THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF CIVIL ENGINEERING
Bachelor of Technology (Engineering)

Final Examination - 2012/13

CEX 6239 Construction Management

Time Allowed : Three Hours

Date: 03rd August 2013 Time : 0930-1230 hrs.

Answer any four (4) questions.
All questions carry equal marks

Q1.

(a) Describe a system that a contractor may adopt in order to select the most appropriate construction plant for earthwork operations for a pipe laying project. (13 marks)

(b) Compare and contrast the plant maintenance policies which a contractor may adopt, highlighting the features, advantages and disadvantages of each policy. (12 marks)

Q2.

(a) A network consists of the following activities with indicated duration in weeks.

Table 1

Activity	Duration (weeks)	Preceded by
A	3	-
B	2	A
C (completion)	4	D
D	2	E
E	5	A
F(completion)	1	B
G	2	B
H(completion)	3	E,G

(i) Draw an activity-on-arrow network diagram for the set of activities. Identify the critical path and determine the project completion time. (08 marks)

(ii) Draw a suitable activity-on-node network diagram for the project indicating activity times, sequence of activities and the critical path. (06 marks)

(iii)Prepare a bar chart based on 'Earliest Event Times' indicating the Latest Event Times and the floats of activities on the same chart. (06 marks)

(b)Compare the use of bar charts and network diagrams for construction projects. (05 marks)

Q3.

The details of a construction project are given below.

Contract Value - 400 Million
Time for completion - 06 months

Mark up ie. Contractor's profit % added to costs to give monthly values – 10%
Retention - 10%
Release of retention- 50% on completion and balance after 6 months

Mobilisation Advance - 20%
Advance Recovery- 20% of Cum Value starting from second payment onwards

Bill Payments- made monthly with one month payment delay
Costs incurred may be paid with a one month payment delay

Cumulative Value Vs Time data to be calculated from the following production data.

Table 2

Time (month)	Cumulative Value (% of Contract Value)
1	30%
2	45%
3	60%
4	75%
5	90%
6	100%

(a) Prepare a Cash-Flow forecast. (18 marks)
(b) Draw 'CASH-IN' and 'CASH-OUT' graphs. (07 marks)

You may make relevant assumptions where necessary.

Q4.

(a) Discuss the concept of 'managing' a Design Team and identify the major requirements to be included in a Design Brief with respect to the construction of a building. (10 marks)

(b) Describe the multiple activities to be considered in computing the cycle time for a job of 'excavating earth and dumping' for filling a road trace. Illustrate a set of possible activities on a multiple activity chart. (08 marks)

(c) Outline the possible 'motivation theories' to be used for motivating people on civil engineering construction sites. (07 marks)

Q5.

(a) Briefly explain the Standard Form Contract that could be used with a Bill of Quantity type contract. (05 marks)

(b) When Standard Form Contracts are used, 'terms' have a specific meaning. Give the specific meanings with regard to ICTAD conditions of contract, for the following terms.

(i) The **Architect**
(ii) The **Contractor**
(iii) The **Engineer**
(iv) The **Employer**

(10 marks)

(c) Explain the relationship between the following documents; Drawings, Specifications and BOQ and state the significance of the information contained therein. (10 marks)

Q6.

(a) Problems in the handling of materials and structural elements on a construction site need to be considered at the planning stage of a building construction project in order to prevent accidents. Discuss the Factors as given by Niskanen & Lauttalammi, affecting accident risk in materials handling on construction sites and ways in which problems manifest.

(12 marks)

(b) Using the 'Hours saved system' as an Incentive Scheme for operating a production bonus for a construction project, calculate the following.

A bricklayer building drainage manholes should be able to lay 60 bricks per hour at standard performance (100P). Each manhole contains 720 bricks. If the bricklayer can achieve this target then he will be entitled to a bonus of 33 1/3% of his basic rate of payment. Calculate the bricklayer's earnings when his performance is 50P and 100P respectively. The basic rate of payment is Rs 100 per hour.

(13 marks)