S.2
MATHEMATICS
PAPER 1
SARB EXAMS
NOV/DEC 2024
2 ¼ HOURS

SESEMAT MBARARA REGION

END OF YEAR PROMOTIONAL SARB EXAMS 2024

NEW LOWER SECONDARY CURRICULUM

S.2 MATHEMATICS PAPER 1

TIME; 2 hours and 15 minutes

INSTRUCTIONS

- *This paper consists of two sections; A and B. It has six(6) examination items*
- *Section A has two compulsory items*
- *Section B has two parts; I and II. Answer one item from each part*
- *Answer four examination items in all*
- *Any additional item(s) answered will not be scored*
- *Graph paper should be provided*
- *Silent non-programmable scientific calculators & mathematical tables with a list of formula may be used*

ITEM 1

During Covid-19 pandemic, a liquid of spray sanitizer was used to kill the virus. Liquid sanitizer could be made using ethanol, hydrogen peroxide, glycerin and water. To make 20 litres of liquid sanitizer; 16 litres of ethanol, 1 litre of hydrogen peroxide, 0.4 litres of glycerin are required and water tops up to make 20 litres of the liquid sanitizer. A litre of liquid sanitizer was costing UGx.12,000. A certain lady who had been job hunting for a while, landed on this information and was very excited to start the business. The lady had a challenge with simple manipulation skills.

TASK

(i) Determine the quantity of water that is used to make 20 litres of liquid sanitizer.
(ii) What is the percentage of each ingredient in 20 litres of sanitizer?
(iii) If the lady wants to make 60 litres of liquid sanitizer at once, what is the quantity of each ingredient that must be used?
(iv) How much money would the lady make if she was to sell all the 60 litres of liquid sanitizer?

ITEM 2

(a) In a certain Nursery school in the western region, absenteeism during term 3 is on a high level compared to term 2 due to more rains in the months of October and November. During the Board meeting at the end of term two, the head teacher raised the concern and the Board members decided to look for a permanent solution to the problem.
Absenteeism was caused by the most common transportation means to schools which was Bodabodas. The board came up with the idea of buying school Vans and the options were Noahs and Mini buses.
A smaller committee of the board sat and came up with the following constraints;

$$x + 2y \leq 10, \quad 3x + y \leq 15, \quad x \geq 2, \quad and\ y \geq 1.$$

Additional information provided by the smaller committee was that, the number of Noahs would be represented by x and number of Mini buses y . The Noah carries 7 pupils and Mini bus carries 15 pupils.
The entire board could not make sense of the information provided. The board was only interested in knowing the maximum number of pupils that would be transported to reduce absenteeism.
At the time of the meeting, the school also presented another problem they were facing to do with operational costs. Their expenditure as a school was exceeding the income collected. The board passed that the school fees was to be increased to UGx.500,000. Due to this increase 50 pupils left the school the following term. The total fees collection rose from UGx.180,000,000 to UGx.200,000,000.

TASK

a) By graphing the inequalities on the same pair of axes, determine the maximum number of pupils that would be transported.

b) (i) Determine the number of children in the school before and after the dropout of some.

ii) Determine the school fees that each child was paying before.

iii) What percentage of the learners dropped out?

SECTION B

PART I (Choose one question)

ITEM 3

A certain school has been seriously having Music Dance and Drama (MDD) practice in preparation for the upcoming National MDD competition; A few days towards the competition the choir master realizes that the number of students involved in the choir practice has to be reduced so as to minimize on expenditure due to budget constraints the school is currently facing.

The choir master selected three items namely Drama (D) Folk dance (F) and Instrumental composition (I) to help him determine the number of students to take for the MDD competitions.

The condition set was that for a student to qualify to represent the school, the student must be involved in atleast 2 items of the 3 mentioned above.

Of the 93 students who were actively involved in choir practice, 53 were involved in Drama, 52 were involved in Folk dance and 57 were involved in instrumental composition. 25 were involved in both Drama and instrumental composition while 31 were involved in both Drama and Folk dance. 27 were involved in Folk dance and instrumental composition.

TASK

(i) How many students would be chosen to represent the school in the MDD competition?

(ii) What percentage of the students were not chosen?

(iii) If special treatment was to be given to some students as they travelled who would you consider and why?

ITEM 4

A certain secondary school has had an emergency that requires finance in not more than 48 hours to solve the emergency. Before any money is withdrawn from the school account, the headteacher, Bursar and Chairman BOG must sign so that money can be withdrawn.

The board member is in town **A** and is planning to travel to town **B** which is half way as you travel to town **C** where the school is located. The head teacher and Bursar are in town **C** and have already signed. The bursar is planning to travel to meet up with the chairman BOG in town **B** to get the signature.

Both the bursar and the chairman BOG plan on how to link up and decide their travels the following day.

The chairman BOG will travel privately using a double cabin which averagely moves at a speed of 100km/h.

The bursar will board Global executive bus which travels averagely at a speed of 90km/h. They will both set off at 8:00am.

They also planned to spend an hour together in town **B** before proceeding with the journey as the BOG chairman will be having an assignment in the next town beyond town **C**.

The arrangements are such that the BOG chairman and the bursar will travel together back to town **C** with the same means of transport (double cabin) at the same speed as before. The distance between towns **A** and **C** is 240km and town **B** is half way the towns **A** and **C**.

TASK

By drawing their planned distance time graphs on the same pair of axes and using a scale of 1cm: 30 minutes on horizontal axis and 1cm: 25km on vertical axis;

(i) Determine the time when the Bursar and Chairman BOG will meet.
(ii) How long will it take BOG chairman to wait for the bursar?
(iii) From their planning of their arrival time in town **C**, will the bursar be in time to solve the emergency? Support your position.

PART II

ITEM 5

An architect is designing a roof top garden on a triangular shaped building. The building dimensions are;

Side AB = 25m
Side BC = 30m
Side AC = 20m

The architect also wants to install a fountain at the centre of the garden. The architect is wondering how to locate the centre of the garden so as to install a fountain. Architect also desire to design a circular sitting around the fountain.

TASK

(i) How can the architect find the centre point of the roof top garden to locate the fountain?
(ii) What is the measure of the angle at vertex A?

(iii) What is the maximum possible diameter of the circular sitting area around the fountain?

ITEM 6

A manager of a hotel in a rural setting is faced with a problem of shortage of water. A manager also wants someone to paint one wall of museum owned by the same hotel measuring 24m by 18m. One 4 litre tin of paint is able to paint an area of a wall measuring 4m by 3m.

A manager has a rectangular metallic sheet of width 6m in the store and two identical circular metallic pieces of area $38.48m^2$. The length of a rectangular sheet is equal to the circumference of the circular pieces. The manager was advised to hire a welder who also does painting to take up the contract of painting the museum and make a water tank for the hotel.

TASK

a) (i) Determine the amount of paint the welder needs to use in painting the museum.
   ii) If the welder buys the paint in 4-litre tins at UGx.68,000 each, how much money does he need to buy a required paint?

b) Determine the capacity of the water tank the welder is to make from the available materials from the hotel store.

END