



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

***Faculty of Engineering and
Technology***

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

Institutional Based Programme

HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING

EBC 3115: CONSTRUCTION PLANT & EQUIPMENT

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: JUNE/JULY 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

This paper consists of **FIVE** questions in **TWO** sections **I & II**.

Attempt **ALL** questions in section **I** and only **TWO** questions from section **II**
Maximum marks for each part of a question are clearly shown
This paper consists of **THREE** printed pages
SECTION I (Attempt ALL questions – 30 marks)

Question 1 (30 marks)

- a) List down **SIX** reasons for employing construction plant and equipment (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 excavation plant (8 marks)
- d) With the aid of sketches, differentiate between the following plant and equipment (10 marks)
 - (i) Tractor shovel
 - (ii) Guy derrick crane
 - (iii) Tilting drum mixer
 - (iv) Pneumatic roller
 - (v) Forklift truck

SECTION II (Attempt any TWO questions – 40 marks)

Question 2 (20 marks)

- a) Sketch and give the use of each of the following transporting and lifting plant. (12 marks)
 - (i) Bottom dumper
 - (ii) Track mounted crane
 - (iii) Forward dumper
 - (iv) Dependent crane
- b) Clearly give the procedure for blasting (4 marks)
- c) Discuss the **TWO** factors that affect the choice of driving hammers (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 excavators (8 marks)
- c) Determine the productivity of a roller given the following data: (4 marks)
 - Working day = 9 hours
 - Working week = 6 days
 - Roller width = 2.03 m
 - Minimum number of passes = 2
 - Roller speed = 2 kph
 - Overlap at each end of the drum = 0.015
 - Maximum compacted thickness = 200 mm

$$\begin{array}{lcl} \text{Efficiency of roller} & = & 85\% \\ \text{Number of passes (N)} & = & 2 \end{array}$$

Question 4 (20 marks)

- a) Sketch and give the use of each of the following concreting plant (12 marks)
- (i) Non-tilting drum mixer
 - (ii) Paddler mixer
 - (iii) Truck mounted mixer
 - (iv) Pan mixer
- b) List down **TWO** factors that affect productivity of piling
- a) 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 9hour day, how long will it take to complete the work in a day? (4 marks)

Question 5 (20 marks)

- a) Sketch and give the use of each of the following compacting plant (12 marks)
- (i) Poker vibrator
 - (ii) Vibrating roller screed
 - (iii) Tandem roller
 - (iv) Power rammer
- b) List down **TWO** factors that affect productivity of bitumen laying plant (2 marks)
- c) A basement of size 12m 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 to be excavated bulks at 25%. How long will it take to complete the excavation if it works for 9hrs per day? (4 marks)