SECTION A

Answer **all** *items in this section. (Maximum score:* ***40****)*

Item 1

The Ministry of Education and Sports has just recently received a requisition from four different schools in a given village. The schools are requesting for mathematics learners' books for learners in senior four. The following are the requisitions made by the different schools

- School A requested for 120 books
- School B requested for 90 books
- School C requested for 150 books
- School D requested for 100 books

The inspector of schools has today Thursday visited School B and School A to find out if the books were received as requested. Records show that thirteen days ago he was in school C and he will be in school D in the next four days. On a Thursday, he spent a quarter of the time at school A and two-quarters of the remaining time in school B. Inspection of schools starts at 8:00 am and ends at 4:00 pm.

Task:

(a) Help the government determine the least number of books it is to purchase such that these schools receive the books as requested

(b)(i) On which day was the inspector in school C?

(ii) On which day will the inspector be in school D?

(c) Determine the amount of time (in hours) the inspector has spent in schools A and B.

Item 2

Kyepukulu realized much demand for Irish potatoes and chicken feeds in feeds in Kyetume Mukono district and decided to move to Mbale district where they were in plenty from the following sub-counties; Bumasikye, Nananyonyi, Nakaloke, Budwale and Industrial division.

From Bumasikye, he purchased 300 bags of Irish potatoes and 200 bags of chicken feeds which cost a total of UGX. 750,000. From Nakaloke, he purchased 250 bags of Irish potatoes and 450 bags of chicken feeds totalling UGX. 600,000.

On his way back he decided to use Canter Dianas and Isuzu Fusos to transport his pieces of luggage. He required at least 4 Canter Dianas and not more than 3 Isuzu Fusos. A maximum of 12 vehicles altogether was used. Each trip cost UGX 200,000 for a Canter Diana and UGX 300,000 for an Isuzu Fuso. He has allocated UGX 1,200,000 for the transportation of his luggage.

Task

(a) Sketch a map to summarise Mr Kyepukulu's journey in Mbale district.
(b) How much did each bag of Irish potatoes and chicken feeds cost Mr Kyepukulu?
(c) Determine the number of Canter Dianas and Isuzu Fusos Mr Kyepukulu needs to use to minimize the cost of transport.

SECTION B

This Section has two Parts; **I** *and* **II**

Part I

Answer **one** *item from this part (Maximum score:* ***20****)*

Item 3

Hajji Lwanganya is planning to paint his newly constructed house in Kazinga. He has planned to spend a maximum of two million Uganda shillings. He tasked, Kamada, his most trusted painter from Kikonda Trading Centre to find out the prices of the various colours of paint needed from two main hardware shops, ROTAM Hardware and MilMambo Hardware.

At Rotam Hardware, the cost of a tin of red, yellow and orange paint is Shs 20,000, Shs 15,000 and Shs 25,000 respectively. At MilMambo Hardware, the cost of red, yellow and orange paint is Shs 21,000, Shs 14,000 and Shs 26,000 respectively. According to the estimates from Kamada, 40 tins of red paint, 25 tins of yellow paint and 40 tins of orange paint are needed to complete this work.

Task:

(a) Use matrices to find out if Hajji Lwanyaga will be able to fully paint his house.

(b) If not, how many tins of paint of each colour are required to paint the remaining part of the house?

(c) Which hardware shop is cheaper?

(d) If the two hardware shops bought the paint from the same supplier, Kansai Plascon Uganda, at the same price total of Shs 1.6 million, who made a bigger percentage profit?

(e) Why do you think the two hardware shops sell the same paint from the same supplier at different prices?

Item 4

Mr Sserwadda, a teacher at Kobwin Seed Secondary School owns a restaurant in Mukono. At the end of each day, he looks at which foods were ordered to determine how much of each foodstuff he should buy the next day. On one of the days during the week, he found out that out of 100 customers who had visited his restaurant that day, 45 had ordered Matooke(M), 48 had ordered rice (R) and 41 had ordered potatoes(P). He also noted that 17 customers had eaten matooke only while 23 did not order any of the three foods. Additionally, only two customers had eaten matooke and potatoes only. The number of customers who had eaten all three foods was equal to those who had eaten only rice and potatoes.

Task:

(a) Mr Sserwadda is interested in knowing the number of customers who had eaten potatoes only and rice only. As a mathematics student, help him since it was missing from his records on that day.

(b) If a customer is selected at random from the above sample, what is the probability that he/she ate at most two types of foods?

(c) He also noted in that very week that the number of customers was growing by 2.5% each day. If the number of customers who had eaten matooke only was 17 on Monday, how many customers were they by the end of Thursday?

Part II

Answer **one** *item from this part (Maximum score: 20)*

Item 5

Alek Construction Company has been tasked with designing a new pyramid-shaped monument, a scaled-down replica of the Great Pyramid of Giza in Kampala. The original Great Pyramid at Giza has a base length of 230 meters on each side and a height of 140 meters. The replica will have a scale factor of $\frac{1}{1000}$ of the original pyramid size. The exterior of the replica will be covered with limestone tiles, each measuring 0.5 meters by 1 meter. Inside the replica pyramid, there will be a cube-shaped chamber with a side length of 5 meters. The company needs to determine the volume of stone required for the structure Each cubic metre of such stone will cost the company UGX 100,000.

Task:

(a) What are the dimensions of the replica pyramid?

(b) Calculate the minimum number of limestone tiles needed to cover the exterior of the replica pyramid.

(c) How much money (to the nearest shillings) should the company prepare to buy the stone to use in constructing the replica pyramid?

(d) What is the elevation angle from one of the base corners to the apex of the original pyramid?

Item 6

Due to increased traffic jams on the route from *town P* to town S through *towns Q* and *R*, the National Roads Authority(**NRA**) proposes to create alternative routes to reduce the traffic jams in their proposed projects:

Project One; A straight tarmac road running from *town P* directly to *town S*.

Project Two; A perfectly circular flyover road from *town Q* to *town S* passing by *town R*.

To boost the growth of *towns Q, R* and *S*;The National Electricity Board(**NEB**) also proposes a project(Project three):

Project Three: A central power station to serve *towns Q, R* and *S* positioned at equal distances from the three towns.