Benha University
Faculty of Engineering at Shoubra
Civil Engineering Department
Third Year Civil, Structures

Final 2nd Term Exam
Date: 4 / 6 / 2015
Irrigation & Drainage Engineering
CVS 325
Duration: 3 hours

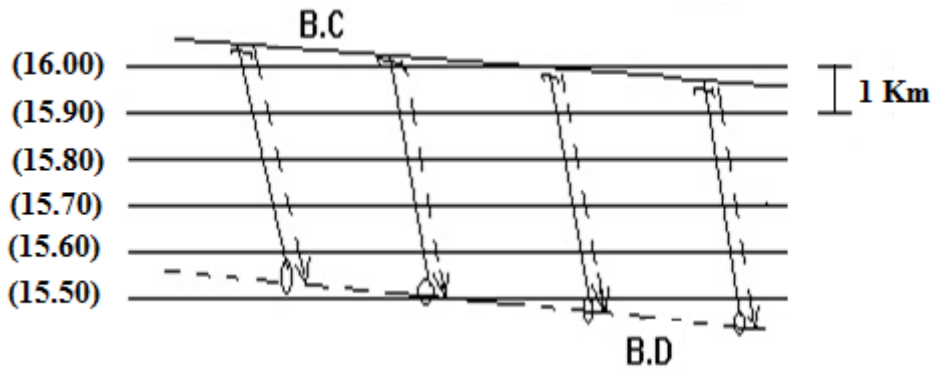
- Answer all the following questions.
- Illustrate your answers with sketches when necessary.
- The exam consists of 3 pages.
- No. of Questions: 4
- Total Mark: 100 Marks

الجزأ الأول (د / علاء) – ورقتان: الأولى وجهين للأسئلة، والثانية وجه واحد للاجابة فيها (بدون كتابة بيانات شخصية) وتسليمها مع كراسة الاجابة، واجابة باقى الأسئلة فى كراسة الاجابة

الجزأ الثانى (د / محمود) – ورقة وجه واحد للأسئلة – مع مراعاة الفصل بين اجابات كل دكتور فى كراسة الاجابة

Question (1) (5 %) (5 Marks)

Evaluate the following planning?



Question (2) (12 %) (3x4=12 Marks)

The planning shown in figure (1) is correct. *On the figure (1):*

a) Draw both the branch drain 1 and the branch drain 2?

b) Fix the required constructions?

c) Determine the total area served for the branch canal, the branch drain 1 and the branch drain 2?

Question (3) (33 %) **(11x3=33 Marks)**

A branch canal has a length of 15 km with two turn irrigation rotation. The design data is given in table (1).

1. What is the total area served by the branch canal?
2. Sketch a plan for the branch and distributor canals showing required constructions and the areas served?
3. In the given table, calculate the areas served for design and the discharges at different sections of the branch canal, where the compensation ratio is 30 % and F.W.D. = 50 m^3/Fed/day?
4. In the given table, fix the missed water levels at km 4.0, 8.0, 12.0 and 15.0?
5. Design the cross section of the branch canal at km 6.0 (Z=1 & b=2y)?
6. Calculate the velocity of water at km 6.0 of the branch canal? Give your comment?
7. Draw the typical cross section at km 6.0 of the branch canal showing the expropriation width, assuming S = i?
8. Determine the quantities of cut and fill at this section?
9. If the quantities of cut and fill at this section are not equal, what is the solution?
10. On figure (2), draw a longitudinal section from km 4.0 to km 8.0 only?
11. On figure (2), assuming S = i, draw the land and water lines from km 8.0 to km 12.0 only?

