

THE OPEN UNIVERSITY OF SRI LANKA
 Bachelor of Technology (Civil) - Level 6
 CEX 6331- Construction Engineering and Management
 FINAL EXAMINATION – 2015/2016



Time Allowed: Three (03) hours

Date: 02-12-2016 (Friday)

Time: 09:30 – 12:30 hrs.

The paper consists of 06 questions. Answer Four (04) questions.

Q1.

- (a) Show the importance of providing 'site preparation and services' effectively in a large multi storey building construction project by taking three 'site preparation and services' to illustrate your answer.
 (Marks 06)
- (b) The preparation of site layout plan for any project is decided on the individual project requirements. Sketch a site layout plan for a typical multi storey building construction project.
 (Marks 07)
- (c) Material storage is an important aspect under site planning and so receives site engineers' special attention. If you are the site engineer for four storied building project, explain the precautions that need to be taken in storing cement, reinforcement, timber and sand.
 (Marks 06)
- (d) Explain what is meant by shoring in the context of civil or building construction. The choice of method of shoring depends on a number of factors. Briefly explain these factors with respect to an excavation work done on a congested construction site.
 (Marks 06)

Q2

- (a) Draw a neat sketch of a typical cross section of a flexible pavement, indicate the key elements and explain the purpose of any four key elements.
 (Marks 06)
- (b) List five important components of an aggregate crushing plant. Briefly state the primary function of each of these components.
 (Marks 06)
- (c) There are four different types of foundations to transfer structural loads to the ground. Indicate briefly the situations where each one of these is most suitable.
 (Marks 07)
- (d) Provide short descriptions on the following types of rollers:
- (i) Pneumatic tired rollers
 - (ii) Smooth wheel rollers
 - (iii) Sheep's foot roller
- (Marks 06)



Q3

- (a) There are a number of factors affecting the workability of concrete other than water content. Identify five such factors and explain briefly how they affect the workability. (Marks 07)
- (b) Still quite a number of RC multi-storey buildings are constructed in remote areas where there are no facilities to obtain both ready mixed concrete and concrete pumping. Therefore, taking adequate precautions to maintain the uniform and specified workability of concrete during the entire construction period is important. Explain the site engineer's role in this. (Marks 05)
- (c) Explain why it is necessary to cure concrete during the early stages of hardening. Briefly describe three ways in which curing can be done. (Marks 07)
- (d) Success of a concrete pumping operation depends on the coordination among the main parties involved. Explain the main points that need to be agreed upon by these parties. (Marks 06)

Q4.

- (a) Describe the principal modes of load transfer in relation to piles. Illustrate your answer with sketches. (Marks 06)
- (b) Explain both the advantages and disadvantages of using cast-insitu piles over precast piles with reference to Sri Lankan construction conditions. (Marks 07)
- (c) Explain briefly what purposes are served by formwork in concreting and what standards are expected of them. (Marks 05)
- (d) In relation to a poker vibrator used to compact concrete laid on a slab, explain briefly why it is important
 - to insert the poker quickly
 - to withdraw the poker slowly
 - not to vibrate too long
 (Marks 07)

Q5

- (a) Due to improper shuttering 'grout runs' and 'grout fins' can be formed. Explain separately how they are formed and how they can be removed. (Marks 06)
- (b) There are several methods of attacking the face of tunnels driven through rock. List four common methods of doing this and explain any two in detail. Illustrate your answer with sketches. (Marks 05)
- (c) Briefly explain, separately, the advantages of the two processes 'planning' and 'progress control' for a contractor in his dealings with the consultant in relation to a building construction project. (Marks 08)
- (d) Accurate 'project data' is vital for successful construction planning. Discuss. (Marks 06)



- Q6. An individual investor wishes to construct a holiday home in Nuwaraeliya. He awarded the contract to a builder who decided to adopt network analysis as the planning technique for the project. The builder therefore, divided the construction project into a number of activities. The details of these activities are depicted in the table below;

Symbol	Activity description	Immediate preceding activity	Duration Days
A	Development of the site	-	16
B	Foundation with Pillars	A	10
C	Crawl space plumbing	B	02
D	Air conditioning and Heating	B	02
E	Water heater	C	02
F	Walls, ceiling and rough roofing	D	14
G	Rough plumbing	E,F	06
H	Rough wiring	E,F	04
I	Heating and AC ducts	E,F	05
J	Doors and windows	E,F	03
K	Exterior siding	J	03
L	Interior wall finishing	G,H,I	10
M	Finish roofing	K	10
N	Finish flooring	L	06
P	Plumbing and drainage	M	02
Q	Kitchen and bathroom finishing	N	03
R	Finish carpentry	N	05
S	Finish painting	Q,R	06
T	Finish electrical and interior decoration	S	03
W	Landscaping	P	04
X	Handing over	T,W	01

- (a) Draw the activity on arrow diagram of the project. (Marks 11)
- (b) Carry out the 'forward pass' and 'backward pass' for the arrow diagram, determine the event times and indicate the critical path. (Marks 04)
- (c) Explain the situations where different types of dummy activities are used. (Marks 04)
- (d) Explain the purposes of carrying out the following two operations associated with project planning;
 Resource scheduling
 Resource smoothing (Marks 06)