THE OPEN UNIVERSITY OF SRI LANKA
Bachelor of Technology (Civil) - Level 6
CEX 6331- Construction Engineering and Management

FINAL EXAMINATION - 2012/2013
Time Allowed: Three (03) hours

Date: 08-08-2013 (Thursday) Time: 0930 - 1230 hrs.

The paper consists of 06 questions. Answer any four (04) questions.

Q1

(a) Site mobilisation is a process that can be accomplished in stages. Briefly explain the different stages while highlighting principal tasks carried out in each stage.

(Marks 07)

(b) The purpose of site exploration is to collect complete details of the site in order to enable the designer to take decisions on relevant aspects regarding designing of the building. Explain four such relevant aspects.

(Marks 06)

(c) Soil has been classified in number of ways based on different characteristics of soils. The most widely accepted classification adopted by practicing engineers is that based on grain size distribution, and according to this soil can be classified as: Boulder, Gravel, Sand, Silt and Clay. Describe each one of this.

(Marks 07)

(d) When carrying out excavation work on a congested construction site the sides of an excavation frequently require shoring. The choice of method depends on number of factors. Briefly explain these factors.

(Marks 05)

Q2

(a) Explain in detail why it is necessary to remove entrapped air (voids) from fresh concrete.

(Marks 07)

(b) Describe different methods and plants available for horizontal movement of concrete.

(Marks 07)

(c) The effective use of poker vibrator is very important to obtain the optimum compaction. Briefly state five precautions an operator of a poker vibrator can take in order to obtain the optimum compaction.

(Marks 05)

(d) Explain the reasons why pumpable concrete mixes have to be different from normal concrete. Indicate briefly the characteristics of a pumpable concrete mix with respect to mix proportions and ingredients.

(Marks 06)

Q3.

(a) List different situations where the technique of rock drilling could be used.

(Marks 06)

(b) There are three methods of producing holes in rock. Write a short description about each method.

(Marks 07)

(c) Name and explain the four elements of a flexible pavement.

(Marks 05)

(d) List five important components of an aggregate crushing plant. Briefly state the primary function of each component.

(Marks 07)

Q4

(a) Earth fill dams for the storage of water are preferred to other types of dams in most situations due to economy of construction. However, earth dams have their own share of limitations and in such situations other types are considered in place of earth dams. Identify these limitations and explain them.

(Marks 07)

(b) List three kinds of machinery used in dam construction. Also state the specific uses of each of this machinery.

(Marks 07)

(c) Explain briefly what purposes are served by formwork in concreting and what standards are expected of them.

(Marks 05)

(d) Explain four advantages of plywood formwork over timber formwork.

(Marks 06)

Q5

(a) There are several methods of attacking the face of tunnels driven through rock. List four common methods and explain any two in detail. Illustrate your answer with diagrams.

(Marks 07)

(b) Explain the method of construction of pre-tensioned prestressed concrete and post-tensioned prestressed concrete. You may use diagrams for this.

(Marks 08)

(c) Explain the term cofferdam. List the points that should be kept in mind when constructing a cofferdam.

(Marks 05)

(d) List down the factors which affect the choice of a particular type of cofferdam.

(Marks 05)

Q6.

The Asian Development Bank has agreed to fund a project to develop water supply facilities in a remote newly developed township. The contract has been awarded to a local contractor who has a shortage of technically competent supervisors. The project once planned has following activities with given durations, precedence activities and supervisory requirements;

Activity	Immediate Preceding Activity	Duration Days	Supervisory Requirement (number of supervisors)
A	-	2	-
B	A	4	2
C	A	4	4
D	A	3	0
E	B	4	6
F	C	7	0
G	C	2	4
H	D	5	4
J	F	2	2
K	H	5	2
L	J	2	-
M	E, L, G	3	-
N	K, M	2	-

(a) Draw the activity on arrow diagram for this project, carry out the forward pass and backward pass on this network and identify the critical path.

(Marks 08)

(b) Compute the three main types of floats used in Critical Path Method (CPM) for all activities.

(Marks 04)

(c) Draw a resource aggregation chart based on 'early start order' for the resource 'supervisor'.

(Marks 05)

(d) Explain comprehensively the significance of planning and progress control, separately, in relation to a construction project.

(Marks 08)