UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 5 Examination in Engineering: February 2025

Module Number: CE5301 **Module Name: Construction Processes and Technology**

[Three Hours]

[Answer **all questions**, each question carries twelve marks.]

Q1.

a) List important considerations when conducting setting out for a building.

[2.0 Marks]

b) Briefly explain, with sketches, what aspects of a building are controlled during the setting out procedure.

[3.0 Marks]

c) Discuss the use of grids in setting out a multi-story building.

[2.0 Marks]

d) Assume that you are required to set out a rural drainage scheme where the trench, bedding materials, and pipes must be laid to a specific design gradient. Discuss, with sketches, how this setting out is carried out using tools that can be made locally from simple materials.

[3.0 Marks]

e) Suggest the types of locations where manholes should be placed in a drainage scheme.

[2.0 Marks]

Q2. A luxury apartment complex is being constructed in Colombo targeting the business community. The structure consists of masonry infill walls of thickness of 225mm. Floor levels will be finished with ceramic floor tiles.

a) Sketch the appropriate bond pattern you suggest for the walls using the selected masonry material.

[2.0 Marks]

b) List two strategies to address dampness in the walls of lower floors.

[2.0 Marks]

c) Briefly explain effective methods to reduce noise transmission between apartments through masonry infill walls or other elements.

[2.0 Marks]

d) Briefly explain a suitable method to fix the tiles on a floor area of 3.5m (length) x 1.5m (width). Use sketches where necessary.

[2.0 Marks]

e) A community hall with a Calicut tile roof is proposed to be constructed in addition to the complex.

i Mention the visible indications of a good Calicut tile.

ii Draw a suitable roof plan indicating the roof elements for the typical building outline shown in Figure Q2.

[4.0 Marks]

Q3.

a) List the important design considerations for building foundations.

[2.0 Marks]

b) List four situations in which a raft foundation is recommended for a building.

[2.0 Marks]

c) Briefly discuss, with sketches, the various types of piles that can be used for foundation works.

[3.0 Marks]

d) Briefly explain, with sketches, the use of a pile raft foundation for a building.

[2.0 Marks]

e) i What are the visible signs of ground subsidence beneath a building foundation?

ii Discuss how the building can be restored through underpinning the existing foundation.

[3.0 Marks]

Q4.

a) List the three key parties involved in a typical construction project and briefly describe the roles and responsibilities of each party.

[2.0 Marks]

b) Face shovels and backhoes are two commonly used fixed positioned earth moving machines.

i What is the major functional difference between a face shovel machine and a backhoe?

ii Briefly discuss the two different subfields of construction, providing two usages of a backhoe machine in those subfields.

[3.0 Marks]

c) i What is meant by system formwork?

ii Briefly discuss two advantages and two disadvantages of system formwork compared to traditional formwork.

[3.0 Marks]

d) i List down two most common waterproofing methods that can be used for roof top slab waterproofing works.

ii Briefly explain the installation process of sheet membranes on a roof top slab highlighting important considerations.

iii Explain two advantages of using sheet membranes on roof top waterproofing compared to other methods.

[4.0 Marks]

Q5.

a) Briefly explain the followings.

i Constructing an earthen embankment foundation

ii General rules for compaction of an earthen embankment construction

[3.0 Marks]

b) i What are the reasons for excessive or insufficient moisture content of soil layers during embankment construction?

ii Suggest how to prevent them from occurring.

[3.0 Marks]

c) i Briefly explain the different methods applied for sealing water ingress during a tunnel construction.

ii Discuss possible socio-environmental impacts of tunnel constructions and suggest mitigation measures for them.

[3.0 Marks]

d) i Briefly describe the steps of laying a pipe in an open trench.

ii Discuss the use of trenchless installation of pipelines and utilities.

[3.0 Marks]

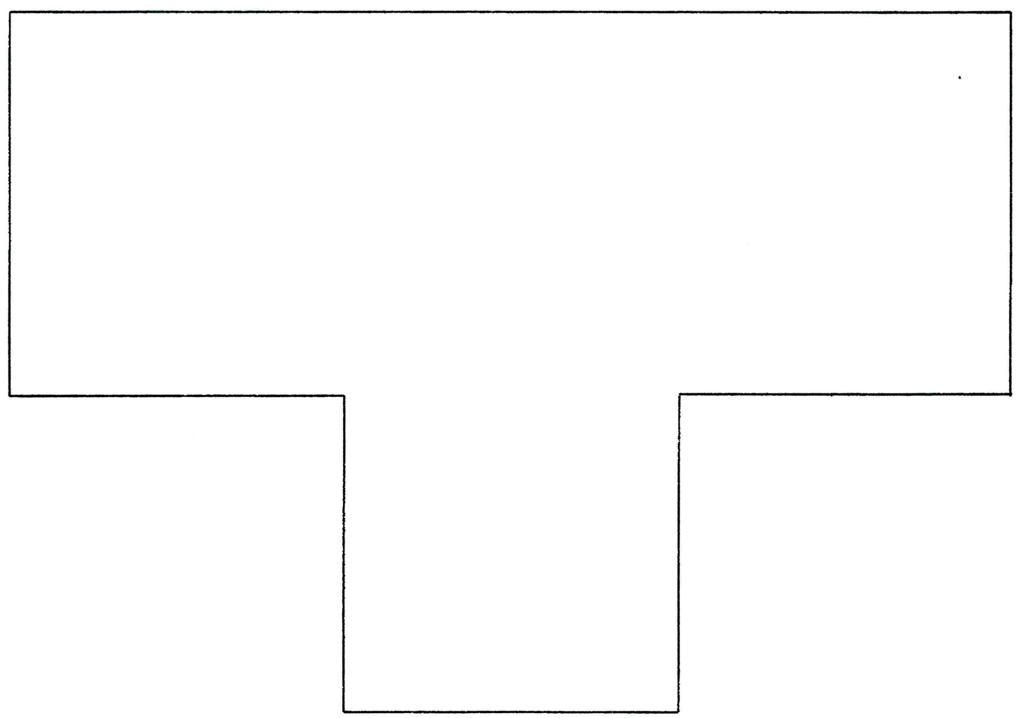

Figure Q2: Building Outline