UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 6 Examination in Engineering: December 2018

Module Number: CE6301 Module Name: Construction Processes and Technology

[Three Hours]

[Answer **all questions**, each question carries Twelve marks]

Q1. a) Name the four basic setting out procedures that could be followed in executing setting out of construction elements.

[1.0 Marks]

b) A setting out plan of a building construction project is given in Figure Q1(a) which consists of three different types of grids indicated as Grid A, Grid B and Grid C. Identify what is represented (typical terminology) by Grid A, Grid B and Grid C in the setting out plan and briefly define the meaning of two of the above grids.

[2.0 Marks]

c) A layout of a small house is given in Figure Q1(b). The living room consist of a corner wall with 120 degree angles as shown in the figure. Explain the procedure of setting out 120 degree angle by only using threads, pegs and a tape.

[2.0 Marks]

d) A horizontal curve in an A class road is given in Figure Q1(c). The radius of the curve is 500 m and the project forward tangents to the curve at point T_1 and T_2 meet at point I. Assume the chainage of point I is 2350.00 m and the deflection angle is 30 degrees, complete the setting out data required in Table Q1 considering 100m chords through chainage.

[7.0 Marks]

Assume $\delta^0 = 28.6479 \times {}^{C}/_{R}$

Where δ^0 = Deflection Angle (in degrees)
C = Chord Length
R = Radius of Horizontal Curve

Table Q1: Setting Out Details

Chord No	Chord Length	Chainage	Deflection Angle			Setting Out Angle		
			0	′	″	0	′	″
1								
2								
3								
4								

Q2. a) Explain the purpose and use of following site documents

i. Method of Statement
ii. Special Condition of Contracts

[2.0 Marks]

b) A mixed development project is overseeing by a Project Manager. The project duration is 24 months. Two Site Engineers and a Project Accountant is assigned to the Project Manager. Each Site Engineer is assisted by a Technical Officer and two Supervisors. In addition to that, Stores Manager directly reports to the Project Manager and Health and Safety Officer reports to one Site Engineer. Considering above details, sketch the site organizational chart for this project.

[2.0 Marks]

c) Recognize the direct and indirect costs associated with construction accidents

[2.0 Marks]

d) As per the Factory Ordinance, describe the types of accidents compulsory to be notified to the District Factory Engineer in a written notice.

[2.0 Marks]

e) Apprise how a construction company could achieve optimum profitability with a strong commitment for Health and Safety.

[4.0 Marks]

Q3. a) i. Draw a typical slab formwork system and identify all the components/elements.

[2.0 Marks]

ii. Briefly describe reasons for the blow holes and uneven colours appearing on concrete surfaces and what modification could be done to formwork systems in order to eliminate those defects.

[2.0 Marks]

iii. In constructing in situ bored piles, briefly explain the reason for the requirement of casting a pile to a height above the finishing level and subsequently, hack the excess height rather than finish concreting at the required finishing level of the pile.

[2.0 Marks]

b) i. Draw a sketch of a door frame and name main elements.

[2.0 Marks]

ii. Briefly explain the factors to be considered in determining the size of a brick wall. [2.0 Marks]

iii. What are the factors to be considered in selecting a suitable roofing material for a house? List two advantages of having a steep pitched roof for a house.

[2.0 Marks]

Q4. a) i. Explain two important properties of fresh concrete and list the factors affecting each of the property.

[2.0 Marks]

ii. What is meant by shotcrete? List two types of constructions that use shotcreting method.

[2.0 Marks]

b) Explain different types of flooring materials that can be used for modern housing construction.

[2.0 Marks]

c) i. What is the composition of a clay brick?
ii. What chemical content gives red colour for a burnt clay brick?
iii. List three types of brick bonding used for wall construction and illustrate them with sketches.

[3.0 Marks]

d) Briefly describe new developments in compliance with sustainable concept for each of following building materials. [3.0 Marks]

i Steel
ii Sand
ii Timber

Q5. a) Describe the construction procedure for following items. [6.0 Marks]

i. Embankment
ii. Pipe Laying
iii. Tunneling

b) Briefly describe different soil stabilization and compaction methods used in road construction works.

[3.0 Marks]

c) What is meant by

i. Trenchless pipeline installation
ii. Cross fall in road construction
iii. Road grading [3.0 Marks]

