JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY SPECIAL RESIT EXAMINATIONS FOR THE DEGREE IN SCIENCE IN CONSTRUCTION MANAGEMENT

THIRD YEAR RESIT 2020/2021 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TCM 3324

COURSE TITLE: Construction Plant and Equipment Management

EXAM VENUE: **STREAM: BSc CONSTRUCTION MGT**

DATE: ../11/2020 **EXAM SESSION:**

DURATION: …HOURS

Instructions

1. **Answer question 1 (Compulsory) and ANY other two questions**
2. **Candidates are advised not to write on question paper**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION 1 (30 Marks)

i. Give reasons why you, construction manager need to study this course (**6 Marks**)

ii. What do you understand by the term " time-value of money'' as concerns machinery management? Give reasons to support this principle as well as any suitable example where it is applicable (**8 Marks**)

iii. The general aim of construction is to produce a structure at reasonable cost and of sound workmanship within acceptable time limits. Discuss the main reasons that a manager may consider to choose machinery and not manual labour (**12 Marks**)

iv. Discuss the cycles of operation in a two-stroke internal combustion engine (**4 Marks**)

QUESTION 2

i. One of the functions of a construction manager in a new project/ on-going project is equipment procurement. Discuss the objectives of this function? (**14 Marks**)

ii. Explain the following (**6 Marks**)
   a) Bank interest
   b) Company cost of capital

QUESTION 3

i. Discuss the importance of good/accurate record keeping in construction machinery planning and operation (**10 marks**)

ii. Discuss what you understand by Salvage Value of a piece of equipment. Explain factors which may affect salvage value (**10 Marks**)

QUESTION 4

i. Define the following terminologies as used in construction discipline (**10 Marks**)
   a) Coarse aggregate
   b) Optimum moisture content
   c) Pavement
   d) Liquid Limit (LL)
   e) Plasticity index (PI)

ii. Briefly explain (5 Marks)
   a) Effect of compaction on soils
   b) Effect of water content on compaction of soils

iii. An earthfill when completed will occupy a net volume of 142,972m3. The borrow material is stiff clay which has wet density of $\rho_w = 2066\,Kg/m^3$, water content ω of 16.5% and in-place void ratio, e of 0.620. The fill will be compacted in layers of 200mm depth (loose measure0 and compacted to a dry density, ρ_d of 1826 Kg/m3 at a moisture content of 18.3/%. Compute the required volume of borrow pit excavation (5 marks)

QUESTION 5 (20MARKS)

i. In machinery purchase and utilization, cost expenses can be broadly classified as ownership costs and operating costs. List the various cost elements included under each category (**7 Marks**)
   a) Ownership costs (**4 Marks**)
   b) Operating costs (3 Marks)

ii. A construction plant is known to have three lives as enumerated here below. Explain in brief each of these lives (**6 Marks**)
   a) Physical life
   b) Economic Life
   c) Useful Life

iii. The initial cost of a piece of construction equipment (pneumatic tire mounted) is Ksh 5,500,000. The estimated salvage value of the equipment is Ksh 900,000 and the useful life of the equipment is 10 years. The machine will operate 2000 hrs per year. The cost of one set of tires is Ksh 400,000 and a new set of tires will be replaced after every 3 years of operation. A major repair work will be carried out on the equipment at the end of year 6 at a cost of Ksh 450,000. The company's cost of capital is 8% per year. Compute the total cost per hour for the construction equipment considering time value of money (**7 Marks**)