TEVETA

ADVANCED CERTIFICATE IN COMPUTERS

LEVEL 5 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATION

NOVEMBER/DECEMBER 2019

SUBJECT: QUANTITATIVE ANALYSIS

TIME ALLOWED 3 HOURS

TOTAL MARKS: 100

PASS MARK : 50

INSTRUCTIONS TO CANDIDATES:

1. Write the examination number and the National Registration Card Number on the answer booklet provided
2. There are Seven (7) questions in this paper
3. Attempt any Five (5) questions of your choice
4. Cell phones and programmable calculators are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

QUESTION 1

(a) The activities to be carried out to complete building a boat is given below:

ACTIVITY	IMMEDIATE PROCESSOR	ESTIMATED TIME DAYS
A	-	4
B	A	12
C	A	11
D	-	20
E	D	6
F	B, C, E	7
G	F	10

Required:

(i) Draw a network for the scheme of activities set out above including earliest and latest start times. (10 Marks)

(ii) State the network paths and identify the critical path and project duration. (4 Marks)

(b) $\int_2^8 (x^2 - 6\chi + 8) d\chi$ (6 Marks)

[Total Marks: 20 Marks]

QUESTION 2

(a) In a queue system single channel, single server, the traffic intensity is 0.75 and the service rate is 60.

Calculate:

(i) The arrival rate (2 Marks)

(ii) Number of cars in the queue (4 Marks)

(iii) Average tome in the queue (4 Marks)

(iv) Probability of 3 cars in the system (4 Marks)

(b) Illustrate De-Morgan's Rules (6 Marks)

[Total Marks: 20 Marks]

QUESTION 3

(a) Given

Maximise $Z = 50x + 40y + 70z$

Subject to

$$3x + 2y + z \leq 50$$
$$x + 4y + 2z \leq 78$$
$$5x + y + 4z \leq 110$$
$$x, z, y \geq 0$$

Required:

(i) Indicate slack variables for the above constraints (2 Marks)

(ii) Construct an initial simplex tableaux (8 Marks)

(b) Describe the steps involved in Operations Research (10 Marks)

[Total Marks: 20 Marks]

QUESTION 4

(a) The data below is for Maize used in production of children's food.

Normal Usage	120 per day
Minimum Usage	60 per day
Maximum Usage	200 per day
Lead Time	20 – 30 days
EOQ	1000

Calculate:

(i) Re-order level (2 Marks)

(ii) Minimum level (4 Marks)

(iii) Maximum level (4 Marks)

(b) Explain the following terms:

(i) Lead time (2 Marks)

(ii) Queue displine (2 Marks)

(iii) Stock out costs (2 Marks)

(iv) Queue (2 Marks)

(v) Total float (2 Marks)

[Total Marks: 20 Marks]

QUESTION 5

Mario Chali Manufacturing Company makes two products Bags and Cases using three different materials D E and F. The requirements for the products are given below:

	Products		
	Bags	Cases	Maximum Units
D	1	1	70
E	8	5	400
F	20	9	900

The profits per Bag is K800 and per Case is K150

(i) Formulate the objective function (3 Marks)

(ii) Formulate Constraint Functions to maximise the objective function (7 Marks)

(iii) Draw the graph for the constraint functions (7 Marks)

(iv) Obtain the profit (3 Marks)

[Total Marks: 20 Marks]

QUESTION 6

Ben Bozo Trading has plants, each of which can manufacture any four products. Because of being located in different countries, the costs of production and profits differ from plant to plant.

Given below are profit data.

	Products		Profits	
	A	B	C	D
Plants 1	1	8	4	1
2	5	7	6	5
3	3	5	4	2
4	3	1	6	3

Required:

(i) Assign the products to plants in order to maximise the projects. (16 Marks)

(ii) Calculate the maximum profits obtained. (4 Marks)

[Total Marks: 20 Marks]

QUESTION 7

Solve the following:

(a) $\int(1 + t^2 + t^4 + t^6)\,dt$ (3 Marks)

(b) $\int(2x - 1)(x + 3)\,dx$ (3 Marks)

(c) $\int(x + 5)7\,dx$ (3 Marks)

Evaluate the following:

(d) $\int_0^2(4 - x^2)dx$ (3 Marks)

(e) $\int_{-1}^3(3x^2 - x + 6)dx$ (3 Marks)

(f) $\int_9^{36}(\sqrt{x} - 2)\,dx$ (5 Marks)

[Total Marks: 20 Marks]