

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	: 2024/2025
Date	: 14 th February 2026
Time	: 1330 - 1630 hrs
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) Describe the external (additional) factors that need to be considered at the planning stage for site mobilisation in relation to a construction of a multi-storey apartment complex in a city area.
(Marks 07)
- (b) Provision of 'site preparation and services' in a construction site is an essential requirement to be fulfilled before commencing a project. Explain how the following two services can be established in a road construction project.
Material storage
Water supply and Electrical supply
(Marks 07)
- (c) Explain how the sub soil investigation benefits a design engineer assigned to design a multi-storey building.
(Marks 05)
- (d) Briefly explain how irrigation canals are laid out for excavations while showing how they can be excavated.
(Marks 06)

Q2.

- (a) Explain the factors that need to be taken into consideration in providing support to an excavation.
(Marks 06)
- (b) A flexible road pavement composed of a number of elements. Briefly and separately describe the types and respective specifications adopted in Sri Lanka when preparing two of these elements namely road base and surfacing.
(Marks 07)
- (c) There are several factors affecting the workability of concrete other than the water content. Briefly explain five such factors.
(Marks 05)
- (d) Briefly explain the external factors that affect the selection of mode of transport of concrete. Explain four different ways of transporting concrete while highlighting the volume (capacities) of concrete that can be handled, and the situations in which each method can be optimally adopted.
(Marks 07)

Q3.

- (a) The role of operator of the poker vibrator is significant to obtain the optimum compaction of concrete. Write down the good practices an operator of a poker vibrator can adopt in this regard, in point form.
(Marks 06)
- (b) Explain the reasons why pumpable concrete have to be different from normal concrete. State six characteristics of a pumpable concrete mix in terms of mix proportions and ingredients used in preparing the mix.
(Marks 06)

- (c) Explain the method of construction of pre-tensioned prestress concrete and post tensioned prestress concrete. You may use diagrams to illustrate your answer.
(Marks 08)

- (d) Name any five plant and equipment used in sheet pile driving process. Briefly explain any two of these plant and equipment highlighting their purpose of use.
(Marks 05)

Q4.

- (a) Explain the purposes served by formwork when used in concreting and what features are expected of them.
(Marks 06)

- (b) The cement grouts can be classified into three types. Describe the uses of each type of cement grout.
(Marks 06)

- (c) Explain the construction process of 'auger bored piles'. Illustrate your answer with sketches.
(Marks 07)

- (d) Explain 'semi financial incentives' and 'financial incentive schemes' used in construction industry illustrating your answer with examples.
(Marks 06)

Q5.

- (a) List six different properties of high performance concrete (HPC) having resistance in severe environment (high durability in severe environment). Explain any two such properties.
(Marks 06)

- (b) Most countries including Sri Lanka has their own Green Building rating system to evaluate the extent to which sustainable principles have been adopted at the design stage and operational stage of a building. Write a descriptive note on different aspects of the building (design stage and operational stage) which have drawn attention of Green Building rating system.
(Marks 07)

- (c) The correct use of ladders and scaffolds at construction sites in different situations is vital in terms of safety and productivity of workers and equipment. Explain good practices that can be adopted when ladders and scaffolds are used at construction sites.
(Marks 06)

- (d) Explain the differences between quality control and quality assurance.
(Marks 06)

- Q6. The table shown below gives the sequence of activities associated with a building project. Also, it depicts the duration and supervisory requirement of each activity.

Activity	Immediately Following Activities	Durations (Weeks)	Supervisory Requirement (Number of supervisors)
A	C, D, E, F	4	2
B	D, F	5	1
C	J	6	3
D	J, H	8	4
E	G	3	0
F	K	7	2
G	L	8	3
H	I, K	11	2
I	M	3	2
J	L	8	1
K	N	4	1
L	-	8	3
M	-	9	3
N	-	4	3

- (a) Draw the activity on arrow network diagram of this project, carry out the forward pass and backward pass on this network and indicate the critical path. (Marks 09)
- (b) Name three types of floats used in Critical Path Method and compute these for activities G and C. (Marks 04)
- (c) Draw a resource aggregation chart based on 'early start order' for the resource 'supervisor'. (Marks 04)
- (d) Explain comprehensively the significance of planning and progress control, separately, in relation to a construction project. (Marks 08)