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MATHEMATICS
Paper 1
July/Aug. 2023
2 ½ hours



UGANDA TEACHERS' EXAMINATIONS SCHEME

Uganda Certificate of Education JOINT MOCK EXAMINATIONS

MATHEMATICS

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

Answer all questions in section A and any five questions from section B.

Any additional question(s) attempted will not be marked.

All necessary working must be shown clearly.

squared paper is provided.

Silent, non-programmable scientific calculators and mathematical tables with a list of formulae may be used.

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Turn over

SECTION A:(40 MARKS)

Answer all questions in this section.

- 1. In a pie-chart showing classes, S.1, S.2, S.3, S.4 and S.5, the sector for S.1 is a quadrant. The percentage of students in S.2, S.3 and S.5 are 30%, 18% and are S4?
- 2. A translation $\binom{-3}{y}$, maps are point P (5, -4) onto P^I(x, 1). Find the values of (04 marks) x and y.
- 3. Express $\frac{2x^2+5x-3}{-x-3}$ in the form ax + b. (04 marks)
- 4. Find the values of n, for which the matrix A has no inverse. $\begin{pmatrix} 2n+3 & -1 \\ -4 & 2n+3 \end{pmatrix}$ (04 marks)
- 5. Amon is 36 years old. Dina is 11 years old. In how many years from now will Amon be twice as old as Dina will then be?
- (04 marks) 6. Find the value of a in the equation $\frac{5}{6}a = 2(a-1) - \frac{3}{4}(2a-3)$.
- (04 marks) 7. A regular polygon has an exterior angle of 1440 less than interior angle. Calculate the interior angle sum of the polygon. (04 marks)
- 8. A teacher recorded marks for six students as 70, 65, 56, 53 66 and 68. Calculate the mean mark using assumed mean of 60 marks. (04 marks)
- 9. On a level ground, points P and R are such that P is due South East of R. Find the bearing of R from P. (04 marks)
- 10. Find the smallest integrant value of x which satisfy the inequality $8-x \le \frac{1}{2}(2x-1)$. (04 marks)

SECTION B (60 Marks)

Answer any **five** questions from this section.
All question carry equal marks.

- 11. (a) A tetrahedron has faces numbered 1, 2, 3 and 4. Another tetrahedron has faces numbered 3, 4, 5 and 6.In a game, two tetrahedrons are tossed together. The sum of scores on the first tetrahedron and the second tetrahedron is recorded.
 - (i) Draw the sample space for the scores (02 marks)
 - (ii) Find the probability of gating a score which is a factor of 20.

(02 marks)

(iii) What is the probability of getting a score which is at most 6?

(02 marks)

- (b) The probability that Tina will arrive late at school is $\frac{2}{5}$. The probability that Sam will arrive late at school in $\frac{4}{7}$.
 - (i) find the probability that both Sam and Tina will arrive late at school. (04 marks)
 - (ii) What is the probability that Sam will arrive late at school and Tina arrive early. (02 marks)
- 12. A retailer bought commodities from four different wholesalers.
 - He bought 4 bags of rice, 6 bags of flour, 2 bags of salt and 2
 bags of sugar from Brain wholesale shop.
 - He bought 3 bags of rice, 4 bags of salt and 5 bags of sugar from Kato's shop.
 - He bought 3 bags of rice, 8 bags of flour, 5 bags of salt and 3 bags of sugar from Dan's shop.

Turn over

All the wholesalers sold each bag of rice, flour, salt and sugar at shs. 230,000, shs. 140,000, shs 25,000 and shs 200,000respectively.

- Write down a matrix for the (a)
 - Commodities bought with order of 3 x 4.
 - (ii) Prices of commodities with order of 4 x 1 (03 marks)
- Using matrix multiplication of matrices in (a) above, find the retailers (b) (06 marks) total expenditure.
- The retailer sold all the commodities at his shop and got a total of (c) shs. 8,202,000. Determine the profit or loss the retailer got.

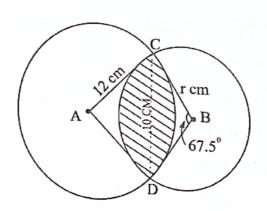
(03 marks)

13. Use graphical method to solve the following pair of simultaneous equation using values of x, from -3 to +4. (12 marks)

$$y-x^2+x+6=0.$$

 $y+x+2=0.$

14. Two circles with centres A and B interest at C and D. The common chord CD = 10cm length \overline{AC} = 12cm, \overline{CB} = rcm and angle DBC = 67.5°.



Calculate the angle CAD. (a)

(04 marks)

If the shaded area is $17.07cm^2$, determine the radius r (correct to 2sf) (b)

(08 marks)

15. A transformation $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$ maps a triangle with vertices P (1,2), Q (3,2) and R (3, 1) onto P₁ Q₁ R₁. A transformation, whose matrix is $\begin{pmatrix} 4 & -2 \\ 3 & -1 \end{pmatrix}$, then maps triangle P₁ Q₁ R₁ and P₂Q₂R₂. Determine the

Coordinates of P₁Q₁and R₁. (a)

(04 marks

Coordinate of P₂Q₂ and R₂. (b)

(04 marks)

Single transformation matrix that can map $P_2Q_2R_2$ onto PQR. (c)

(04 marks)

- 16. Okello and Adam left town A for town B, each cycling at a space 16km/h. After covering 20km, Adam reduced speed to 10km/h for the rest of the journey but Okello maintained his speed up to town B. At town B, Okello waited for 9 minutes before Adam arrived. Calculate;
 - The time Adam cycle before reducing speed. (a)
 - The distance they covered, (b)
 - Adam's covering speed. (c)

And the same

(12 marks)

- 17. The lines AB, AC and x + y = 12 are boundaries of a feasible region. The coordinates of A, B and C are (2, 2) (4, 8) and 10, 6) respectively.
 - Represent the feasible region on a graph with AC, as a broken line, (a) and the rest of the lines are solid. (05 marks)
 - Use line AB and AC to find two inequalities that describe the feasible (b) region. (05 marks)
 - Determine the minimum value of 3x + y in the feasible region. (c)

(02 marks)

END