



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020**

COURSE NAME : INFRASTRUCTURE ENGINEERING
TECHNOLOGY

COURSE CODE : BNC 31703

PROGRAMME CODE : BNC

EXAMINATION DATE : DECEMBER 2019 / JANUARY 2020

DURATION : 3 HOURS

INSTRUCTION : ANSWERS ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

- Q1** Earthworks is engineering works created through the moving of massive quantities of soil and rock, understanding the soil and rock mechanic is essential statutory requirement.
- (a) List **THREE (3)** the main element need to consider in earthworks. (3 marks)
 - (b) State and briefly describe **TWO (2)** planning of ground investigation in earthwork stage. (6 marks)
 - (c) The second process of earthwork stage is design. As technologies, suggest things to consider in earth works design. (6 marks)
 - (d) In order to minimize material waste or borrow, it is necessary to produce what is called a Mass Haul diagram. With add of sketch, describe the term below. (10 marks)
 - (i) Rising Curve
 - (ii) Maximum Point
 - (iii) Falling Curve
 - (iv) Minimum Point
 - (v) Areas at The End
- Q2**
- (a) Give **FIVE (5)** objectives of water sensitive urban design. (5 marks)
 - (b) Differentiate the definition of drainage and drainage system (4 marks)
 - (c) Two main goals of drainage are prevention of seepage and improvement of soil properties. As technologist engineer, propose the standard operation procedure excavation and backfilling material of type drainage system component below. (10 marks)
 - (i) Precast Block Drain
 - (ii) Culvert
 - (d) Nowadays to control the runoff water and drainage design of Malaysian authorities are using Urban Stormwater Management Manual for Malaysia (MSMA). Compare **THREE (3)** design concept between conventional and Urban Stormwater Management Manual for Malaysia (MSMA) (6 marks)

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Q3 Many engineering project such excavations, appropriate systems for the management and control of the groundwater should be planned before start of each project.

(a) Give **THREE (3)** the important of groundwater control? (3 marks)

(b) Permeability is a critical parameter for the assessment of how water flows through soil and rocks. With add of sketch, Differentiate **THREE (3)** type of soil permeability depends on the properties of the soil. (12 marks)

(c) Dewatering is a necessary process for construction for underground projects. Compare and illustrate **TWO (2)** methods of groundwater control and dewatering below.

- (i) Sump Pumping
 - (ii) Well Point Systems
- (10 marks)

Q4 You work as an Engineering Technologist in the consultant company, where you are required to provide an infrastructure planning of sewerage system in new development for residential area..

(a) Sketch and explain components of the sewerage line system from the housing toilet to the sewerage treatment plant. (10 marks)

(b) Your sewerage treatment system is 3 km away from the housing area, sketch and differentiate on **THREE (3)** factors to be considered on manhole construction and give your suggestion if the sewerage pipe system cannot be connected to receiving last manhole at sewerage treatment system by gravity flow. (15 marks)

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– END OF QUESTIONS –