

E.SC. MUSANZE

**GENERAL EXERCISES FOR S3 (I)**

1. Copy and complete **/5marks**

a)  $(x + \dots)^2 = \dots + 6x + \dots$

b)  $(\dots - \dots) = 4x^2 - \dots + 25$

c)  $\dots - 64 = (7x - \dots)(\dots + \dots)$

2. Given that  $a = -2$ ,  $b = 3$  and  $c = -1$ , calculate the value of  $\frac{4a^2-ac^3}{b+c}$  **/2 marks**

3. Given that  $2^{27} = 134217728$ , write down the value of a)  $2^{26}$  b)  $2^{29}$  c)  $2^0$  **/3marks**

4. Given that  $f(x) = 2x + 1$  and  $g(x) = x^2 - 9$ , find the value of  $x$  if  $gof(x) = 0$  **4marks**

5. The sum of two numbers is 23 and their difference is 3. Find the sum of the squares of the two numbers. **/3marks**

6. a) If  $135_n = 75_{ten}$ , find the value of  $n$  **/3marks**

b) Given that  $A=3203_{four}$  and  $B=1121_{three}$ . Find  $A+B_{five}$ . **/3marks**

7. It is given that  $f(x) = \frac{k}{x+2}$  and  $f(6) = 6$ . Find  $f(-14)$  **/3marks**

8. Simplify the expression.  $\frac{3a^3}{3a^2-6ab} + \frac{4b^3}{2b^2-ab}$  assuming the denominator is not zero. **/4marks**

9. In a family of 48, 24 members like cassava and 36 members like potatoes. 12 members like both cassava and potatoes. **/4marks**

a) How many members like cassava only?

b) How many members like neither cassava nor potatoes?

10. Solve the following simultaneous equations.  $\begin{cases} 3x + 5y = 4 \\ 2x + 3y = 3 \end{cases}$  **/4marks**

11. The sum of two numbers is at most 48. If one number is two times the other, find the maximum possible values of the two numbers **/3 marks**

**12.** In a class of 36 students, 23 like Mathematics, 15 like Physics and 13 like Chemistry. 7 students like Mathematics and Physics, 9 like Mathematics and Chemistry and 6 like Physics and Chemistry. Two of the students do not like any of the subjects. **/6marks**

- a) Represent this information on a Venn diagram.
- b) Find the number of students who like all the three subjects
- c) How many students who like only one of the three subjects?

**13.** At Jenga-Mwili supermarket, Ali bought 7kg of Irish potatoes and 5 trays of eggs at 11800 francs. Moses bought 8kg of Irish potatoes and 6 trays of eggs at 14000 francs. If franc  $t$  and franc  $p$  are the prices of a kg of potatoes and a tray of eggs respectively. **/6marks**

- a) Write two equations to describe the purchase of the two men
- b) By combining the two equations, determine the cost of purchasing each item using elimination method
- c) How much would Dulu pay for 2 trays of eggs and 2 kg of Irish potatoes?

**14.** The perimeters of a square and a rectangle are equal. One side of the rectangle is 11 cm and the area of the square is 4 cm<sup>2</sup> more than the area of the rectangle. Find the side of the square. **/4marks**

**15.** The perimeter of a rectangle is 68 cm. If the diagonal is 26 cm, find the dimensions of the rectangle **/3marks**

**GOOD LUCK!!!!!!**

## GENERAL EXERCISES FOR S3 (II)

### SECTION A. ATTEMPT ALL QUESTIONS (55 MARKS)

1. Given that  $2^{27} = 134217728$ , write down the value of a)  $2^{26}$  b)  $2^{29}$  c)  $2^0$  / **3marks**
2. Solve for x in the following expressions: a)  $x^{\frac{1}{2}} = 3$       b)  $x^{\frac{-1}{2}} = 6$  / **4marks**
3. a) Betty and Alex are to share 144 oranges with Betty getting twice as many oranges as Alex. Find how many oranges each will get / **4 marks**  
  
