THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT PROGRAMME - LEVEL 7
POST GRADUATE DIPLOMA / STAND ALONE COURSES

Final Examination – 2011

CEX7101 – Planning and Control in the Construction Industry

Time Allowed: Three Hours

Date: 21st February 2012   Time: 0930-1230 hrs.

Section A and Section B consist of three questions each.
Select **two (2) questions from each section** and answer a **total of four (04) questions.**

Section A

Q1.

(a) Identify a 'constructed product' and explain the main processes involved in delivering the product.

(10 marks)

(b) Explain the difficulties encountered in implementing the concept of 'appropriate technology' in the construction industry.

(07 marks)

(c) Describe the resource inputs to the construction industry and their impact on the economy.

(08 marks)

Q2.

(a) One of the problems faced by the construction sector is the rapid fluctuation of demand for construction.

(i) Identify & explain the factors which can cause changes in demand. (08 marks)
(ii) Explain the steps that can be taken to stabilize such fluctuations and ensure an adequate sector workload.

(10 marks)

(b) Explain how the Government can use the construction industry as an economic regulator. (07 marks)

Q3.

(a) It is required to construct a housing scheme consisting of 50 individual houses on a large area of land. Identify the broad scope of the project and explain the factors which affect the choice of 'planning techniques' for different stages of the project giving the particular advantages in adopting the selected techniques at each stage.

(15 marks)

(b) Explain how Clients, Consultants and Contractors need to work hand-in-hand in creating a healthy construction industry.

(10 marks)

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Section B

Q4.

The table below gives a schedule of activities for the construction of a bridge

Table 4.1

Activity name	Activity reference	Description	Duration (weeks)
A	0-1	Cast Decks	04
B	0-2	Cast Frames	10
C	0-3	Set Out	01
D	1-9	Deliver Decks	01
E	2-8	Deliver Frames	01
F	3-4	Excavate Foundations	02
G	3-5	Filling to approach	03
H	4-6	Concrete Foundations	01
I	5-7	Grade approach	03
J	6-8	Fix bearing pads	03
K	7-11	Hardcore approaches	04
L	8-9	Erect pre cast frames	05
M	9-10	Lay deck	04
N	10-12	Surface deck	03
O	11-12	Surface approaches	03
P	12-13	Complete & clear up	01

(a) Draw a complete <u>activity-on-arrow network</u> showing durations, event numbers and event times and indicate the critical path. (06 marks)

(b) Draw a complete activity-on-node network, indicate the critical path and calculate the total floats of activities. (08 marks)

(c) Draw bar charts based on the earliest start times and the latest start times. (04 marks)

(d) Explain how to make use of the float times in managing resources. (07 marks)

Q5.

(a) (i) Explain the importance of resource planning at the Design Stage for construction contractors. (12 marks)

(ii) Describe a methodology for preparing resource aggregation diagrams for the different types of resources used on construction projects. (05 marks)

(b) Table 5.1 gives a portion of a bar chart for construction of a two storey building.

All activities are to be carried out by a direct labour force.
Assuming standard norms given in Chart 5.1 and stating any other required data,

(i) Calculate the total number of labour required in the first month of operation.

(ii) Calculate the number of bags of cement required in the first and second months of operation and arrive at a suitable size of a cement store.

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(08 marks)

Table 5.1- Bar Chart

Description of work	Unit	Qty	March				April				May			
Excavation for foundation	M^3	100		█	█									
50mm blinding layer of concrete under column bases	M^2	15			█	█								
1:2:4 Concrete in column bases	M^3	08					█	█						
1:2:4 Concrete column shaft upto 1st floor	M^3	45							█	█				
Rubble foundation up to DPC	M^3	50					█	█	█					
1:2:4 Concrete in 1st floor beams & slab	M^3	90									█	█	█	█

Chart 5.1 Work Norms

Item	Quantity & Unit	Labour
1. Excavation for foundation	1 M^3	1 labour day
2. Blinding Concrete	3 M^2	1 labour day & 1 Mason day
3. Shuttering	1 M^2	1 Carpenter day & 1 labour day
4. Bar Bending	2 M^3	1 Bar Bender day
5. Concreting	1 M^3	1 Mason day & 3 labour days
6. Rubble Masonry	3 M^3	1 Mason day & 2 labour days

Cement requirement:
1 M^3 of Blinding Concrete   6 bags
1 M^3 1:2:4 Concrete   9 bags
1 M^3 Random Rubble Masonry   2 bags

Q6.

(a) Explain how you can exercise Progress Control on a project where the work programme is based on the critical path method.   (07 marks)

(b) Describe the method of progress control through 'Percentage Completion Method'.   (08 marks)

(c) Illustrate a suitable Work Breakdown Structure and Work Packages for the construction of a large hydropower project which involves; the construction of several dams, many hydro power & power projects, new town development projects and a road network including many bridges and culverts. State any suitable assumptions you may make.   (10 marks)