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

Study Programme	: Bachelor of Technology Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**: CVX6546/CVX6831Construction Engineering and Management**
Academic Year	: 2020/2021
Date	: 18th January 2022
Time	: 1400-1700hrs
Duration	: **3 hours**

General Instructions

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

Q1.

(a) Provision of 'site preparation and services' in a construction site is an essential requirement. Explain how the following two services can be established in a bridge construction project:

- Compressed air supply
- Material storage

(Marks 07)

(b) Explain the external factors that needs to be considered at the planning stage for site mobilisation.

(Marks 06)

(c) Describe the following two types of rollers separately emphasising on the specifications related to compaction:

i) Tamping roller

ii) Smooth wheel roller

(Marks 07)

(d) Write a descriptive note on a 'shoring'.

(Marks 05)

Q2.

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

(Marks 07)

(b) Explain four different ways of transporting concrete while highlighting on the volume (capacities) of concrete that can be handled and the situations in which each method can be optimally adopted.

(Marks 07)

(c) There are a number of factors affecting the workability of concrete other than the water content. Identify five such factors and explain briefly how each affects the workability.

(Marks 06)

(d) The effective use of poker vibrators is very important to obtain the optimum compaction. Write down in point form the appropriate practices an operator of a poker vibrator should adopt in this regard.

(Marks 05)

Q3.

A

(a) 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)

(b) What do you understand by 'concrete mix design'? Explain why design mixes are needed in a construction project.

(Marks 07)

B

(c) Describe a 'combined foundation' while illustrating your answer with sketches.

(Marks 06)

(d) Write a descriptive note on 'concrete driven piles' in relation to shape, driving process and advantages.

(Marks 06)

Q4.

A

(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 06)

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

(Marks 07)

B

(c) Explain what is meant by high performance concrete (HPC). List any eight different properties that are required of HPC.

(Marks 06)

(d) Describe your understanding on Green Rating for buildings.

(Marks 06)

Q5.

A

(a) Explain the role of a project manager in construction safety in relation to the three main requirements.

(Marks 07)

(b) Discuss how you can achieve personal safety in a construction site.

(Marks 06)

B

(c) Differentiate between quality control and quality assurance.

(Marks 06)

(d) Describe your understanding on formal quality standards using an example of a formal quality standard.

(Marks 06)

Q6. The Reliable Construction Company has just secured the winning bid of Rs. 500 million to construct a new plant for a major manufacturer. The main activity schedule is presented in the following table;

Activity	Activity Description	Immediately Preceding Activities	Duration (Weeks)
A	Excavate the foundation	-	4
B	Lay the foundation	A	8
C	Put up the rough wall	B	20
D	Put up the roof	C	12
E	Install the exterior plumbing	C	8
F	Install the interior plumbing	E	10
G	Put up the exterior siding	D	14
H	Do the exterior painting	E and G	18
I	Do the electrical work	C	14
J	Put up the wallboard	F and I	16
K	Install the flooring	J	8
L	Do the interior painting	J	10
M	Install the exterior fixtures	H	4
N	Install the interior fixtures	K and L	12

(a) Draw the activity on arrow diagram for this project.

(Marks 08)

(b) Carry out the forward pass and backward pass calculations on this network, and indicate the critical path.

(Marks 03)

(c) Explain how the two processes 'planning' and 'progress control' are implemented in a construction project.

(Marks 08)

(d) Explain the benefits accrued to the contractor through a well developed construction program in his dealings with the consultant.

(Marks 06)