



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING 2010
DIPLOMA IN CIVIL ENGINEERING 2010

EBC 2215: CONSTRUCTION PLANT

END OF SEMESTER EXAMINATION

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*
- *Pocket calculator*
- *Mathematical tables*

This paper consists of **FIVE** questions

Answer **THREE** questions

This paper consists of **THREE** printed pages
SECTION A (COMPULSORY) – 30 MARKS

Question 1

- a) State **FIVE** objectives of maintaining plant (5 marks)
- b) A contractor may opt to buy his own plant or hire. State **FOUR** advantages of purchasing own plant hiring (4 marks)
- c) How long will it take a face shovel with bucket capacity of 0.5 cubic meters to excavate a trench that is 10m long, 6m wide and 4m deep? Take the soil bulking as 25% and machine working cycle time of 5 minutes while working at 80% efficiency. (Duration in days) (8 marks)
- d) State **THREE** warning symptoms of plant break down (3 marks)
- e) Briefly describe **FIVE** items of field service of construction plant (10 marks)

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

Question 2

- a) Calculate the cost of owning and operating a pneumatic face shovel given the following data:
 - (i) Purchase price – 15.8 million
 - (ii) Resale value – 6 million
 - (iii) Average annual repairs and maintenance – 780,000.00
 - (iv) Taxes and insurance – 5% of depreciation
 - (v) Diesel – consumes 12 litres per 9 hour working day @ 90/= per litre
 - (vi) Lubricating oil – 5 liters per week @ 150/=
 - (vii) Operators wages – 15,000.00
 - (viii) House allowance – 3000 per month
 - (ix) 2 No banks men – 300.00 per day
 - (x) Tyres – 2 sets @ 560,000.00
 - (xi) Cutting edges 2 sets @ 90,000.00
 - (xii) Overheads and profits – 20% (15 marks)
- b) Outline **FIVE** earth moving operations that can be carried out by construction plant (5 marks)

Question 3

- a) With the aid of a sketch, explain the working cycle of a drag line (15 marks)
- b) State **FIVE** advantages of a WHEELED over TRACKED dozers (5 marks)

Question 4

- a) Concrete mixers can be classified as Continuous or Batch. Briefly describe the following types of batch mixers

- (i) Non tilting type
 - (ii) Reversing type
 - (iii) Tilting type
 - (iv) Pan mixers
- (15 marks)

b) Differentiate between a site and Highway dumper (5 marks)

Question 5

- a) A tipper of capacity 4.5 cubic meters is used to tip soil at a distance 10 Km from the excavation area. When travelling loaded and empty, the speed is 45km/hr and 75km/hr respectively. How much soil will be transported if the machine is hired for 5 days (assume a 9 hour working day) (8 marks)
- b) Outline **SEVEN** safety requirements in the use of cranes (7 marks)
- c) State **FIVE** aims of mechanizing civil engineering operations (5 marks)