b) In a certain class there are 72 boys. If the ratio of the number of girls to the total number of pupils in the class is 3: 7, find the number of girls in the class / **3 marks**
4. Find the quotient and the remainder of the division  $2x^3 + 9x^2 - 7x - 6$  by  $2x - 1$  using long division / **4marks**
5. Given that  $f(x) = 2x + 1$  and  $g(x) = x^2 - 9$ , find the value of x if  $gf(x) = 0$  / **4 marks**
6. The sum of two numbers is 23 and their difference is 3. Find the sum of the squares of the two numbers. / **3marks**
7. a) If  $135_n = 75_{ten}$ , find the value of n / **3marks**
8. It is given that  $f(x) = \frac{k}{x+2}$  and  $f(6) = 6$ . Find  $f(-14)$  / **3marks**
9. Given that two sets A and B are such that  $n(A) = 12$  ;  $n(B) = 13$  ;  $n(A \cup B) = 20$  and  $n(\varepsilon) = 24$ . Find a)  $n(A \cap B')$  b)  $n(A \cup B')$  where  $\varepsilon$  is the universal set and  $B'$  represents the complement of B. / **4marks**
10. A line with gradient 3 passes through the point A (-2, -3). Find out: / **6marks**
  - a) The equation of the line.
  - b) The coordinates of the points where the line cuts the x-axis
  - c) The coordinates of the points where the line cuts the y-axis
11. A line m is parallel to line n. Line n passes through points (4, 5) and (1, - 4). Find the equation of line m if it passes through (0, -1) / **3marks**
12. A number (p) is increased by 80% .The new number is then increased by 60 % giving a final result of 144.Find the original number P. / **3marks**
13. In a family of 48, 24 members like cassava and 36 members like potatoes.12 members like both cassava and potatoes. / **4marks**
  - c) How many members like cassava only?
  - d) How many members like neither cassava nor potatoes?
14. If you deposit 4500Frw at 5% annual interest compounded quarterly, how much money will be in the account after 10 years? / **4marks**

**SECTION B (ATTEMP ALL QUESTIONS) (45 MARKS)**

**Q16.** In a class of 36 students, 23 like Mathematics, 15 like Physics and 13 like Chemistry. 7 students like Mathematics and Physics, 9 like Mathematics and Chemistry and 6 like Physics and Chemistry. Two of the students do not like any of the subjects. **/9marks**

- d) Represent this information on a Venn diagram.
- e) Find the number of students who like all the three subjects
- f) How many students who like only one of the three subjects?

**Q17) a)** Given that lengths of the three sides of right-angled triangle are  $x$ ,  $x + 1$ , and  $x + 2$  units; find the value of  $x$ . **/3marks**

b) In a right-angled triangle the length of the median to the hypotenuse is  $(3x - 7)$  cm long. The hypotenuse is  $(5x - 4)$  cm long. Find the length of the hypotenuse. **/3marks**

c) In a right- angled triangle, the altitude to the hypotenuse is 8 cm high. The hypotenuse is 20 cm long. Find the lengths of the segments of the hypotenuse **/3marks**

**Q18.** The polynomial  $p(x) = x^3 - 5x^2 + bx + a$  is divisible by  $x + 1$  and leaves a remainder of 6 when it is divided by  $x - 1$  **/9marks**

Find the values of the coefficients a and b. Hence solve  $p(x) = 0$

**Q19.a)** Draw in the Cartesian plane triangle ABC, where A (-3, 3) , B(-2,2) , C(0,4) **/9marks**

b) Find the coordinates of A'B'C', the image of ABC under the translation of vector

$$\vec{u} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$$

c) Find the coordinates of A''B''C'', the image of ABC under the rotation about the origin of axes through  $-90^\circ$

d) Given that point A (-3, 3) is mapped into A'''(-1,3) by a reflection , find the coordinates of B''' and C''', image of B and C

What is the equation of the mirror line?

**Q20.a)** Given that  $y = x^2 - x - 2$  , copy and complete the following table **/9marks**

x	-3	-2	-1	0	1	2	3
y							

b) Draw the graph of the function  $y = x^2 - x - 2$  for  $-3 \leq x \leq 3$  (use a scale of 2cm to represent 1 unit on the x-axis and 1cm to represent 1 unit on the y-axis )

c) From the graph, determine the value of y when  $x = 0.5$  and the value of x when  $y = 0$

**GOOD LUCK!!!!!!**

**GENERAL EXERCISES FOR S3 (III)**

- Evaluate, writing your answer in simplest form
  - $(\sqrt{7} - 4)(4 - \sqrt{5})$  / **5marks**
  - $(2\sqrt{5} - 3\sqrt{3})(2\sqrt{5} + 3\sqrt{3})$  / **5marks**
- Rationalize the denominator
  - $\frac{\sqrt{2}}{\sqrt{2}-\sqrt{3}}$  / **5marks**
  - $\frac{2}{\sqrt{8}}$  / **2marks**
- Use factor method to find the square root of the following
  - 1296 / **5marks**
  - 64 / **5marks**
- Factorize and simplify  $\frac{2x+6}{3x+9}$  / **3marks**
- Given that  $x = 3, y = 4$  and  $w = 5$ . Evaluate  $\frac{3y-5w}{w+x}$  / **5marks**
- Given that  $(2x + ay)^2 = bx^2 + cxy + 16y^2$ . Find the value of a, b and c  
/ **5marks**
- Given that  $f(x) = ax^3 + ax^2 + bx + 12$  and that  $f(-2) = f(3) = 0$ , find the value of a and b  
/ **5marks**
- Factorize the following expression completely  $x^2 - 16$  / **5marks**
- If  $x + 4$  is a factor of  $f(x) = x^2 + 7x + 12$ , find other factor / **5marks**
- Solve for x in the equation  $32^{x-3} \times 8^{x+4} = 64 \div 2^x$  / **5marks**