

**THE OPEN UNIVERSITY OF SRI LANKA
DIPLOMA IN TECHNOLOGY (CIVIL) - LEVEL 4
FINAL EXAMINATION - 2005/2006**



CEX 4232 - CONSTRUCTION ENGINEERING AND PLANNING

Time allowed : Three hours

Date : Thursday, 20th April 2006

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 sheets with section A and Section B written respectively on the answer scripts.

Write down your Index Number clearly on both answer scripts.

SECTION A

(01)

- (a). Explain what is meant by the term 'soil compaction' in relation to engineering. (5 marks)
- (b). Write down the factors which influence the degree of soil compaction while briefly explaining them. (5 marks)
- (c). Briefly describe the procedure for filling & compacting earth works. (5 marks)
- (d). State the different methods available for specifying soil compaction to the contractor. Discuss their advantages and drawbacks. (5 marks)

(02)

- (a) Draw a diagram showing a typical wiring and switching system with two switches & bulbs. Indicate live and neutral wires clearly in the diagram. (5 marks)
- (b) There are three types of electric wiring installation used in domestic buildings. Briefly explain what these are. (5 marks)
- (c) Lamps used for lighting of domestic buildings can be either (i) filament type, or (ii) fluorescent type. Briefly explain the two types. (5 marks)
- (d) List the five types of lamps commonly available. Briefly describe each of them. (5 marks)

(03)

- (a) Explain what is meant by 'curing' of the concrete cast at site and the reasons why it should be done. (5 marks)
- (b) List and explain all the factors which influence the 'workability' of freshly mixed concrete. (5 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. (5 marks)
- (d) Explain the terms "entrapped air" in concrete and "entrained air" in a concrete mix. (5 marks)

(04)

- (a). Explain the difference between 'rigid pavements' and 'flexible pavements' in highway construction. (5 marks)
- (b). Draw a neat sketch of typical 'climbing tower crane' labeling main components of it. (5 marks)
- (c). Describe the two basic types of poker vibrators, explaining difference of their vibratory function. (5 marks)
- (d). Provide a neat labeled sketch of a manhole and explain the usage of it. (5 marks)

SECTION B

(05)

- (a) Explain what you understand by progress control of construction projects. (6 marks)
- (b) Discuss the factors which determine the frequency with which progress is measured and evaluated. (7 marks)
- (c) Explain how you can use bar charts in progress control. (7 marks)

(06)

- (a) Briefly outline the main functions of the following machines (6 marks)
- (i) Grader
 - (ii) Dragline
 - (iii) Hoe
- (b) Describe 'cycle time' in relation to a truck engaged in an earthwork operation associated with the construction of an earth fill dam, identifying its elements. (7 marks)
- (c) Discuss the methods available to increase productivity of earthwork operations carried out using machinery. (7 marks)

(07)

- (a) Explain how 'Inventory Control' is carried out by a firm engaged in hiring of construction plant. Also discuss the advantages of adopting 'Inventory Control' in relation to this business. (10 marks)
- (b) Accident preventive measures are vital in construction projects. Explain the different practices available for promoting occupational safety and health at construction sites. (10 marks)

(08)

A reactor and storage tank are interconnected by an insulated process line that needs periodic replacement. You are the maintenance and construction superintendent responsible for this project. The works engineer has requested your plan and schedule for a review with the operating supervisor. The precedents and crew requirement for each activity have been determined from a familiarity with similar projects.

Symbol	Activity description	Time (Hrs)Days	Precedents
A	Develop required material list	8	-
B	Procure pipe	200	A
C	Erect pipe	12	-
D	Remove scaffold	4	I, M
E	Deactivate line	8	-
F	Prefabricate sections	40	B
G	Place new pipes	32	F, L
I	Fit up pipe and valves	8	G, K
J	Procure valves	225	A
K	Place valves	8	J, L
L	Remove old pipe and valves	35	C, E
M	Insulate	24	G, K
N	Pressure test	6	I
O	Clean-up and start-up	4	D, N

- (a) Draw an activity on arrow network diagram and mark the critical path. (10 marks)
- (b) Find out the total float, free float and independent float for activity C and G. (5 marks)
- (c) Briefly explain why different types of dummies are used in activity on arrow networks. Illustrate your answer with diagrams. (5 marks)