



## **CERTIFICATE IN ADVANCED COMPUTER STUDIES**

### **LEVEL 5 EXAMINATIONS**

### **FINAL INTEGRATED SUMMATIVE EXAMINATIONS**

**NOVEMBER/DECEMBER 2018**

### **QUANTITATIVE ANALYSIS**

**TIME: 3 HOURS**

**TOTAL MARKS: 100**

### **INSTRUCTIONS**

**PASS MARK: 50**

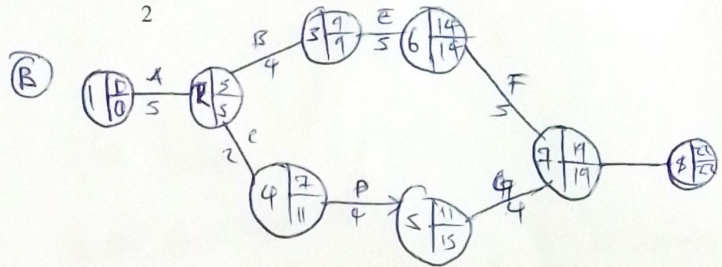
- 1. Write your examination number and NRC number of the answer booklet provided**
- 2. There are two (2) Sections in this paper. Section A is compulsory**
- 3. Attempt any three (3) questions from section B.**
- 4. All questions carry equal marks**
- 5. Programmable calculators and cellular phones are NOT allowed in the examination room.**

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



## SECTION A: COMPULSORY

### QUESTION 1



(a) Define the following terms:

(i) Critical path

(2 marks)

(ii) Total float

(2 marks)

(b) Mohani Limited has established a project team to undertake market research work. The dependency table is given below:

Activity	Proceeding Activity	Duration (Days)
A	-	5
B	-	4
C	A	2
D	C	4
E	B	5
F	B	5
G	B, C	4
H	F	3



(i) Draw a network diagram of the project.

(8 marks)

(ii) Determine the project duration.

(2 marks)

(iii) Determine the critical path.

(2 marks)

(iv) Calculate the float of activity F

(4 marks)

[Total: 20 Marks]

### QUESTION 2

(a) Integrate:

(i)  $y = 18x^2$

(3 marks)

(ii)  $f(x) = 6x^4 - \sqrt{x} - 5$

(3 marks)

$$\begin{aligned} \int y &= \int 18x^2 \\ &= \frac{18x^{2+1}}{2+1} \\ &= \frac{18x^3}{3} \\ &= 6x^3 \end{aligned}$$



(b) Evaluate:

(i)  $\int_1^2 (6x^2) dx$

$(6x^2) dx$

~~$\int_1^2 (6x^2) dx$~~

(4 marks)

(ii)  $\int_0^4 (2x - 1)^2 dx$

(6 marks)

(iii)  $\int_3^4 (5x) dx$

~~$\int_3^4 (5x) dx$~~

(4 marks)

## SECTION B: ATTEMPT ANY THREE QUESTIONS

## QUESTION 1 ✓

(a) Define:

(i) Recorder level

(2 marks)

(ii) Maximum stock

- This is the stock that

(2 marks)

(iii) Economic Order Quantity (EOQ)

(2 marks)

(b) The following data relate to a particular stock item:

Normal usage &gt;

220 units per day

Minimum usage

100 units per day

Maximum usage

280 units per day

Lead time

50 - 60 days

EOQ

10,000 units

Calculate:

(i) Reorder level

$y = 18(2)$

(4 marks)

(ii) Minimum level

$18\left(\frac{1}{x^2}\right)$

(5 marks)

(iii) Maximum level

(5 marks)

[Total: 20 Marks]

$f(x) = 6x^4 - \sqrt{x} - 5$

$f(x) = 6\left(\frac{1}{x^4}\right) - \sqrt{x} - 5$

$f(x) = 6\left(\frac{1}{x^4}\right) + 5$



## QUESTION 2

(a) Given  $f(x) = \frac{2}{x+1}$ ,  $g(x) = 3x-2$  ✓

Find:

