Menoufiya University
Faculty of Engineering, Shebin El-Kom
Civil Engineering Department
Second Semester Examination, 2014-2015
Date of Exam: 06/06/2015

Subject: Design of Irrigation Works II
Code: CVE422
Year: Fourth year
Time Allowed: 3.0 hours
Total Marks: 70 marks

Solve as much as you can, any missing data can be reasonably assumed, and follow steps of solution using neat sketches.

QUESTION (1)..... (16 Marks)

A-) Explain with aid sketches:

1- The precautions to undertaken to safeguard the channel bed against scour... (2 marks)
2- Seepage effects on heading up structures. ..... (2 marks)
3-How weirs can be used for controlling the water discharges through Nasabah.(2 marks)

B-) A clear over-fall weir is to be constructed at a given drop site of a canal. The maximum and minimum passing discharges through the canal are 8.00 and 6.50 m^3/s, respectively. The full data of the canal at weir's site, which are obtained from the longitudinal section, are given in the following table:-

	U.S the weir	*D.S the weir*
High water level (H.W.L)	(31.50)	(30.00)
Low water level (L.W.L)	?	(29.50)
Bed Level	(29.50)	(28.00)
Bed width	5.0	5.0
Side slopes	1:1	1:1
Berm level	(32.00)	(30.50)
Road level	(33.00)	(32.00)

It's required to :-

a) Give complete hydraulic design of weir. .....(3 marks)
b) Find the safe floor dimensions (Length and thickness). (C_B=14.5)..... (2 marks)
d) Draw plan and Sec. Elevation with suitable scale. ..... (5 marks)

QUESTION (2)..... (18 Marks)

A-) Explain briefly the different types of regulators according to their position in irrigation network.....(2 marks)

B-) Explain with sketches the effect of the pier shape on the head loss.....(2 marks)

C-) A control regulator is to be constructed a cross main canal according to the following data:

The maximum discharge passing through the regulator =55.0m^3/s
Bed Level = (20.00) , Bed Width = 26.0 m , H.W.L (D.S) = (24.00)
L.W.L (D.S) = (23.80) , Berm Level = (24.30) , Road Level = (25.80)
Road width = 8.0 m , Land level = (24.30)
Side slopes from bed to berm =1:1 , Equivalent live load on the bridge=2.50 t/m^2

It's required to :-

1) Make a complete hydraulic design of the regulator. ..... (4 marks)
2) Calculate the stresses at the base of the pier considering case of max.(M_x).(5 marks)
3) Draw SEC. Elevation with suitable scale. ..... (5 marks)

QUESTION (3)..... (18 Marks)

a-) Explain with sketches the different types of locks according to location of locks..(2 marks)

b-) Explain briefly the methods of emptying and filling of the lock chamber. .....(2 marks)

b-) It's required to construct a symmetrical isolated lock according to the following data:

	U.S Lock	*D.S Lock*
High water levels=	(15.00)	(14.20)
Low water levels=	(14.00)	(13.20)

Bed level= (10.00) , berm level=(16.00)

Minimum water depth for safe navigation is 3.0 m

Time required for filling or emptying the lock chamber is 8.0 min.

Dimensions of lock chamber= 80x16

It's required to :-

1- Give all empirical dimensions for all elements of lock..... (4 marks)

2- Make a hydraulic design for the side culvert..... (4 marks)

3- Design the landing wall *according to the critical case of loading* ..... (6 marks)

QUESTION (4)..... (18 Marks)

a-) Explain with sketches the classification of dams according to use? ..... (2 marks)

b-) Discuss the factors affect the choice of dams' type? .....(2 marks)

c-) Discuss why the rock fill dams are preferable..... (2 marks)

d-) The shown gravity dam for case of full reservoir with horizontal earth quake (α=0.10) and for empty reservoir determine the following:

1- Factor of safety against Overturning. ..... (2 marks)

2- Factor of safety against Sliding. ..... (2 marks)

3- The Shear friction factor. ..... (2 marks)

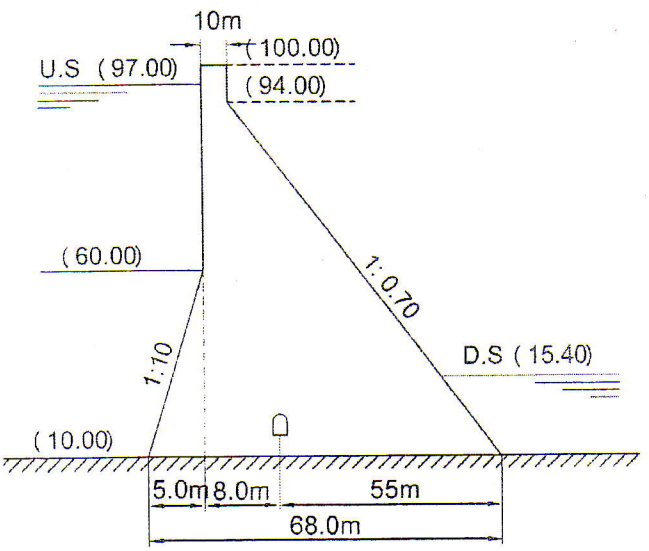
4- The vertical Normal Stress. ..... (2 marks)

5- The Major principal stress. ..... (2 marks)

6- The Intensity of shear. ..... (2 marks)

Assume γ_m=2.30 t/m^3 , μ=0.70 , q=13.0 kg/cm^2

(Dimensions and levels are in ms)



With our best wishes

Prof. Mohamed Sobeih

This exam measures the following ILOs												
Question Number	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	A1	A4	A2	A3	B1	B2	B3	B2	C2	C3	C1	C5
Skills	Understanding Skills				Intellectual Skills				Professional Skills			