THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING

HDBC 12J

EBC 3115: CONSTRUCTION PLANT & EQUIPMENT

END OF SEMESTER EXAMINATION

SERIES: APRIL 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions
Maximum marks for each part of a question are clearly shown
This paper consists of **THREE** printed pages

SECTION I (COMPULSORY)

Question 1 (30 marks)

a) List down **SIX** factors affecting the selection of excavators (6 marks)

b) Name any **THREE** types of explosives and for each give their uses (6 marks)

c) Discuss the **FOUR** factors that affect productivity of compacting plant (8 marks)

d) With the aid of sketches, differentiate between the following plant and equipment (10 marks)

(i) Tractor shovel
(ii) Track mounted crane
(iii) Truck mounted mixer
(iv) Sheep foot roller
(v) Continuous flight auger

SECTION II (Attempt any TWO questions)

Question 2 (20 marks)

a) Sketch and give the use of each of the following concreting plant (12 marks)

(i) Tilting drum mixer
(ii) Reversing drum mixer
(iii) Paddle mixer
(iv) Pan mixer

b) List and briefly explain **TWO** factors that affect productivity of piling plant and equipment (4 marks)

c) A contractor has a mixer with a drum capacity of $0.45m^3$. The amount of concrete required is $200m^3$. The machine works at 80% efficiency. Assuming a 9hr day, how long will it take to complete the work in a day? (4 marks)

Question 3 (20 marks)

a) Discuss and sketch the following drilling methods. (8 marks)

(i) Rotary drilling
(ii) Percussion drilling

b) Discuss the **FOUR** factors that affect the selection of concrete mixers (8 marks)

c) A basement of size 2m wide x 22m long x 5m deep is to be excavated by a back actor of shovel capacity $1.5m^3$. Its cycle time is 2.5mins and the machine works at 90% efficiency. The soil is to be excavated bulks at 25%. How long will it take to complete the excavation if it works for 9 hours per day? (4 marks)

Question 4 (20 marks)

a) Sketch and give the use of each of the following transporting and lifting plant (12 marks)
   (i) Rear dumper
   (ii) Truck mounted crane
   (iii) Self-supporting tower crane
   (iv) Bottom dumper

b) Clearly give the procedure for blasting (4 marks)

c) List and briefly explain **TWO** factors that affect the choice of driving hammers (4 marks)

Question 5 (20 marks)

a) Sketch and give the use of each of the following compacting plant (12 marks)

   (i) Smooth wheeled roller
   (ii) Vibrating roller screed
   (iii) Pneumatic roller
   (iv) Vibrating roller

b) List and briefly explain **TWO** factors that affect productivity of bitumen laying plant (2 marks)

c) A dump truck has a capacity of $8.75m^3$. It is tipping soil at a distance of 6km from the excavation area. It is travelling at a speed of 6km/hr. Loading time is 5 mins. Discharge time is 2 mins. How much soil will be transported if the machine has been hired for 6 days? Assume a 9hr working day. (4 marks)