THE OPEN UNIVERSITY OF SRI LANKA
Bachelor of Technology (Civil) - Level 6
CEX 6331- Construction Engineering and Management
FINAL EXAMINATION - 2014/2015
Time Allowed: Three (03) hours

Date: 03-09-2015 (Thursday) Time: 0930 - 1230 hrs.

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

Q1

(a) Site mobilisation is a process that can be accomplished in stages. With reference to a building construction project, briefly explain the tasks involved in different stages while highlighting the principal tasks carried out in each stage.

(Marks 07)

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

(Marks 06)

(c) Name four possible types of material that could be encountered during an excavation for a building requiring a deep foundation. Also name equipment/tools which could be used in the excavation of these materials.

(Marks 06)

(d) Provide short descriptive notes on the following two types of rollers:

(i) Tamping rollers
(ii) Smooth wheel rollers

(Marks 06)

Q2

(a) Explain four parameters which influence the degree of compaction to be achieved by a vibratory roller.

(Marks 07)

(b) Explain three traffic engineering considerations that need to be incorporated in the design of a road.

(Marks 06)

(c) Entrapped air in fresh concrete can cause a number of harmful effects. Explain how this happens.

(Marks 07)

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

(Marks 05)

Q3.

a) Explain the implications of using more of fine gradings than coarse gradings of aggregates in producing concrete with respect to achieving workability.

(Marks 05)

b) Write short explanatory notes on the following terms related to concreting

(i) Water cement ratio

(ii) Mix design

(Marks 06)

c) Describe different methods and plants available for horizontal and vertical movement of concrete.

(Marks 07)

c) 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 sketches.

(Marks 07)

Q4

(a) Draw a cross section of an earth dam, and mark six important features. Also briefly explain any three features

(Marks 06)

(b) Discuss the advantages of steel formwork over timber formwork.

(Marks 06)

(c) Describe and illustrate different types of cracks found in concrete while emphasizing on how they are formed and identified.

(Marks 05)

(d) Name and describe different types of joints found in concrete structures. Draw sketches of these joints and mark the important features.

(Marks 08)

Q5

(a) List the three methods of producing holes in rock. Explain these methods while highlighting their special features.

(Marks 07)

(b) Briefly describe two types of internal vibrators.

(Marks 05)

(c) Explain briefly what is meant by the two processes 'planning' and 'progress control' with respect to a construction project.

(Marks 06)

(d) Explain the benefits of a well developed construction project management program for a contractor in his dealings with the consultant.

(Marks 07)

Q6. The Table shown below gives a breakdown of activities associated with a building project. Also it depicts the precedence relations and durations of each activity.

Symbol	Activity	Immediate predecessors	Durations days
A	Mobilization		3
B	Excavation	A	4
C	Concreting	B	2
D	Erect Frames	C	4
E	Lay brick work	D	6
F	Install basement drains	C	1
G	Concrete basement floor	F	2
H	Roof plumbing	F	3
I	Roof wiring	D	2
J	Heating and ventilation	D,G	4
K	Fasten plaster board	I, J,H	10
L	Lay flooring	K	3
M	Fixed kitchen fixtures	L	1
N	Finish plumbing	L	2
O	Finish carpentry	L	3
P	Finish roofing	E	2
Q	Finish gutters	P	1
R	Lay storm drains	C	1
S	Sand and varnish flooring	O,T	2
T	Paint	M,N	3
U	Finish electrical work	T	1
V	Finish grading	Q, R	2
W	Landscaping	V	5

(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 12)

(b) Explain the situations where different types of dummy activities are used.

(Marks 04)

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

(Marks 03)

(d) Explain the purpose of the following two operations emphasising how they would be carried out;

Resource scheduling

Resource smoothening

(Marks 06)