

**THE OPEN UNIVERSITY OF SRI LANKA
DIPLOMA IN TECHNOLOGY (CIVIL) - LEVEL 4
FINAL EXAMINATION - 2014/15**



CEX4232 - CONSTRUCTION ENGINEERING AND PLANNING

Time allowed : Three hours

Date : Wednesday, 26th August 2015

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) Explain what is meant by 'soil compaction'. (04 marks)
- (b) What are the factors which influence the degree of soil compaction? (04 marks)
- (c) Briefly describe the procedure engaged for compacting earth works. (04 marks)
- (d) Briefly describe the four (04) methods available to specify soil compaction to the contractors. (08 marks)

(02)

"Strength" and "durability" of hardened concrete are important factors that have to be ensured during the construction stage.

- (a) Briefly discuss the factors which influence the strength of concrete. (05 marks)
- (b) Discuss the function of water in a concrete mix, explaining its effects on the strength and durability of concrete. (05 marks)
- (c) In construction of a high-rise building when ready mix concrete is to be used, state what details should be considered and planned by the contractor to ensure concreting to be done correctly. (05 marks)
- (d) List the various methods available for curing concrete in floor slabs. (05 marks)

(03)

- (a). List-down the causes for bleeding and precautions you suggest to prevent bleeding in a concrete mix at the site. (05 marks)
- (b). Explain what is meant by 'segregation' of a concrete mix, its causes and how it affects the concrete cast at site. (05 marks)
- (c). What are the three (03) main ways of entraining air in the concrete? (06 marks)
- (d). Explain the procedure for placing concrete under water with Bentonite slurry. (04 marks)

(04)

- (a) Write down three (03) advantages and three (03) disadvantages of reciprocating pumps. (06 marks)
- (b) Describe the two (02) basic types of impellers in centrifugal pumps emphasizing on the difference of their basic structure. (04 marks)
- (c) The cheapest method adopted for demolition of an existing building to a heap of rubble, is commonly called "fragmentation" in construction industry. Name and briefly describe three (03) types of methods available for carrying out "fragmentation" process. (05 marks)
- (d) Draw a neat sketch of a flexible road pavement indicating the different layers. Briefly describe each of these layers. (05 marks)

SECTION B**(05)**

Assume that you have been appointed as the maintenance and construction engineer of a project which needs regular periodic maintenance. The main activities involved in the project, together with their duration and precedents are shown below.

Activity	Activity Description	Duration (8 Hrs/ Day)	Precedents
A	Preparation of material list	10	-
B	Purchase of Pipes	30	A
C	Erect pipes	15	-
D	Removing Supports	4	H, N
E	Disengage existing old pipe line	14	-
F	Assemble new pipe sections	20	B
G	Place new pipes to the line	10	F, M
H	Fit up pipes and valves	12	G, L
K	Procure valves	30	A
L	Place new valves in the line	30	K, M
M	Remove old pipe and valves	10	C, E
N	Insulation of the pipe line	22	G, L
P	Conducting pressure test	8	H
Q	Cleaning and test run	4	D, P

- Draw an Activity on Arrow (A-O-A) network diagram and mark the critical path/s for the project indicating time durations, event numbers, and event times. (08 marks)
- Briefly describe four (4) types of floats with reference to an activity and find the respective floats for activities E, H and K. (06 marks)
- Briefly explain the different types of dummies used in the above A-O-A network diagram. Illustrate your answer with diagrams. (06 marks)

(06)

- Briefly explain the different practices that are adopted for promoting occupational safety and health at construction sites. (10 marks)
- Explain the importance of first aid in common injuries. (05 marks)
- How do you classify wounds inflicted on workers in a construction site? Also briefly describe the wounds that cause discontinuity in either skin or the mucous membrane. (05marks)

(07)

- (a) Explain the elements of costs involved in making up a 'Tender Price' for a construction Project. (03 marks)
- (b) Explain the following estimating methods.
 - (i). Unit rate estimating
 - (ii). Operational estimating (06 marks)
- (c) What do you understand by 'Progress Control' of a construction project? Explain the parties involved in this and their role. (08 marks)
- (d) List the elements of progress reporting procedures. (03 marks)

(08)

Write short descriptive notes on the following.

- (a) The Macro level planning and Micro level planning. (05 marks)
- (b) 'Resource Aggregation charts' and their effect on activity schedules. (05 marks)
- (c) The alternative ways that will increase the production rate of earth moving operation. (05 marks)
- (d) Why is it important to address the 'Major Considerations' during the site planning process prior to providing site facilities for a construction site? (05 marks)