



**UNIVERSITI TUN HUSSEIN ONN MALAYSIA
FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : PLANT & MACHINERY
COURSE CODE : BNC 31903
PROGRAMME : BNC
EXAMINATION DATE : JULY 2022
DURATION : 3 HOURS
INSTRUCTION
1. ANSWER **ALL** QUESTIONS
2. THIS TEST IS AN **ONLINE**
ASSESSMENT AND CONDUCTED
VIA **OPEN BOOK**

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

- Q1** Earthwork is the preliminary work that should be done before construction work begin where a lot of machinery is used in the earthwork stage.
- (a) Propose **THREE (3)** types of Bulldozer blade for the earthwork at your site. (9 marks)
 - (b) Analyze the differences between **THREE (3)** basic types of scrapers: crawler-drawn scraper, two-axle scraper and three-axle scraper. (6 marks)
 - (c) Base on **Figure Q1 (c)** and information below, Calculate the
 - (i) Cut and Fill Volume
 - (ii) Haul Distance of Earthwork for Bulldozer.
 (10 marks)
- Q2** In recent years, the Malaysian government has given continuous focus on highway development projects in the country and optimized the use of roadways to improve the country's economic status. Different highway mega projects have been initiated, with the involvement of multiple large contractors.
- (a) Based on your understanding, briefly explain on **ONE (1)** highway mega project that is currently ongoing in Malaysia. (3 marks)
 - (b) Based on the highway mega project mentioned in **Q2 (a)**, investigate **FIVE (5)** type of plant and machineries involved in the different stage of the construction process. (10 marks)
 - (c) Evaluate **THREE (3)** complications of machinery fleet management in a tunnel project. Give relevant examples based on the complications that are mentioned. (12 marks)
- Q3** As the earthwork is done, piling work is taking over the task.
- (a) Based on data given :

Hammer used	= Winch Operated Drop Hammer
Pile Size	= 150mm
Pile design Working Load	= 180Kn
Estimated Pile Penetration Length, L	= 18m
Assume type of Driving	= Medium
Weight of Hammer, w	= 10kN
Factor of safety, Fs	= 0.5
k, Factor	= 0.5
Weight of Hammer,	
Dolly & Stationeries parts	= 5kN
Type of Soil	= Clay

Propose Hammer Drop, H = 600mm

Calculate:

- (i) Self Weight of pile, W_p
- (ii) Combine All Weight, P
- (iii) Settlement Load, W_m
- (iv) Temporary Elastic Compression Factor, A_c
- (v) Efficient of Blow, P/w

(15 Marks)

- (b) Investigate the vibration method and bored pile method in terms of their piling process, suitability and advantage. Provide sketches to support your answers.

(10 marks)

Q4 Industrial Revolution 4.0 was involved in many sectors in the world including the construction sector.

- (a) In case of major construction projects, the speed of work and the timely completion of work is very important. The proper use of the appropriate equipment contributes to the following impacts. Examine and explain level of industrial revolution below

(i) Industrial Revolution 1

(2 marks)

(ii) Industrial Revolution 2

(2 marks)

(iii) Industrial Revolution 3

(2 marks)

(iv) Industrial Revolution 4

(2 marks)

- (b) Construction company can acquire a new construction technology in IR4.0 era as an engineer for the company, and propose new technology in order to ease the monitoring the project.

(8 marks)

- (c) These are the latest technologies involved in the construction industry.

- Building Information Modeling (BIM)
- Industrialized Building System (IBS)
- 3D Printing

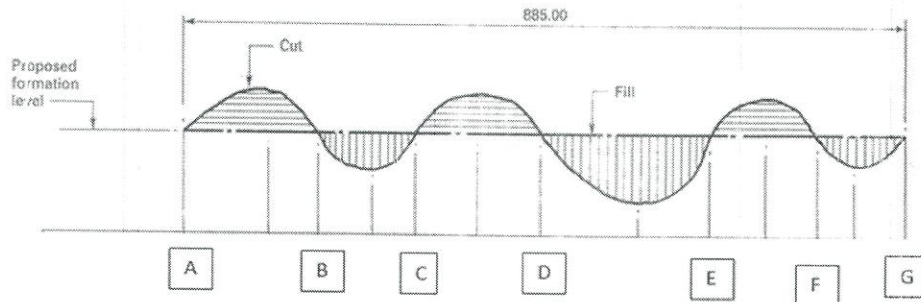
Based on your understanding, critically discuss the **THREE (3)** new technology above.

(9 marks)

- END OF QUESTIONS -

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	A - B	B - C	C - D	D - E	E - F	F - G
DISTANCE (m)	165	117	152	206	134	131
VOLUME (m³)	10,326	6,831	9,013	14,937	7,618	5,747

Figure Q1 (c)

