



MACHAKOS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

FIRST YEAR FIRST TERM EXAMINATION FOR

DIPLOMA IN BUILDING TECHNOLOGY & CIVIL ENGINEERING

CIVIL ENGINEERING CONSTRUCTION AND DESIGN

2707/2705 / 105 CP: CONSTRUCTION PLANT AND EQUIPMENT

DATE: 3/06/2021

TIME: 2:30 – 5:30 PM

INSTRUCTIONS:

Attempt all the questions

1.
 - a) State 5 reasons for using constructions plants (10 marks)
 - b) List 6 factors to consider when selecting a construction plant (6 marks)
 - c) Outline 4 factors that affects the productivity of excavators (4 marks)
2.
 - a) Sketch and describe a bulldozer and state its operations (10 marks)
 - b) Describe a scraper and state where it is used (10 marks)
3.
 - a) Sketch the following types of concreting machine (10 marks)
 - I. Tilting drum mixer
 - II. Pan mixer
 - b) The volume of concrete to be placed is 195m^3 ,
A mixer of capacity of 0.43m^3 is to be used, its cycle time is 4 minutes and it works at 90% efficiency. Concreting has been programmed to take 5 days; will the machine be adequate to complete the work? (assume 9 working hour) (10 marks)
4.
 - a) Calculate the number of days a back actor is required given the following (10 marks)
 - I. Shovel capacity = 0.35m^3
 - II. Amount to be excavated = 160m^3
 - III. Cycle time = 5minutes
 - IV. Efficiency = 75%
 - V. Working hours per day = 9

b) The following data was obtained from a manufacturer's specification for a scraper

- I. Scraper capacity = 10 tones
- II. Haul speed (full) = 13km/hr.
- III. Haul speed (empty) = 18km/hr.
- IV. Loading time = 5 minutes
- V. Dumping time = 1.5 minutes
- VI. Accelerating/decelerating time = 0.9 minutes

If the length of haul road is 6 km and the efficiency of the scraper is 94%, calculate the productivity for a 9 hrs. day of the scraper and the scrapers required for the project

(10 marks)

5. a) Sketch and label a dragline and state where it is used

(10 marks)

b) Differentiate between a roller and a vibrator

(4 marks)

c) Sketch a two-wheel tandem

(6 marks)