TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2501: ENGINEERING MANAGEMENENT I

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: 15 Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

-Drawing instruments.

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE

a) Outline the selection criteria for general plant and the following plant in particular;
   i) Crane for high rise buildings.
   ii) Earth moving plant. (9 marks)
b) Discuss the principal reasons which necessitate a business to hold stock. (6marks)
c) Use hypothetical figures to explain the "worst possible/best possible outcomes" technique in the decision theory. (9marks)
d) Explain the plant depreciation principle, and use hypothetical figures to outline the decling balance method. (6marks)

QUESTION TWO

a) Discuss the rational of maintaining an inventory control system, stating the advantages and disadvantages of;

i) Low stock levels,
ii) High stock levels. (8marks)

b) The demand for a commodity is 18,000 units per year at a steady rate. It costs 6,000 shillings to place an order and 45shillings to hold a unit per year.
c) Use the economic ordering quantity (E O Q) formula, to determine the batch size to minimize inventory costs, the number of orders placed per year, the length of the inventory cycle and the total costs of having the stock per annum. (!2marks)

QUESTION THREE

Project R, tabulated below is to be constructed in Vindoni, Kilifi, district. Determine the, logic of the project, and draw the network analysis diagram, calculate all the floats and show the critical path of the project.

Activity number	activity	Duration (weeks)
a)	Preliminaries, access roads, site offices and sanitation	7
b)	Basement excavations	5
c)	column bases and foundations excavations	3
d)	foundations concreting	3
e)	Substructure Walls to d,p,c.	2
f)	Substructure frame	3
g)	External walls- 1st storey	4
h)	Columns and beams 1st storey	2
i)	1st storey floor slab	3
j)	External walls 2nd storey	4
k)	Frame 2nd storey	2
l)	Flat roof	3

m)	Internal finishes	2
n)	External finishes	2
o)	External drainage	3
p)	Land scaping/ planting trees,flowers and grass	3

PROJECT R

QUESTION FOUR

Use cost/time optimization techniques to establish the ideal time for carrying out project x, as shown in the chart provided below;

activity	Immediately preceding item	Normal duration (weeks)	Normal cost	Crash duration (weeks)	Crash cost
A	-	5	30000	-	7200
B	A	6	42000	1	7500
C	A	7	28000	2	4800
D	A	9	36000	4	4200
E	B,C	7	35000	2	6000
F	D,E	8	64000	-	-
G	C	8	72000	1	12000
M	F,G	3	36000	-	-

Fixed costs at sh. 6000 per week. PROJECT X.

QUESTION FIVE.

a) With the aid of analytical tables, explain the following decision theory concepts;
i) Opportunity lost tables,
ii) Conditional profit tables,
iii) Bayes strategies. (9marks)
b) Use the minimax criterion to determine which of the following projects should be undertaken. Each of the projects lead to varying net costs which the businessman classifies as outcome 1, II, and III. The pay off matrix (conditional cost table is provided below

Net outcomes	I	II	III
Project			

P	(150)	(350)	(450)
Q	(400)	(550)	(525)
R	(600)	(700)	(500)

(11marks)

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QUESTION ONE

a) Draw a plant policy for a construction firm with annual turnover of sh. 1.2b (6marks)
b) Discuss the merits and demerits of the following plant arrangements;
i) Owning,
ii) Hiring,
iii) Leasing. (9marks)
c) Outline the records essential for efficient plant maintenance. (8marks)
d) State the purpose of inventory models and outline the schostatic models; P, and Q. (7marks).

QUESTION TWO

a) Discuss the aspects which a site manager should take into account to ensure effective plant utilization.
b) A mechanical tractor having a 1.5 m3 shovel capacity is to be used in basement excavation.
The tipping yard for the exaction materials is located 20m away from the site. Determine the appropriate number of 4m3 lorries which should be used for optimum tractor utilization. (8marks).
c) Outline the various forms of plant maintenance. (6marks)

QUESTION THREE

Draw the network analysis diagram, calculate the floats and the critical path of the project Q, shown below, and prepare the network analysis chart.

activity	Immediately preceding Activity	Duration (weeks)
A	-	5
B	A	4
C	A	8
D	A	6
E	B	4
F	D	5
G	D	5
J	F,C	6
H	F,C	6
K	H,E	5
L	H,E	6
N	G	7
M	G.J	4
O	M,L,K	4
P	N	8

Q	M	3
R	P, Q, O	4

PROJECT ‘Q’

QUESTION FOUR

a) Discuss the decision theory concept stating its application in business management (6marks)

b) Use hypothetical figures to explain the following methods applied in the decision theory;

i) The minimax criterion,

ii) The minimax regret criterion,

iii) The best possible/ worst possible criteria. (14 marks)

QUESTION FIVE

a) Outline the four categories of inventory costs. (8marks)

b) Determine the cost of one m3 of excavation using a mechanical shovel 1.5m5 shovel capacity, purchased at sh. 18m and having a resale value of sh6m after 6years of use. (12marks)