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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023**

COURSE NAME : PLANT & MACHINERY

COURSE CODE : BNC 31903

PROGRAMME CODE : BNC

EXAMINATION DATE : JULY / AUGUST 2023

DURATION : 3 HOURS

INSTRUCTION : 1. ANSWER **ALL** QUESTIONS
2. THIS FINAL EXAMINATION IS CONDUCTED VIA CLOSED BOOK.
3. STUDENTS ARE PROHIBITED TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

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

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TERBUKA

- Q1** (a) The construction contractor's ability to win contracts and to perform them at a profit is determined by two vital assets: people and equipment. During the takeoff of earthwork construction planning, the planner must make decisions concerning:
- equipment needs
 - sequence of operations
 - crew size

Based on your understanding, critically discuss the factors that influence the decision making based on the **THREE (3)** aspects above. Provide suitable examples for each aspect mentioned.

(12 marks)

- (b) At one location, an excavation work is done by an excavator with bucket load factor of 0.8, job efficiency of 75% with the production of 175 BCM/h, load factor 0.77 and truck transit time of 0.5 hour. The type of soil is tough clay. The truck has a capacity of 12.6 BCM to fully service the shovel.
- (i) Assess the number of trucks required for this excavation work. (3 marks)
- (ii) If a dipper cycle time of this excavation is 25 second with the amount of 2.5 LCM, calculate the number of trucks required. (5 marks)
- (iii) If there is only an availability of 10 trucks, calculate the production of this team. (2 marks)
- (c) During hauling, the apron is lowered to capture the material. Explain the purpose of sprinklers on the haul. (3 marks)

- Q2** (a) Compare **THREE (3)** characteristics between crawler and wheeled tractors. (6 marks)
- (b) Illustrate the effect on dozer production for downhill dozing and slot dozing. (4 marks)
- (c) Distinguish grader and scraper with suitable sketch ups. (15 marks)

- Q3** (a) Discuss briefly on the difference between Horizontal Directional Drilling (HDD) and horizontal boring/pipe jacking in terms of accuracy, labour usage, cost difference and launching mode (surface/subsurface).
(4 marks)
- (b) With appropriate diagram, demonstrate the major procedures in implementing the underground utilities installation.
(11 marks)
- (c) In recent years, Malaysia government has given continuous focus on railway development projects in the country and optimise the use of railroads to improve the country's economic status. Based on a completed railway project in Malaysia, recommend the plant and machineries involved in each different construction stage.
(10 marks)
- Q4** (a) Describe the functions of a crane limit switch.
(2 marks)
- (b) With the aid of diagrams, appraise the main procedures of tower crane erection using hydraulic jacks and climbing mast.
(10 marks)
- (c) The construction of tall buildings often requires the tower crane for lifting construction materials. Assess **TWO (2)** differences between self-supporting static tower cranes and supported static tower cranes.
(4 marks)
- (d) You as a specialist installer for material hoist in your company. Propose **THREE (3)** requirements needed to select a material hoist that will comply with good safety practices.
(9 marks)

- END OF QUESTIONS -