



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)