

CONFIDENTIAL



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014**

COURSE NAME : CONSTRUCTION EQUIPMENT
MANAGEMENT
COURSE CODE : BFP 40203/BFP4023
PROGRAMME : 4 BFF
EXAMINATION DATE : JUNE 2014
DURATION : 3 HOURS
INSTRUCTION : ANSWER FIVE (5) QUESTIONS
ONLY

THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

CONFIDENTIAL

- Q1** (a) In earthwork activities there are a few information required to help us to do a planning for cut and fill work. In this scenario, the source of cutting is 600 m^3 , width of embankment is 13 m and length of embankment is 100 m. You are suppose to do filling work at 300 mm thickness with compaction factor is 90%. You have one unit excavator to do cutting work which has efficiency 50 min/hr, standard cycle 200 /hr, swing depth factor 1.0, bucket volume 0.76 m^3 (loose volume) and bucket fill factor 0.95. Assume depth/maximum depth 12/21 and $1.0 \text{ BBM} = 0.9 \text{ CCM}$.
- (i) Estimate volume required for filling work (3 marks)
 - (ii) Calculate extra volume of cutting area (2 marks)
 - (iii) Determine production rate for the excavator (2 marks)
 - (iv) Calculate time to complete cutting work by using this excavator and also base on the volume required for filling work (2 marks)
- (b) Calculate load factor for soil sample in 1 m^3 with loose condition 500 kg and compaction condition 800 kg. (1 mark)
- (c) Generally bulldozer and backpusher can be use in earthwork activity. Compare the difference between bulldozer and backpusher in term of function and spesification. (10 marks)

- Q2** (a) The earthmoving application of dozers principally involves excavating and pushing soil over relatively short distances. Operating conditions may include rough terrain, steep slopes, and poor traction. This short distance zone of operation is often referred to the power zone of earthmoving. While the maximum efficient dozing distance is 91 m. There for, explain the techniques to increase production of earthwork volume by using bulldozer. (9 marks)
- (b) Excavation ditch have a cross section area 225 m^2 , soil having 12 % of swell and repose angle is 37° .
- (i) Find the size of a conical spoil pile (3 marks)
- (ii) Find the base width and height of the triangular spoil bank (3 marks)
- (c) Compaction is the process of artificially increasing the density of soils by forcing the soil particle close together, primarily by expelling air from the void spaces in the soil. An increasing in soil density caused by the expulsion of water from the void spaces is referred to consolidation. Consolidation is a long-term process normally requiring months or years while compaction takes place in a much shorter time. Now days, using compaction equipment in heavy construction to increase soil density are more practical. Evaluate the function and suitability of tamping foot rollers and pneumatic rollers technique compaction which is available in construction industry. (5 marks)



- Q3** (a) Dragline is a versatile machine that capable to do excavation work for a multiple range of operations. It can handle materials that range from soft to medium hard. The greatest advantage of a dragline over other machine is it long reach for digging and dumping. It can excavate material and load into hauling units, such as truck or dispose it in spoil piles near the pits from which it is excavated. Summarize the operation of dragline. (10 marks)
- (b) Explain the function of motor grader. (2 marks)
- (c) Illustrate the function of moldboard at motor grader. (8 marks)
- Q4** (a) At one location, there is excavator doing excavation work with bucket load factor is 0.8, job efficiency is 75% with production 175 BCM/h, load factor is 0.77 and truck transit time is 0.5 hour. Type of soil is tough clay.
- (i) Determine the number of truck required for this excavation work. (3 marks)
- (ii) If a dipper cycle time of this excavator is 25 second with amount of 2.5 LCM. Estimate the numbers of truck require. (6 marks)
- (iii) If number of truck available on site only 10 trucks. Estimate the production of this team. (1 mark)
- (iv) Evaluate the situations and the answers from (i), (ii) and (iii) (10 marks)

- Q5**
- (a) List **two (2)** types of material hoist. (2 marks)
 - (b) You as a specialist installer for material hoist in your company. Give an advices on requirement needed to select a material hoist that will comply with a good safety practices. (10 marks)
 - (c) List **four (4)** types of tower crane. (4 marks)
 - (d) Summarize the important of using concrete pump in general point of view. (4 marks)
- Q6**
- (a) List **four (4)** characteristics of soil that contribute to the difficulty of excavation work. (4 marks)
 - (b) Illustrate the fundamental method of seismic refraction test technology in rock investigation works. (10 marks)
 - (c) There are **three (3)** types of mounted ripper. Discuss the difference in each type. (6 marks)

- END OF QUESTION -



FINAL EXAMINATION

SEMESTER/SESSION: SEM II/2013/2014
 COURSE NAME : CONSTRUCTION EQUIPMENT
 MANAGEMENT

PROGRAMME : 4 BFF
 COURSE CODE : BFC 40203

Production = CSVBE

1.0 m³ BMC = 1.25 LCM = 0.9 CCM

$$\text{Swell (\%)} = \left(\frac{\text{Weight/bank volume}}{\text{Weight/loose volume}} - 1 \right) \times 100$$

$$\text{Shrinkage (\%)} = \left(1 - \frac{\text{Weight/bank volume}}{\text{weight/compacted volume}} \right) \times 100$$

$$\text{Load Factor} = \frac{\text{Weight/loose volume}}{\text{Weight/bank}}$$

$$\text{Load Factor} = \frac{1}{1 + \text{swell}}$$

$$B = \left(\frac{4V}{L \times \tan R} \right)^{1/2}$$

$$H = \frac{B \times \tan R}{2}$$

$$\text{Volume} = \frac{1}{3} \times \text{Base area} \times \text{Height}$$

$$D = \left(\frac{7.64V}{\tan R} \right)^{1/3}$$

$$\text{Load time} = \frac{\text{Haul unit capacity}}{\text{Loader production @ 100\% efficiency}}$$

Load time = Number of buckets X Excavator cycle time

$$\text{Number of units required (N)} = \frac{\text{Total haul unit cycle time}}{\text{Load time}}$$

