



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

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

EBC 2306: CONSTRUCTION PLANT & EQUIPMENT

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 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

Use neat, large and well labeled diagrams where required

This paper consists of **THREE** printed pages

Question One

- a) Explain the following terms as used in trucks:
- (i) Payload
 - (ii) Truck capacity
 - (iii) Heaped capacity
 - (iv) Plant balancing
 - (v) Plant matching
- (10 marks)**
- b) An excavator is used to excavate a trench of 1000m long by 3m deep by 2m wide with a bucket of capacity 0.52m^3 . The soil swell factor is 1.75, cave in factor is 12%, bucket efficiency is 1.3. The plant works for 48 minutes per hour. If the excavator's cycle time is 25sec, calculate:
- (i) Volume of loose material to be transported away from site
 - (ii) Time to excavate trench
 - (iii) The frequency for trucks of capacity 10m^3 is required.
- (10 marks)**

Question Two

- a) Briefly explain the following types of maintenance:
- (i) Preventive maintenance
 - (ii) Servicing and maintenance
 - (iii) Planned maintenance
- (6 marks)**
- b) State TWO advantages and TWO disadvantages of PLANT HIRE
- (4 marks)**
- c) State THREE factors that affect the choice of plant.
- (3 marks)**
- d) State FIVE reasons for using Mechanical plant.
- (5 marks)**
- e) Outline TWO factors which affect the productivity of a plant.
- (2 marks)**

Question Three

- a) Explain the following purchasing methods of a plant
- (i) INSTALLMENT
 - (ii) CASH
- (5 marks)**
- b) Explain the following terms:
- (i) Serviceability factor
 - (ii) Utilization factor
 - (iii) Operating factor
- (6 marks)**
- c) A site operated for 40 weeks a year, 5 days a week and 8 hours a day. Poor work planning kept the plant idle for 8 weeks. During the remaining time, the excavator could not be used because of a breakdown for 4 hours each week. Determine:
- (i) Hours available for works
 - (ii) Hours work was found
 - (iii) Hours actually worked

(iv) Operating factor

(v) Serviceability factor

(vi) Utilization factor

(9 marks)

Question Four

- a) An item of plant has a cash price of ksh 500,000/=, determine the cost of purchase through hire purchase if initial deposit is 35% of the cash price. Interest rate is 7.5% per annum and the payment period is 36 months. Determine the monthly payment of the same plant. **(8 marks)**
- b) State FOUR operating factors of a plant operating cost. **(4 marks)**
- c) State the factors that affect the productivity of trucks **(5 marks)**
- d) Explain the following:
(i) Low-loaders
(ii) Articulated trucks **(3 marks)**

Question Five

- a) Outline the SIX details or information that must be provided on an earth moving plant. **(6 marks)**
- b) State THREE precautions to be adhered to when operating a HOST. **(3 marks)**
- c) State TWO types of Dump trucks and explain their features. **(4 marks)**
- d) Explain the following:
(i) Sum of the year digit method
(ii) Declining balance
(iii) Straight line method **(6 marks)**
- e) Define the term “plant” **(1 mark)**