



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
DIPLOMA IN BUILDING & CIVIL ENGINEERING**

EBC 2205: CONSTRUCTION PLANT

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: OCTOBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*

This paper consists of **FIVE** questions. Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question 1

- a) Each construction plant has a rated output set by the manufacturer. Outline **FIVE** reasons why the rated output may be different from the site (actual) output (5 marks)
- b) With the aid of a sketch outline the operation of a face shovel (10 marks)
- c) A contractor has a concrete mixer of capacity 0.45 cubic meters. He wins a tender of concrete a dam of concrete volume 175 cubic meters. Concreting is scheduled to take seven days before the onset of long rains. Assuming a mixer cycle time of 5 minutes and it operates at 75% efficiency, check whether the mixer will be adequate for the work. (5 marks)
- d) Outline **FIVE** factors that affect the owning and operating cost of construction plant (5 marks)
- e) State **FIVE** objectives for electing to use construction plant in Building and Civil Engineering projects (5 marks)

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

Question 2

- a) Concrete mixers can be classified as Batch, Continuous mixers. Briefly outline the working sequence of the following.
- (i) Tumbling Drum Mixer
- (ii) Reversing Drum Mixer (10 marks)
- b) Calculate the cost of owning and operating a back actor given the following data:

Purchase Price – 12.5 million

Useful life of plant – 6 years

Average annual maintenance and repairs – 0.9 million

Re-sale value – 5.7 million

Annual storage – kshs. 800,000

Transport charges per two years – kshs 900,000

Diesel 20 litres per 9 hour working day at 28/- per litre

Lubricating oil – 12 litres per week @ 40/= per litre

Operators wages – kshs 8,000 per month

2 No Banks men @ kshs. 400/= per day

Insurance, Taxes and Interest – 10% of depreciation

Overhead and profits – 20% (10 marks)

Question 3

With the aid of a well annotated sketch, describe the construction and operation of a climbing crane (20 marks)

Question 4

- a) How long will it take a back actor with a shovel capacity of 0.35 cubic meters to excavate an embankment with 154 cubic meters of soil given the cycle time of the machine 5 minutes and its works at 80% efficiency? (5 marks)
- b) A machine should be overhauled when warning symptoms of breakdown appears. Describe **THREE** such symptoms. (6 marks)
- c) Briefly explain **THREE** advantages and disadvantages of owning construction plant. (9 marks)

Question 5

- a) With the aid of a sketch, describe the construction of a site dumper (10 marks)
- b) Outline **FOUR** site operations that are carried out by the Bull dozer (10 marks)
- c) Briefly describe **THREE** objectives of electing to use ready mix concrete (6 marks)