



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 12J)

EBC 2306: CONSTRUCTION PLANT & EQUIPMENT

END OF SEMESTER EXAMINATION

SERIES: APRIL 2014

TIME ALLOWED: 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 of the **FIVE** questions

All questions carry equal marks
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One

- a) State FIVE objectives of maintaining plant. **(5 marks)**
- b) A contractor may hire a plant and acquire his own. Describe FOUR advantages of purchasing own plant over hiring. **(4 marks)**
- c) How long will it take a face shovel with bucket capacity of 0.5m^3 to excavate a trench size 10m long 6m wide and 4m deep? Assume soil bulks at 25% and machine cycle time is 5 minutes while working at 80% efficiency (Give duration in days) **(8 marks)**
- d) State THREE warning symptoms of plant breakdown. **(3 marks)**

Question Two

Calculate the cost of owning and operating a tyred face shovel given the following data.

- Purchase price - 15.8 million
- Resale value - 6 million
- Average annual repairs and maintenance - 780,000/=
- Taxes and insurance - 5% of depreciation
- Diesel consumes 12 litres per 9 hr day at 90/= per litre
- Lubricating oil - 5 litres per week at 150/= per litre
- 2No. banks men @300/= per day
- Tyres - 2 sets @ 560,000/=
- Cutting edges - 2 sets @90,000/=
- Overheads and profits – 20%
- Operators wages - 15000/= per month
- House allowance - 3000/= per month **(15 marks)**

- b) Outline FIVE earth moving operations that can be carried out by construction plant. **(5 marks)**

Question Three

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

Question Four

- a) Concrete mixers are classified as continuous and batch mixers. Briefly describe the following types of batch mixers and how they work.
- (i) Non tilting type
 - (ii) Reversing type
 - (iii) Tilting type
 - (iv) Pan mixers **(15 marks)**

b) Differentiate between a highway and a site dumber.

(5 marks)

Question Five

a) A tipper of capacity 4.5m^3 is used to tip soil at a distance 10km from the excavation area. When travelling loaded, its speed is 45km/hr and 75km/hr when empty. Loading time is 3 min while discharge is $2\frac{1}{2}$ min. How much soil will be transported if the machine is hired for 5 days. (Assume a 9 hr working day)

(8 marks)

b) Outline SEVEN safety requirements in the use of cranes.

(7 marks)

c) State FIVE aims of mechanizing civil engineering operation.

(5 marks)