THE OPEN UNIVERSITY OF SRI LANKA
DIPLOMA IN TECHNOLOGY (CIVIL) - LEVEL 4
FINAL EXAMINATION - 2010/11

CEX4232 - CONSTRUCTION ENGINEERING AND PLANNING

Time allowed : Three hours

Date : Wednesday, 09th March 2011 **Time : 09:30 - 12:30**

Selecting at least two (2) questions from each section, answer a total of five (5) questions. All questions carry equal marks.

Answers for sections A & B should be submitted on separate answer books with Section A and Section B written clearly on the cover of the respective book.

Write down your Index Number clearly on both answer books.

SECTION A

(01)

(a) Describe what precautions should be taken when driving pre-cast concrete piles. (04 marks)

(b) Explain what 'replacement piles' and 'displacement piles' mean. (05 marks)

(c) List the methods of load testing of piles. (04 marks)

(d) Explain the meaning of "pile extraction" and describe how pile extraction is carried-out at the site. Also briefly explain the equipment used for this purpose and how they operate. (07 marks)

(02)

(a) Explain what is meant by 'curing' of the concrete cast at site, and the reasons for doing it. (05 marks)

(b) Describe the procedure to repair a honeycombed area on the side of a concrete beam. (05 marks)

(c) Explain what is meant by 'durability' and the precautions, which should be taken at site to ensure the durability of a concrete structure. (05 marks)

(d) Explain the non-destructive test method you adopted in the laboratory to locate the voids in a concrete member. (05 marks)

(03)

(a) Explain what is meant by 'ventilation of drains' and give reasons for providing it. Illustrate the method of providing it with a neat diagram. (06 marks)

(b) Write down the (i) functions, and (ii) suitable locations for manholes. (04 marks)

(c) Write down the criteria adopted in the selection of pipe gradients for a drainage system. (04 marks)

(d) Explain the procedure adopted for testing of internal soil pipes with the help o a suitable diagram. (06 marks)

(04)

(a) Draw a diagram showing a typical wiring and switching system with tw switches & bulbs. Indicate live and neutral wires clearly in the diagram. (04 marks

(b) Briefly explain the <u>three</u> (3) types of electric wiring installation used i domestic buildings. (04 marks

(c) Briefly explain the following terms used in electrical installation systems;
(ii) Earth (ii) Single-phase supply (iii) Three-phase supply (iv) Kilowatt
(v) Rating (04 marks

(d) Lamps used for lighting of domestic buildings can be either (i) filament type, (ii) fluorescent type. Briefly explain the two types. (04 marks

(e) List the <u>five</u> (5) types of lamps commonly available. Briefly describe each them. (04 marks

SECTION B

(05) (a) Explain why construction site layout planning is important. List out the procedure and describe how site planning can be carried out for a building construction project. Give a sketch of a typical site layout plan. (12 marks)

(b) List the ways in which wastage of materials can occur on construction sites and outline methods of avoiding such waste. (08 marks)

(06) (a) A contractor is to prepare an estimate for a building construction project. Explain the use of 'Unit Rate Estimating' and 'Operational Estimating' for a concreting item of work in such a project. Show how calculations are carried out for each method. Make necessary assumptions.

(10 marks)

(b) Describe the '**data**' and the '**operations**' of a Cost Data bank for construction projects and explain its use for estimating Direct Cost Rates for items in a Bill of Quantities. (10 marks)

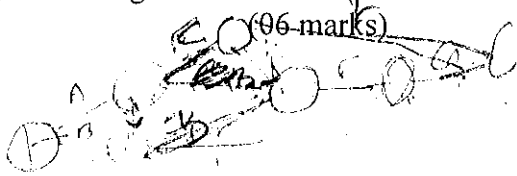
(07) (a) The Table below gives the activities for a project.

Activity	Duration (weeks)	Preceding activity
A	2	-
B	3	-
C	4	A
D	3	B,A
E	8	D,C
F	3	C
G	2	E
H	3	F,G

(i) Draw the network diagram for the above project.
(ii) Calculate and tabulate Early Start Time (EST) and Late Start Time (LST) for each activity.
(iii) Draw a bar chart for the project using EST.
(iv) Find the minimum project completion time and identify the Critical Path for the project.
(v) Determine the float times for each non-critical activity and explain the effect on the project

(14 marks)

(b) Explain how resource aggregation can help in good management of resources by using a simple example. (06 marks)



(08) Write short notes on any two of the following:

(a) Construction Safety
(b) Planning a bridge construction project
(c) Improving the efficiency of earthwork operations

(20 marks)