



# UNIVERSITY OF RUHUNA

## Faculty of Engineering

End-Semester 1 Examination in Engineering: July 2017

Module Number: CE 1301

Module Name: Introduction to Civil Engineering

[Three Hours]

[Answer all questions, each question carries TWELVE marks]

- Q1. a) i) What are the factors to be considered in selecting stations (or control points) for tape and offset surveying? [2.0 Marks]
- ii) What is the purpose of taking tie measurements for control points (stations) in tape and offset surveying? [2.0 Marks]
- iii) Briefly describe the process of tape and offset surveying. [2.0 Marks]
- b) The extract shown in Table Q1 is 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 which need to be considered in choosing materials for different types of structures. [1.0 Mark]
- ii) List different types of structural elements used for civil engineering structures. [1.0 Mark]
- b) i) Timber is obtained from the trunk of a tree for structural purposes. Briefly explain advantages of timber as a structural material. [1.0 Mark]
- ii) What are the major changes that can be observed when timber dries below the Fiber saturation point? [1.0 Mark]
- c) Describe following terms in relation to concreting.
- i) Curing.
- ii) Workability. [2.0 Marks]
- d) Beam AB supported at the two ends is subjected to point load and uniformly distributed load as shown in Figure Q2. Point load applied at the point C is 10 kN. Magnitude of the uniformly distributed load between the points C and D is 2.5 kN/m. Draw Bending Moment Diagram (BMD) and Shear Force Diagram (SFD) of the beam AB.

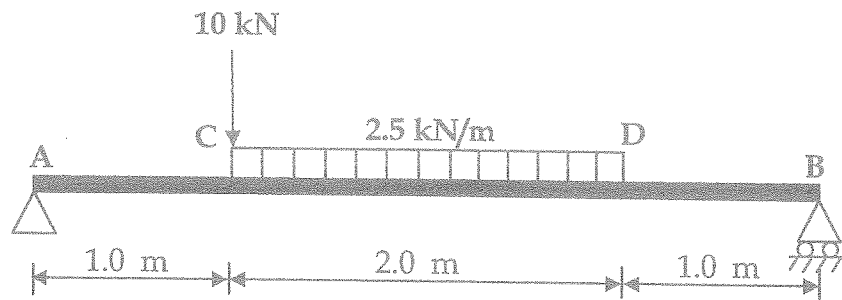


Figure Q2

[6.0 Marks]

- Q3. a) i) State the factors that have to be considered in selecting a land for the construction of residential building. [1.0 Mark]
- ii) With the aid of sketches, explain four shallow foundation types used in building construction. [1.5 Marks]

- b) i) Clay is one of the suitable materials for making bricks. Explain preliminary test that can be used in determining the suitability of clay sample to make bricks. [1.0 Mark]
- ii) Draw the plan view of the stretcher bond and header bond pattern of a 9" thick right angle wall construction with bricks laid under English bond pattern. [1.5 Marks]
- c) i) Briefly explain why traps should be included in sanitary appliances. [1.0 Mark]
- ii) With the aid of sketches, describe the different types of traps in sanitary appliances categorized based on their shapes. [1.5 Marks]
- d) i) State four main types of transportation systems giving examples for each. [1.0 Mark]
- ii) Terminal is one of the elements in a transportation system. Explain the key functions of a terminal. [1.5 Marks]
- iii) Urban Transportation involving users that include commuters, pedestrians and shippers (freight) poses number of challenges. Identify potential challenges and techniques available to overcome these challenges. [2.0 Marks]

Q4. Answer the following questions based on a proposed development of a hotel complex:

- a) It is likely that the water bodies in proximity to the construction area would be polluted due to some non-biodegradable materials released by construction activities. Name two such pollutants and two adverse impacts that these pollutants impose on the water environment. [2.0 Marks]
- b) Explain briefly how the construction activities of the proposed project would cause land pollution. [2.5 Marks]
- c) Give two approaches that can be adopted to manage construction waste and other solid waste in the construction area. [2.5 Marks]

d) Name a primary environmental impact on the atmosphere that is likely to occur during the construction of the proposed hotel complex. Explain how it may induce secondary, tertiary or higher order impact/s.

[2.5 Marks]

e) Highlighting two features of the sustainable development, discuss briefly how to conduct the construction activities of the proposed project in a sustainable manner.

[2.5 Marks]

Q5. a) i) In an Environmental Impact Assessment (EIA) of a development project, explain briefly how to determine the significance of an environmental impact.

[3.0 Marks]

ii) Name two water quality parameters for each of physical, chemical and biological categories.

[1.0 Mark]

iii) Categorize different types of solids found in water using a flow chart.

[2.0 Marks]

b) i) Name four famous sky scrapers in the world with their locations.

[1.5 Marks]

ii) List four historic civil engineering works in the world.

[1.5 Marks]

iii) Name four shapes of ancient Buddhist stupas found in Sri Lanka with example for each shape.

[2.0 Marks]

iv) Identify the most stable shape of ancient Buddhist stupas found in Sri Lanka from the structural and strength point of views and very briefly discuss the advantages.

[1.0 Mark]