCTURES DESIGN (1)/CVE321** **Time Allowed: 3 hours**

Remarks: No. of pages: 2 No. of questions: 4
Allowed Tables and Charts: ***(SHAKER EL BEHAIRY Design Handbook& Concrete Tables)***

Answer all the following Questions [70 Marks]

Question (1) **[18 Marks]**

- **Discuss** the suitable concrete cross section shape of syphon for huge discharges. **[3 Marks]**
- **Differentiate** between skew and right crossing. **[3Marks]**
- **Differentiate** between culverts and bridges. **[3Marks]**
- **Discuss** the needs and types of drainage systems behind retaining walls. **[3Marks]**
- **Classify** the retaining walls in general. **[3Marks]**
- **Explain** briefly, what are the super structures and the substructures of the bridge. **[3Marks]**

Question (2) **[12 Marks]**

A pipe culvert with the following data:

1. Road level (10.00)
2. H.W.L (6.50)
3. Pipe center line level (4.00)
4. Pipe diameter 3m.
5. bed level (3.50)
6. discharge = 8.1 m^3/s
7. side slopes 1 : 1 , 2 : 1

- Check the stress of the pipe culvert in case of all possible cases of loading. **[4Marks]**
- Choose the suitable type of retaining wall. **[1Marks]**
- Make complete design of the suitable retaining wall. **[7Marks]**

Question (3) **[20 Marks]**

A R.C bridge is constructed on a canal with the following data:

- 4 vent each 5m.
- 60 ton truck.
- L.L 0.5 t/m^2
- Bridge width 10m, two sidewalks 1.5m
- Bed width and levels is 27 m and (13.00) Road level (18.00)
- Water level (16.00)
- The berm level above the water level by 1.0m.
- Side slopes 1:1 and 2:1
- C = 0.32 kg / cm^2 q_{all} = 1.6 kg / cm^2 $\varphi = 37°$ γ = 1.65 t/m^3

It is required to:

- A complete design of the superstructure. **[10Marks]**
- A complete design of the pier. **[3Marks]**
- Draw a plan H.E.R. **[7Marks]**

Question (4) **[20 Marks]**

It is required to design a reinforced concrete box section aqueduct to pass the discharge 7.3 m^3/s of the canal above the drain with the following data, the aqueduct will be used as light load bridge:

	Main canal	Drain
Bed width	3.0m	2.0 m
Bed level	(2.00)	(0.00)
Side slope	3: 2 & 1: 1	3: 2 & 2: 1
Water level	(4.20)	(1.60)
Berm level	(5.00)	(3.10)
Bank level	(6.00)	(5.00)
Bank width	9	5

It is required to:

- A complete design of the aqueduct. **[10 Marks]**
- Draw a sec ELE. **[10 Marks]**

و الله ولي التوفيق

د.م / عصام الدين هلال

ملحوظة:هذا الجدول خاص بالجودة ولا يعنى الطالب

Question no.	1	2-a	2-b	2-c	3-a	3-b	3-c
ILO's	A.4,A.11,B3	A.6, A.13, A.15, B9 and B14	A.6, A.13, A.15, B9 and B14	A.15 and B14	A.15 and B14	A.15, B.3, C.10 and B14	A.14 and B14, C15
Question no.	4-a	4-b					
ILO's	A.6,A.11,A.13, A.15, B3,B9 and B14	B 14 and C15					