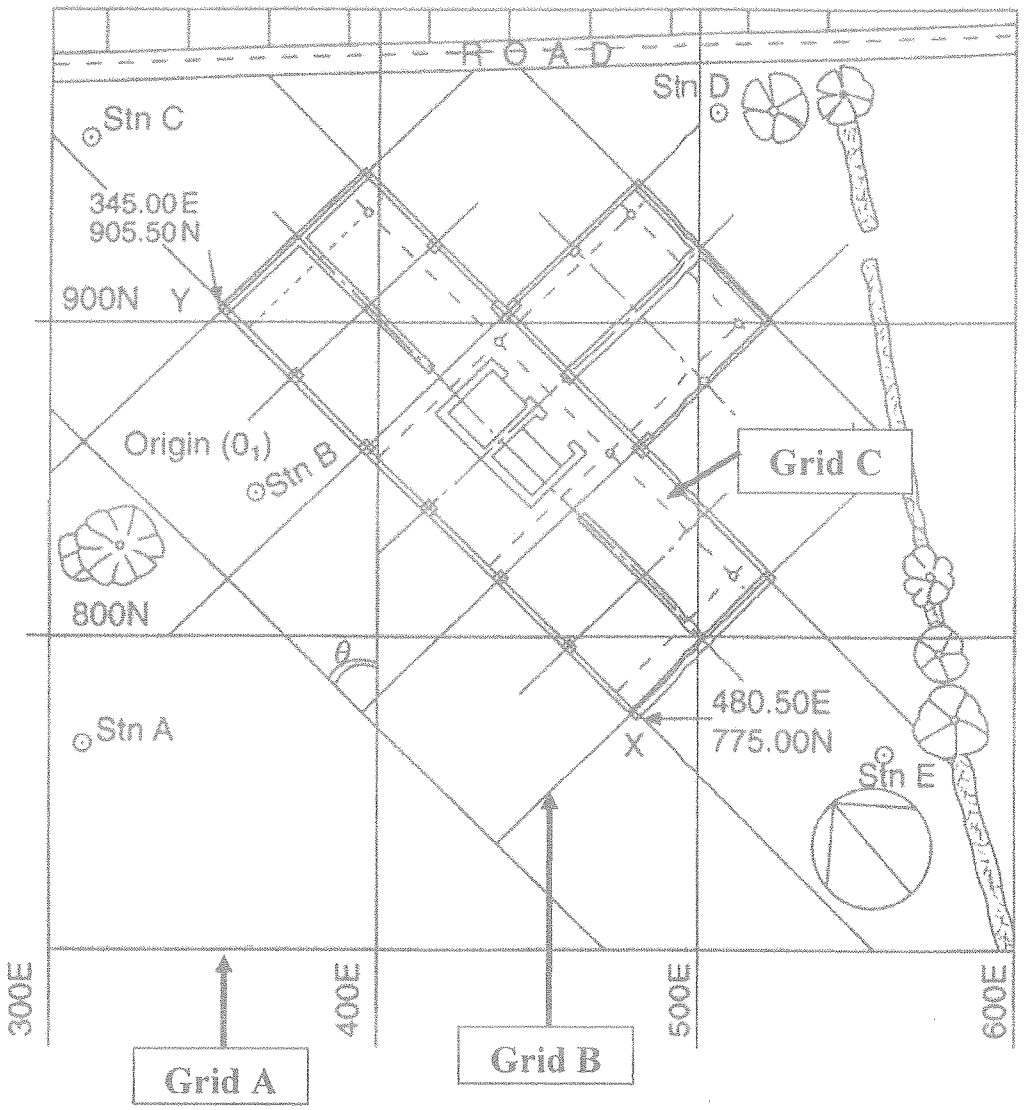

Figure Q1(a)

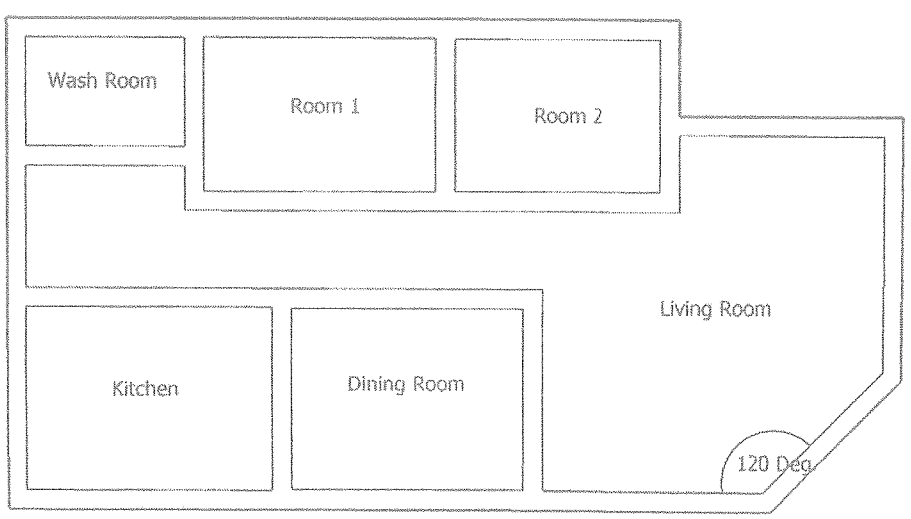

Figure Q1(b)

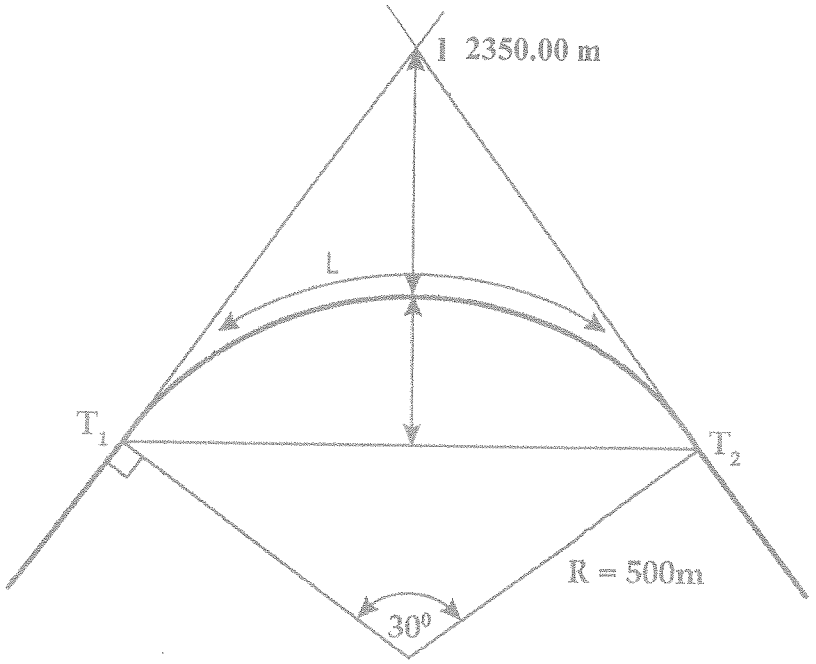

Figure Q1(c)