



UNIVERSITY OF GHANA

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DEPARTMENT OF TEACHER EDUCATION

SCHOOL OF EDUCATION AND LEADERSHIP

COLLEGES OF EDUCATION

END OF SEMESTER ONE EXAMINATIONS FOR LEVEL 100, 2021/2022

B.ED. PROGRAMME

COURSE CODE: TEEG/TEUP/TEJS 107

COURSE TITLE: INTRODUCTION TO LEARNING AND APPLYING NUMBER AND ALGEBRA

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**Instruction:** Answer all questions in Section A and any three questions in Section B.

**Time: 2 hours**

**SECTION A**

**[25 Marks]**

**Answer all the questions in this section. Each question carries 1 mark.**

1.  $A = \{x : x \text{ is a letter in the word SEAT}\}$  and

$B = \{x : x \text{ is a letter in the word EAST}\}.$

Determine if these two sets are equal or equivalent.

- A. Equal and not equivalent
- B. Equivalent and not equal
- C. Equal and equivalent
- D. Neither equal nor equivalent

2. Which of the following is an example of the **Associative Property of Addition**?
- A.  $(20 + 0.5) + 3 = 20 + (0.5 + 3)$
  - B.  $11 + (8 + 3) = 11 + (3 + 8)$
  - C.  $5(7 + 2) = 5(7) + 5(2)$
  - D.  $3 \times (5 \times 4) = (3 \times 5) \times 4$
3. Which of the following sets is finite?
- A.  $\{x: 0 < x < 10\}$
  - B.  $\{x: x > -2, x \text{ is an integer}\}$
  - C.  $\{x: x \text{ is a prime number}\}$
  - D.  $\{x: x < 3, x \text{ is a natural number}\}$
4. A rectangle has sides  $16y + 3$  and  $2y$ , what is the perimeter of the rectangle?
- A.  $36y + 6$
  - B.  $18y + 3$
  - C.  $32y + 3$
  - D.  $36y + 12$
5. There are 21 boys and 6 girls in Mr. Kyeis's room. What is the ratio of girls to boys?
- A. 21:6
  - B. 7:2
  - C. 6:21
  - D. 2:7
6. A 6-gram package of fruit snacks contains 45 pieces. How many pieces would you expect in a 10-gram package?
- A. 25 pieces
  - B. 35 pieces
  - C. 75 pieces
  - D. 70 pieces

7. What is the interest earned on a savings account over 2 years, given a principal of GH¢200.00 and a rate of 5%?
- GH¢25.00
  - GH¢20.00
  - GH¢5.00
  - GH¢2.00
8. What is the value of  $101011_2$  in base 10?
- 34
  - 43
  - 45
  - 86
9. Which of the following relations is **NOT** a function?
- $\{(1, -5), (3, 1), (-5, 4), (4, -2)\}$
  - $\{(2, 7), (3, 7), (4, 7), (5, 8)\}$
  - $\{(1, -5), (-1, 6), (1, 5), (6, -3)\}$
  - $\{(3, -2), (5, -6), (7, 7), (8, 8)\}$
10. The universal set  $\mu = \{a, b, c, d, e, f, g, h\}$ ,  $A = \{a, b, c, e\}$  and  $B = \{c, d, e, g\}$   
Find  $(A \cap B)^I$
- $\{a, b, c, d, g, h\}$
  - $\{a, b, d, f, g, h\}$
  - $\{a, b, c, d, e, g\}$
  - $\{a, b, d, e, g, h\}$
11. A function is defined by  $f: x \rightarrow \frac{x}{2x+1}$ . for what value of  $x$  is  $f$  undefined?
- $\frac{1}{2}$
  - 0
  - $-\frac{1}{2}$
  - 1

