UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 1 Examination in Engineering: August 2018

Module Number: CE 1301 **Module Name: Introduction to Civil Engineering**

[Three Hours]

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

Q1. a) i) List important factors considered in selecting stations (or control points) in tape and offset surveying.

[1.0 Mark]

ii) Explain the purpose of taking tie measurements for stations in tape and offset surveying.

[2.0 Marks]

b) i) Explain the purpose for 'Fly Back' in leveling.

[1.0 Mark]

ii) Explain the difference between Dumpy Level and Tilting Level.

[2.0 Marks]

c) Table Q1 is an extract from a level book and shows staff readings taken between two Temporary Bench Marks (TBMs) 'P' and 'Q'.
Calculate reduced levels of all the points by rise and fall method and comment on the accuracy of the level line based on the readings of the two Temporary Bench Marks 'P' and 'Q'.

Table Q1

Backsight	Intermediate sight	Foresight	Remarks
2.770			TBM 'P' 60.00 m
1.430		3.050	Change point (CP) 1
	1.200		D
1.800		1.850	CP 2
	0.735		E
2.185		1.140	CP 3
0.520		2.010	CP 4
	2.010		F
1.320		1.260	CP 5
		1.100	TBM 'Q' 59.615 m

[6.0 Marks]

Q2. a) i) State the factors to be considered in choosing materials for different types of structures.

[1.5 Marks]

ii) Identify different types of elements used in structures.

[1.5 Marks]

b) i) State advantages of steel construction over concrete construction.

[2.0 Marks]

ii) Although carbon increases strength and hardness, usually the carbon content in the structural steel is controlled. Explain the reasons for controlling carbon content in steel.

[2.0 Marks]

iii) Describe how the following two factors affect the strength of concrete.
1) 'Compaction of concrete'
2) 'Age of concrete'

[2.0 Marks]

c) For structural use, timber is obtained from the trunk of a tree. Explain major changes that timber undergoes when it is subjected to drying below the Fiber saturation point.

[3.0 Marks]

Q3. a) i) State the factors that have to be considered in selecting a land for construction of a residential building.

[1.0 Mark]

ii) List features of an aesthetically pleasing building.

[2.0 Marks]

b) i) Describe the purpose of installing a Damp Proof Course (DPC).

[1.0 Mark]

ii) List the types of materials that can be used for DPC.

[2.0 Marks]

c) i) Explain reasons for including water traps in sanitary appliances.

[1.0 Mark]

ii) Explain main factors considered in installing below-ground drainage lines to ensure efficient operation.

[2.0 Marks]

d) Cold water supply system suggested for a two storey house includes an overhead tank at the roof level and distribution pipes from the overhead tank to the first floor and the ground floor. Appliances in the first floor include water closet, wash basin and bath tub, all located in the toilet of the first floor. Appliances in the ground floor include sink in the kitchen and water closet and wash basin located in the ground floor toilet. Sketch a cold water supply system for the above appliances.

[3.0 Marks]

Q4. a) i) Name the four main types of transportation systems.

[1.0 Mark]

ii) Give an example for each type.

[2.0 Marks]

b) Transportation engineering has always been one of the important civil engineering disciplines. Describe the role of transportation engineer in the context of civil engineering.

[3.0 Marks]

c) State a primary environmental impact during the construction phase of a water supply scheme. Explain how it can induce a secondary and a tertiary impact/s.

[2.0 Marks]

d) State one environmental and one social impact that may arise during the construction phase of an expressway.

[2.0 Marks]

e) State two principles of decision making in the sustainable infrastructure development.

[2.0 Marks]

Q5. a) Explain briefly;

i) How suspended and floating organic solids cause water pollution.

[2.0 Marks]

ii) How nutrients such as 'Nitrogen' and 'Phosphorus' are enriched in water bodies and how they adversely affect the water environment.

[2.5 Marks]

b) Explain two engineering/management approaches to reduce the environmental pollution caused by industries.

[3.0 Marks]

c) "Levels of atmospheric ozone have decreased dramatically across the world since the mid-1900s. Ozone layer depletion is a threat to the mankind." Explain how the depletion of ozone layer is considered a threat to the mankind.

[2.0 Marks]

d) Explain the requirement of a carefully drafted 'Terms of Reference (TOR)' to produce a good EIA (Environmental Impact Assessment) report.

[2.5 Marks]