THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

DIPLOMA IN CIVIL ENGINEERING (DC 10B)
DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBC 10B)

EBC 2215: CONSTRUCTION PLANT & EQUIPMENT

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2011

TIME: 2 HOURS

<u>Instructions to Candidates:</u>
You should have the following for this examination
- *Answer booklet*

This paper consists of **FIVE** questions
Answer question **ONE (COMPULSORY)** from **SECTION A** and any other **TWO** questions from **SECTION B**
Maximum marks for each part of a question are clearly shown
This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question 1

a) State **EIGHT** factors affecting the choice of mechanical plant   (8 marks)

b) Explain **THREE** main methods of plant acquisition   (12 marks)

c) Explain the precautions taken when operating earth-moving plant   (7 marks)

d) Explain the following:
    (i)   Plant matching
    (ii)   Plant balancing   (3 marks)

SECTION B (Answer *any TWO questions from this section*)

Question 2

a) With the aid of a sketch, describe high level discharge dumper with a chute   (8 marks)

b) Explain the following terms as used to express trucks:
    (i)   Pay load
    (ii)   Truck capacity
    (iii)   Heaped capacity   (7 marks)

c) State **FIVE** factors affecting work cycle of trucks   (5 marks)

Question 3

a) State the elements of cycle time of mixers   (2 marks)

b) (i) With the aid of a well labelled sketch, describe tilting drum mixer
   (ii) State the advantages of tilting drum   (9 marks)

c) State the factors affecting productivity of mixers   (4 marks)

d) A concreting site requires $175m^3$ concrete. A mixer of $0.45m^3$ capacity is used. The cycle time of the mixer is 5minutes; efficiency is 75% concreting is programmed to take 7 working days. Determine whether the mixer is adequate   (5 marks)

Question 4

a) State **FIVE** factors considered when selecting excavating plant   (5 marks)

b) With the aid of a sketch, describe the operation of a drag-line   (7 marks)

c) Soil is to be excavated from a trench 1km long x 2m deep x 1m wide, using an excavator with a bucket of 0.48m3 capacity.

Determine:

 (i) Volume of loose materials to be transported off-site
 (ii) Time taken to excavate trench
 (iii) The frequency at which trucks of $8m^3$ capacity will be available.
    Use the following information:-

- Soil swell factor 1.25
- Cave in factor 10% of loose material
- Bucket efficiency 1.2
- Plant works for 50 minutes per hour
- Excavator cycle time is 25 seconds   (8 marks)

Question 5

a) Explain the **THREE** factors affecting compactive effort of vibrating roller (6 marks)

b) Determine the productivity of a roller given the following data.

Working day	-	9 hours
Working week	-	6 days
Roller width (w)	-	2.03
Minimum number of passes (N)	-	2
Roller speed(s)	-	2kph
Overlap at each end of the drum	-	0.015m
Maximum compacted thickness (D)	-	0.015M
Efficiency of the roller (E)	-	85%

                       (6 marks)

c) State **FOUR** precautions taken while blasting   (4 marks)

d) Briefly describe the operation of a self-propelled pressure sprayer. (4 marks)