The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Civil Engineering

Study Programme	: Bachelor of Science Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**:CVX6546 Construction Engineering and Management**
Academic Year	: 2023/2024
Date	: 21st February 2025
Time	: 0930-1230hrs
Duration	: **3 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Six (6)** questions in **Three (3)** pages.
3. Answer any **Four (4)** questions only. All questions carry equal marks.
4. Answer for each question should commence on a new page.
5. This is a Closed Book Test (**CBT**).
6. Answers should be in clear handwriting.
7. Do not use red colour pens.

Q1.

(a) Site mobilisation is an important aspect of any large scale construction project which requires sufficient attention of the project manager. Explain how the following two services can be established in a bridge construction project:

- Plant workshop and standing area
- Material storage

(Marks 07)

(b) Describe two techniques used for ensuring stability and safety of excavations.

(Marks 06)

(c) The classification of strata through which an excavation proceeds is an important consideration. Briefly explain four types of material forming various strata while naming equipment / tool which could be used in the excavation of these materials.

(Marks 07)

(d) Describe pneumatic rollers in terms of features, principle of working, variations and available sizes.

(Marks 05)

Q2.

(a) Describe the 'quality control and tolerances' aspect with regard to the construction of flexible road pavements.

(Marks 06)

(b) Explain the roller compacted concrete (RCC) and state four advantages of using RCC in dam construction.

(Marks 06)

(c) When placing concrete at the construction site the best practices (recommendations) should be complied with. Briefly explain five such best practices (recommendations) that can be adopted when placing concrete.

(Marks 07)

(d) Entrapped air in fresh concrete can cause numerous harmful effects to concrete. Briefly explain four such harmful effects and briefly state how this can be minimised.

(Marks 06)

Q3.

(a) Apart from water content, there are several factors affecting the workability of concrete. Identify five such factors and briefly explain how they affect the workability. (Marks 07)

(b) Briefly explain what is understood by 'Over vibration' and 'Revibration' while emphasizing on situations where these operations can be harmful and their consequences on quality of concrete. (Marks 07)

(c) Describe any three types of connections adopted to connect precast elements. Use sketches to illustrate your answer. (Marks 06)

(d) Name five types of joints used in manual arc welding and illustrate each with a sketch. (Marks 05)

Q4.

(a) Describe a combined footing emphasising on its purpose and features. Illustrate your answer with sketches. (Marks 06)

(b) Briefly explain the construction process of 'driven cast-in-place piles'. Illustrate your answer with sketches. (Marks 07)

(c) Explain how Maslow's hierarchy of needs theory can be applied by a project manager to motivate his subordinates. (Marks 06)

(d) Explain the characteristic features of the following types of contracts:
Fixed price with quantities
Design and Build
Cost reimbursement (Marks 06)

Q5.

(a) List six different properties of high durability concrete that enables it to resist severe and harsh environment. Explain any two such properties. (Marks 06)

(b) Explain the role of a project manager in ensuring construction safety at the site emphasising on how he should adhere to basic principles of safety. (Marks 06)

(c) Explain what is meant by 'housekeeping' in a construction site and methods of implementing this at construction projects. (Marks 06)

(d) The concept of quality that is established now has evolved through four stages. Identify these stages and indicate their main features. (Marks 07)

Q6.

The Housing Development Authority of Sri Lanka has agreed to fund a project to develop water supply facilities in a remote newly developed township. The contract has been awarded to a suitable local contractor. The project once planned will have the following activities with given durations, precedence activities and supervisory requirements;

Activity	Immediately Preceding Activity	Duration (Months)	Supervisory Requirement (Number of supervisors)
A	-	4	-
B	A	8	2
C	A	8	4
D	A	6	0
E	B	8	6
F	C	14	0
G	C	4	4
H	D	10	4
J	F	4	2
K	H	10	2
L	J	4	-
M	E, L, G	6	-
N	K, M	4	-

(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) Name three types of floats used in Critical Path Method and compute these for activities E and J.

(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)