THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

((A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology in Conjunction with Kenya Institute of Highways and Building & Technology (KIHBT)

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

HIGHER DIPLOMA IN CONSTRUCTION

(BUILDING ECONOMICS OPTION)

EBE 3119: MECHANICAL PLANT & EQUIPMENT I

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Drawing Instruments*

This paper consists of **FIVE** questions

Answer any **THREE** questions

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

Question One (20 Marks)

a) State **EIGHT** factors affecting choice of mechanical plant. **(8 marks)**

b) Explain the following methods of plant acquisition
- **i)** Plant hire
- **ii)** Hire purchase **(7 marks)**

c) State **FIVE** advantages of hire purchase. **(5 marks)**

Question Two (20 marks)

a) An item of plant has a cash price of kshs 1.2m . If it is bought on hire purchase, the following terms apply.
- Initial deposit 35%
- Interest rate 15% per year
- Repayment period of 3 years

Determine the following:-

- **i)** Deposit
- **ii)** Extra cost compared with cash price
- **iii)** Monthly payment
- **iv)** Total purchase price. **(8 marks)**

b) State **FOUR** factors that affect plant operating cost. **(4 marks)**

c) Explain:-
- **i)** Ownership cost
- **ii)** **SIX** forms of ownership costs. **(8 marks)**

Question Three (20 marks)

a) State the **FIVE** factors influencing the cost of mechanical plant handling. **(5 marks)**

b) State **FOUR** factors determining economic utilization of mechanical plant. **(4 marks)**

c) Calculate the cost of owning and operating a tyred face shovel given the following data:
- Purchase price = 12.5m
- Resale value = 4.5m
- Useful life 6 years at 2000 hours per year
- Average annual repairs and maintenance cost 780,000
- Taxes, insurance is 5% of depreciation
- Diesel consumed - 7 litres per 9 hours day at 80/= per litre
- Operator's wages = 5000/= per week
- Lubricating oil – 3 litres per week @ 120/= per litre
- 2No Banksmen @ 300/= per day
- Tyres – 3 sets @ 650,000 for six years
- Cutting edges 2 sets @ 90,000 for six years
- Overheads and profits 20% of the total costs. **(11 marks)**

-

Question Four (20 marks)

a) (i) Define plant depreciation
(ii) State **THREE** factors that influences variation of maintenance costs. **(5 marks)**

b) Briefly describe **THREE** main types of maintenance. **(9 marks)**

c) A constractor purchases a plant at a cost of kshs 200,000. Its estimated economic life is 10 years. The average rate of depreciation per year is 25%. Prepare a schedule of depreciation cost of plant using the sum of years digit method.
Assume scrap value of 20,000/= **(6 marks)**

Question Five (20 marks)

a) State **SIX** causes of differences between a plant's rated output and its site output. **(6 marks)**

b) Define the following:
i) Operating factors
ii) Serviceability factor
iii) Utilization factor **(6 marks)**

c) Drain laying project took 52 weeks a year, 5 days a week and 9 hours a day. Poor work planning kept the plant idle for 12 weeks. During the remaining time, the excavation could not do work because of breakdown for 6 hours each week.
Determine:
i) Operating factor
ii) Serviceability factor
iii) Utilization factor. **(8 marks)**