

DEPARTMENT OF MATHEMATICS

S.2 MATHEMATICS

DURATION 2½ HOURS

INSTRUCTIONS

- Attempt all questions

SECTION A

1. Given that  $a \cdot b = b^2 - 3a + 6$ , find;  $(2 \cdot 4) \cdot (-1 \cdot 1)$
2. Amina bought a television set (Tv) at a discount of 5%. The market price of the Tv was Sh. 320,000. How much did she buy the Tv.
3. Make A the subject of the formula if  $T = \frac{2m}{n} \sqrt{\frac{L-A}{3k}}$
4. Given that  $h(x) = bx^2 + 4x$ . If  $h(-1) = 3$ , find the value of b
5. In a class of 15 students, 7 like mathematics (M), 9 like English (E) and 2 like neither mathematics nor English. Find the number of students who like both subjects
6. A line has a gradient of  $\frac{1}{2}$  and passes through  $(-4, 7)$ . Find the co-ordinates of the points at which the line cuts the y - axis
7. Solve the equation  $\frac{3}{4}(2a + 1) = \frac{5}{6}(a + 5)$
8. Solve a pair of simultaneous equation
$$\begin{aligned} 5x - 9y &= 1 \\ 4y - 2 &= x \end{aligned}$$
9. Given the function  $f(x) = \frac{3x-15}{21-7x}$ , find the value of x for which;
  - (i)  $f(x)$  is zero
  - (ii)  $f(x)$  is undefined
10. Simplify  $\frac{3\frac{1}{3}(2\frac{1}{2} - 2\frac{1}{3})}{5\frac{1}{4} - 3\frac{1}{3}}$

SECTION B

11. By shedding the unwanted regions, show the region which satisfies the inequalities

$$x + y \leq 3$$

$$y \geq x - 4$$

$$x \geq -1$$

(b) Calculate the area of the wanted region. (12mks)

12. Using a ruler, a pencil and a pair of compasses only

(a) Construct a triangle ABC such that  $AB = 10\text{cm}$ , angle  $ABC = 135^\circ$  and length  $BC = 6.5\text{cm}$

(b) Measure length AC

(c) Inscribe the angle ABC and measure the radius of the circle

(d) Draw a perpendicular onto AC from B to meet AC at P

(i) Determine length BP

(ii) Calculate the area of triangle ABC

13. Given a function  $f(x) = \frac{3x-3}{4}$  find  $f^{-1}(3)$

(b) Given the functions  $g(x) = \frac{x}{3} + \frac{x}{2}$  and  $h(x) = \frac{7x+3}{12}$

Find the value of x for which  $g(x) = f(x)$

14. Kabala is 475km from Mbarara. A taxi set off from Mbarara at 8:30am heading to Kabale at a steady speed of 50km/hr. 4 hours later, the taxi got a mechanical breakdown that took  $1\frac{1}{2}$  hrs to rectify before ion tinning with the journey to Kabale at a speed of 100km/hr. at 9:30am a minibus left Kabale and reached Mbarara at 1:30pm travelling nonstop.

(a) Represent the journeys of the two vehicles on the same axes. (8mks)

(b) Use your graph to determine the time and distance from Kabale when the two vehicles met. (2mks)

(c) Determine the differences in the times of arrival of the two vehicles. (2mks)

15. Town P is 250km from Q and Q is on a bearing  $067^\circ$  from P. an aero plane moves from P to Q and changes course to town R which is on a bearing of  $185^\circ$  from P and takes  $2\frac{1}{2}$  hours traveling at 320km/hr to reach town R.

(a) Represent the information by scale drawing using 1cm to represent 50km. (8mks)

(b) What is the bearing of R from P and how far is R from P. if the plane is to travel from directly from R to P, how fast should it travel to reach in  $1\frac{1}{2}$  hours. (4mks)

**END**