THE OPEN UNIVERSITY OF SRI LANKA
Department of Civil Engineering
Bachelor of Technology (Civil)- Level 6

CEX6331 – Construction Engineering and Management

FINAL EXAMINATION – 2010/2011

Time Allowed: Three (03) Hours

Date: 2011 - 04 - 04 (Monday) Time: 1400 - 1700 hrs.

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

Q1.

(a) What do you understand by compaction of soil? Explain how you can use water to improve compaction of a clayey soil. (Marks 08)

(b) Identify two commonly used equipment for compaction of earth and for each, briefly explain the specific uses based on soil types and site conditions. (Marks 05)

(c) There are different types of foundations to transfer structural loads to the ground. With reference to each of these types briefly discuss the conditions under which they are optiamally suited. (Marks 06)

(d) Draw a cross section of a typical flexible pavement, mark the five main structural elements and explain their purposes. (Marks 06)

Q2.

(a) Explain how you would achieve optimum workability of concrete under site conditions. (Marks 05)

(b) Describe different types of construction plants used to transport concrete vertically and horizontally, indicating the carrying capacity of each type. (Marks 07)

(c) Write short explanatory notes, emphasising on minimising measures, on the following two conditions related with concreting:
(i) Bleeding
(ii) Segregation (Marks 06)

(d) Explain the reasons why pumpable concrete mixes have to be different. Describe the main characteristics (requirements) of a pumpable concrete mix. (Marks 07)

Q3.

(a) There are several types of dredgers that can be used in different situations. Write a short description about each type emphasising important features. (Marks 09)

(b) Explain briefly the factors that affect the performance and selection of a dredger. (Marks 06)

(c) List different situations where the technique of rock drilling could be used. (Marks 06)

(d) Write short descriptions about the three methods of producing holes in rock. (Marks 04)

Q4.

(a) Draw a cross section of an earth dam and mark the following components on it and describe each highlighting its specific function in ensuring the proper operation of the dam.
(a) Core trench (b) Rock toe (c) Horizontal drainage blanket (Marks 07)

(b) List different kinds of machinery used in dam construction. Also state the specific uses of each of these machinery. (Marks 06)

(c) List four shapes of tunnel cross sections and comment on the uses, advantages and disadvantages of each. (Marks 07)

(d) Explain four advantages of the drift method of driving a tunnel through rock. (Marks 05)

Q5

(a) Material storage is an important aspect under site planning and warrants site engineers' special attention. If you are the site engineer for a four-storied building project, explain the precautions that need be taken in providing 'material storage'. (Marks 08)

(b) Explain why it is important to carry out a site investigation for a multi-storey building prior to the design phase. (Marks 05)

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

(d) Identify and describe the uses of three types of cement grouts. (Marks 06)

Q6.

A reactor and storage tank are interconnected by an insulated process line that needs periodic replacement. You are the maintenance and construction superintendent responsible for this project. The works engineer has requested your plan and schedule for a review with the operating supervisor. The precedents and durations for each activity have been determined from a familiarity with similar projects.

Symbol	Activity description	Time (Hrs)	Precedents
A	Develop required material list	8	-
B	Procure pipe	200	A
C	Erect pipe	12	-
D	Remove scaffold	4	I , M
E	Deactivate line	8	-
F	Prefabricate sections	40	B
G	Place new pipes	32	F, L
I	Fit up pipe and valves	8	G, K
J	Procure valves	225	C,E
K	Place valves	8	J, L
L	Remove old pipe and valves	35	C, E
M	Insulate	24	G, K
N	Pressure test	6	I
O	Clean-up and start-up	4	D, N

(a) Draw the 'activity on arrow' diagram for the project. (Marks 12)

(b) Carry out the forward pass and backward pass calculations on this network, and indicate the Critical Path. (Marks 04)

(c) Name three types of 'floats' used in Critical Path Method and compute these for activities C and K. (Marks 02)

(d) Explain the purpose of the following two operations emphasising how they would be carried out;
Resource scheduling
Resource smoothening (Marks 07)