21. Solve the equation  $5x + 3y - 18$  and  $2x - y = 5$  simultaneously

(a)  $\{x, y: x = 1, y = 3\}$

(b)  $\{x, y: x = 3, y = -1\}$

(c)  $\{x, y: x = 3, y = 1\}$

(d)  $\{x, y: x = -3, y = -1\}$

22. Find the value of P in  $12 : 3(p + 5) = 3 : 6$

(a)  $P = -6$

(b)  $P = 6$

(c)  $P = 5$

(d)  $P = -5$

23. If  $X_{four} = 145_{six}$ , find X

(a) 1101

(b) 1111

(c) 1010

(d) 1001

24. If  $\frac{5}{6}$  of a number is 5 greater than  $\frac{2}{3}$  of it, find the number.

(a) 60

(b) 36

(c) 30

(d) 18

25. A man bought a car for GH¢15,000.00. it was later sold at a profit of 12.5%. what was the selling price?

(a) GH¢16,875.00

(b) GH¢17,143.00

(c) GH¢18,825.00

(d) GH¢19,286.00

## SECTION B

[75 Marks]

Answer any three questions in this section. Each question carries 25 Marks.

1. (a) A school's record on membership of a club of 53 students shows that 32 students belong to club A, 23 belong to club B and 25 belong to club C. Also, 12 students are in clubs A and B, 13 are in clubs A and C, and 7 are in clubs B and C.

- (i) Represent the above information on a Venn diagram
- (ii) Using the Venn diagram, find the number of students who are in

( $\alpha$ ) all three clubs

( $\beta$ ) exactly two clubs

( $\gamma$ ) exactly one club

- (b) Four people can build a house in 9 days. How many days would it take 3 workers to build the same house?

- (c) Express as a ratio: the speed of 1km/min to the speed of 10m/s

- (d) Multiply  $\frac{mk}{3m+3k}$  by  $\frac{m+k}{m}$

2. (a) Given that  $121_m = 25_{10}$ , find the value of  $m$

- (b). Express  $0.\dot{1}\dot{8}$  as a fraction in the form  $\frac{a}{b}$ , where  $b \neq 0$ .

- (c). (i) Draw a table for multiplication,  $\otimes$ , modulo 7 on the set  $M = \{2,3,4,5,6\}$

- (iii) Use your table to find on the set  $M$ , the truth set of  $n \otimes (n \otimes 6) = 3$

- (d) List the subsets of the set  $\{a, b, c, d\}$

- (e) Evaluate:  $2\frac{1}{3} + \left(1\frac{3}{7} \div \frac{15}{28}\right)$

3. a. Find the truth set of  $3x - 2(2x - 7) \geq 2(3 + x) - 4$  and illustrate your answer on a number line.
- b. Find the simple interest on GH¢ 5,720.00 for 3 years at 5% per annum.
- c. A boy went into a bookshop and bought 3 notebooks and 2 ball pens and paid GH¢1.55. His sister also went to the same shop and bought a notebook and 5 ball pens for GH¢0.95. Find the cost of 5 notebooks and 3 ball pens that were bought by their friend.
- d. Find the solution set of the equation  $\frac{1}{5}(2 + t) = \frac{1}{2}(t - 1)$ .
4. a. Explain how to demonstrate the operation  $3 \times -2$  using the number line to a JHS student.
- b. Solve the inequality  $\frac{1}{2}x - \frac{5}{6}(x + 2) \leq 1 + x$ , and illustrate your solution on a number line.
- c. If  $f(x) = x + 1$  and  $g(x) = 3x - 1$ , find
- $f \circ g$
  - $g \circ f$
  - $g \circ f(-1)$
- d. Five women took 8 days to a piece of work. How long will it take 10 women to do the same piece of work if two groups work at the same rate?
5. a. find the inverse of  $h(x) = \frac{1}{x+1}, x \neq -1$
- b. simplify  $\left(2\frac{1}{3} + 3\frac{2}{5}\right) \div \left(4\frac{1}{2} - 1\frac{1}{3}\right)$
- c. find the sum of  $4x^2 + 5a - 2u + 4$  and  $7t + 4x^2 + 10a - 4u^2 + 5$
- d. The cost of an article is GH¢ 40.00 and the profit is 20% of the cost price. What is the selling price of the article?
- e. Find the value of  $x$  in  $133_x = 73_{ten}$