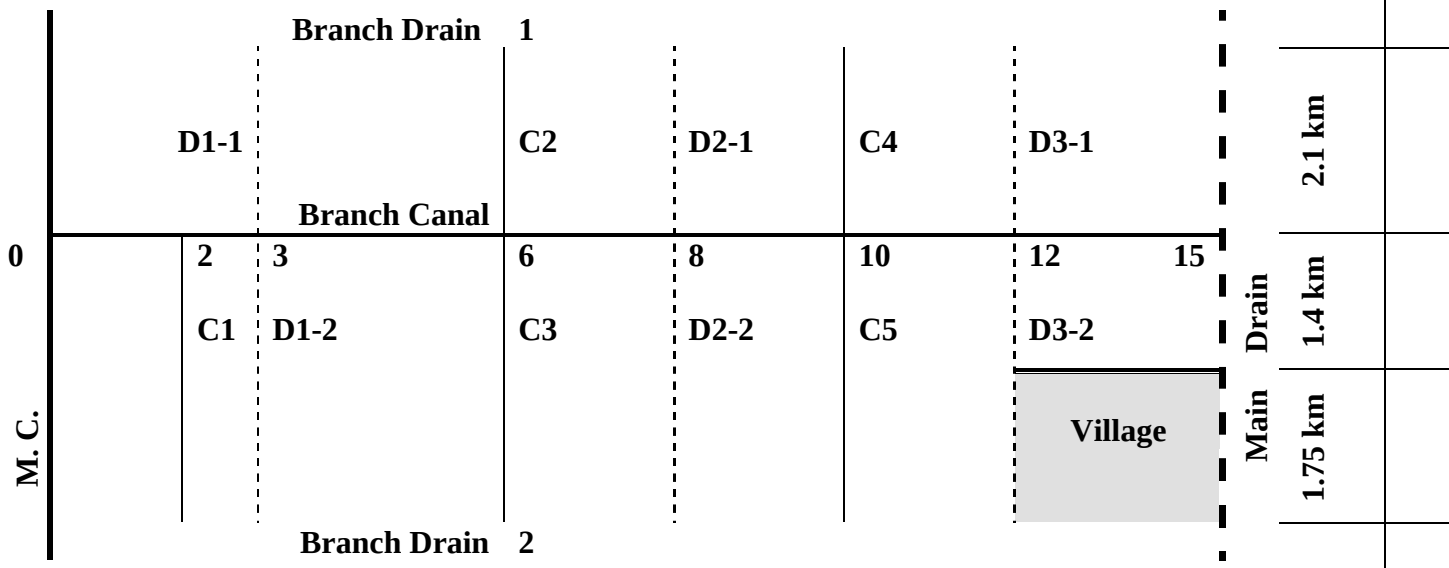


Figure (1): Question (2)

Location Km.	Water Line		Area Served Feddan					
	Level m.	Slope cm/km	Turn A Fed.	Turn B Fed.				
0.0	(15.70)	9	11000 9000	9000 9000				
4.0	( )	9	9000 5000	9000 9000				
8.0	( ) (13.80)	9 10	5000 ---	9000 5000				
12.0	( )	10	---	5000 2000				
15.0	( )	10	---	---				

Table (1): Question (3)

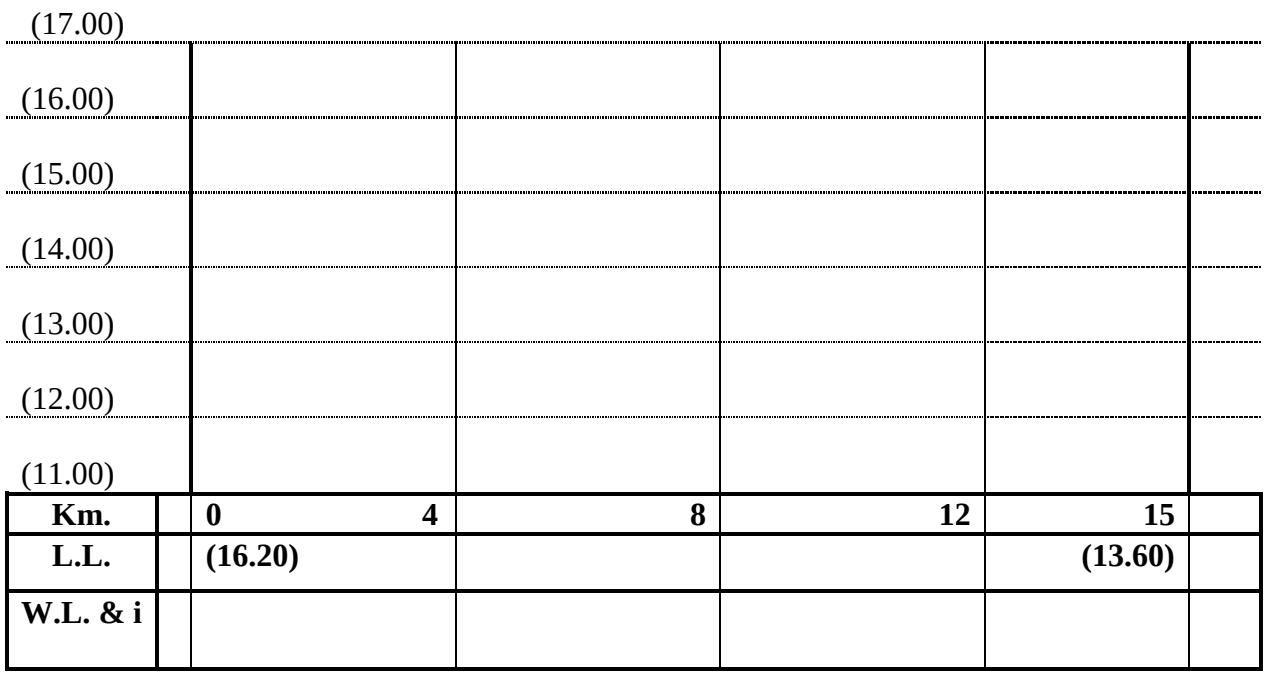


Figure (2): Question (3)

Question (4) (50 %) **(2x25=50 Marks)**

A branch canal crosses a roadway at right angle. The available data at the crossing are as follows:

Canal :

Bed width = 4.00 m, **Bed level** = (10.00), **Inner side slope** 1:1, **Outer side slope** 3:2, **Water level** =(12.00), **Berm level** = (12.50), **Bank width** =6.00 m**, Bank level** (13.50) and **water slope** = 10 cm / km.

Roadway :

Road width = 6.00 m, **Road level** = (13.50), **side slope** 3:2

a) Carry out the hydraulic calculation for steel pipe culvert.

b) Sketch **P. H.E.R, and Sec elevation**

Examiners Board: ***Dr. Alaa El-Hazek, Dr. Mahmoud Refai***