

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF BUILT ENVIRONMENT**

**DEPARTMENT OF QUANTITY SURVEYING**

**PART IV SUPPLEMENTARY EXAMINATIONS – AUGUST 2013**

**CONSTRUCTION EQUIPMENT AND METHODS – AQS4108**

Time: 3 hours

Total Marks: 100

**INSTRUCTIONS:**

Answer all questions

All questions carry equal marks.

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**QUESTION ONE**

- a) A Contractor has purchased excavating plant costing \$85,000. The estimated economic life of the plant is 8 years. The plant's salvage value after 5 years is \$6,000.
- i) Calculate the annual depreciation charge using the straight- line method (5 marks)
  - ii) Calculate the depreciation reserve accumulated by the end of Year 3. (5 marks)
- b) i) Discuss by giving examples of construction plant, the factors to be considered when choosing “matching units” equipment (10 marks)
- ii) Explain the importance of scheduling in relation to construction plant and equipment (5 marks)

**QUESTION TWO**

a) Calculate the owning and operating cost per hour for a 3m<sup>3</sup> front end loader with pneumatic tyres which was purchased for \$125 000.00 and is expected to have a working life of 12 000 hrs (6years).

The contractor is expecting 10% interest per annum on his capital outlay and he has to pay \$650.00 per annum for taxes, \$584.00 per annum insurance, approximately \$840.00 for repairs and maintenance per annum and \$1200.00 per annum for replacement of tyres. He also has to provide fuel and lubricants at a cost of \$120.00 per week. The operator for the loader is paid \$33.00 per 8 hour a day. The loader works an average of 40 hours per week.

(15 marks)

b) Describe the organizational structure ideal for the construction industry, highlighting the functions of each position in the structure. (10 marks)

### **QUESTION THREE**

a) Define the following terms with regard to a construction project

i) Labour productivity (3 marks)

ii) Site productivity (3 marks)

b) A dump truck with a capacity of  $5\text{m}^3$  is used to dispose excavated material to a site 3km away. A power shovel with a dipper of  $1\text{m}^3$  is used to load the material and has standard operating cycle time of 60 sec. The speed of the dump truck is 50km/h and dumping time is 60 sec.

i) Determine the daily standard production rate of the truck. (12 marks)

ii) If a fleet of dump trucks of this capacity is used to dispose of  $600\text{m}^3$  excavated material for 9 hours per day calculate the number of trucks needed daily. (7 marks)

### **QUESTION FOUR**

(a) The following are types of plant and equipment that are used in the Construction industry. Explain the purposes they serve.

i) Graders (3marks)

ii) Backactors (3marks)

iii) Pumps (3marks)

iv) Dumpers (3marks)

v) Vibrators (3marks)

(b) A construction project is represented by the data shown below.

<b>Activity</b>	<b>Duration (weeks)</b>	<b>Preceding Activities</b>
A	2	I
B	6	A,J
C	2	-
D	5	I
E	1	I
F	4	H
G	4	-
H	6	B, E
I	2	G
J	5	C,D

- i) Draw a network diagram to represent the inter-relationships between the activities indicated. (6 marks)
  
- ii) Determine the critical activities and duration of the project. (4 marks)