(i)  $\text{fog}(x)$

(ii)  $\text{gof}(x)$

(iii)  $(\text{fog})^{-1}$

$$(i) \text{fog} = \frac{2}{3x-2+1}$$

$$= \frac{2}{3x-1}$$

$$\therefore x \neq \frac{1}{3}$$

$$3\frac{1}{3} - 1$$

$$1 - 1$$

$$= 0$$

(b) Given that  $E = \{0, 2, 4, 6, 8\}$

List the elements of the following set builder notation:

(i)  $A = \{x : x < 6, x \in E\} \{0, 2, 4\}$

(ii)  $B = \{y : y = 2x, 0 < x \leq 8, x \in E\} \{4, 8\}$

(c) Determine the inverse function of  $F(x) = 8x+6$

$$\text{below } f(x) = 8x+6$$

$$(ii) \text{gof}(x) = 3\left(\frac{2}{x+1}\right) - 2$$

$$= \frac{6}{x+1} - 2$$

$$3(-1)+3 \rightarrow 3x+3$$

$$-3+3 \rightarrow \therefore x \neq 0$$

$$= 0$$

[Total: 20 Mark]

## QUESTION 3

A carpenter makes two products, shelves and cabinets. Each shelf takes three hours to make, and needs two planks of wood and can be sold at a price that yields a contribution of K4.00. Each cabinet takes four hours to make and needs five planks of wood and can be sold at a price that yields a contribution of K7.00. The carpenter is only prepared to work 50 hours per week and he is only able to obtain forty-five planks each week.

Required:

(i) Write the objective function.

(2 marks)

(ii) Construct the constraint functions to maximize the objective function.

(8 marks)

(iii) Draw the graph of the constraint functions

(6 marks)

(iv) Find the maximum profit.

(4 marks)

$$(iii) (\text{fog})^{-1} = \frac{2}{3x-1}$$

[Total: 20 Marks]

$$(d) F(x) = 8x+6 \quad F(x)^{-1} = \frac{x+6}{8}$$

$$F(x)^{-1} = 8x+6$$

$$y = 8x+6$$

$$\frac{y+6}{8} = \frac{8x}{8}$$

$$x = \frac{y+6}{8}$$

$$y = \frac{2}{3x-1}$$

$$2 = 3xy - y$$

$$\frac{2+y}{3y} = \frac{3xy-y}{3y}$$

$$x = \frac{2+y}{3y}$$

$$(\text{fog})^{-1} = \frac{2+x}{3x} \rightarrow 3(0)$$

$$\therefore x \neq 0$$



### QUESTION 4 ✓

(a) Define:

(i) Ordering costs.

(3 marks)

(ii) Holding costs

(3 marks)

(b) A company uses 50,000 glass panes which cost K10 each to purchase. The ordering and handling costs are K150 per order and carrying costs are 15% of purchase price per annum. If the EOQ is 5,000 units, calculate:

(i) Ordering cost

(5 marks)

(ii) Holding cost

(5 marks)

(iii) Total stock cost

(4 marks)

$$EOQ = \sqrt{\frac{2DC_o}{Ch}}$$

D 5000  
C<sub>o</sub> 150  
Ch 1.5

[Total: 20 marks]

### QUESTION 5

(a) Define:

(i) Traffic intensity

(2 marks)

(ii) Queue

— This is the waiting line in a system

(2 marks)

(iii) System

(2 marks)

(b) An average twelve (12) customers are served in a bank every hour at a service counter. If 18 customers enter the bank per hour, calculate:

(i) Traffic intensity

(4 marks)

(ii) Average number of customers when there is no queue.

(4 marks)

(iii) Average time in the queue.

(6 marks)

[Total: 20 Marks]

$$\text{Traffic intensity} = \frac{\lambda}{N}$$

$\lambda$  — arrival rate  
 $N$  — service rate