MAY 2023
EBS 102/102J
COLLEGE ALGEBRA
2 HOURS

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FIRST YEAR, END-OF-FIRST-SEMESTER EXAMINATION, MAY/JUNE 2023

30TH MAY 2023 COLLEGE ALGEBRA 2:00 PM – 2:40 PM

This paper consists of two sections, A and B. Answer ALL the questions in Section A and TWO questions from Section B. Section A will be collected after the first 40 minutes.

SECTION A
(20 MARKS)

Answer ALL the questions in this Section.

For items 1 to 12, each stem is followed by four options lettered A to D. Read each item carefully and circle the letter of the correct or best option.

1. What is the general term of the geometric sequence 5, 10, 20, 40, ...?
   A. $5^n \times 2$
   B. 5×2^n
   C. $5 \times 2^{n-1}$
   D. 5×2^2

2. What values of x satisfy the equation $6x^2 + 5x - 6 = 0$?
   A. $x = \frac{3}{2},\ x = \frac{2}{3}$
   B. $x = \frac{3}{2},\ x = -\frac{2}{3}$
   C. $x = -\frac{3}{2},\ x = -\frac{2}{3}$
   D. $x = -\frac{3}{2},\ x = \frac{2}{3}$

3. In a geometric progression, the 2nd and 5th terms are 10 and 1250 respectively. What is the first term?
   A. 2
   B. 3
   C. 4
   D. 5

4. Which one of the following is a zero of the polynomial function,
$P(x) = x^3 + x^2 - 4x - 4$?

A. 0
B. 1
C. 2
D. 3

5. The operation, @, is defined on the set of real numbers by $m@n = \frac{m+n}{n}$, $n \neq 0$. What is the value of $8@\sqrt{2}$?

A. $4\sqrt{2} + 2$
B. $4\sqrt{2} + 1$
C. $2\sqrt{2} + 2$
D. $2\sqrt{2} + 1$

6. Given that $(1+2x)^6 = 1 + Ax + Bx^2 + ---$, then the values of A and B are respectively.....

A. 12 and 30
B. 12 and 60
C. 6 and 15
D. 6 and 30

7. Samora sells her photographs during festive occasions. At the start of the day, she wants to have at least 25 photograph displayed at her booth. Each small photo she displays costs her GH¢4.00 and each large photo costs her GH¢10.00. She doesn't want to spend more than GH¢200.00 on photos to be display.
Which of the following systems is the correct pair of inequalities to model the situation, x represents the number of small photos and y represents the number of large photos?

A. $x + y < 25$
$4x + 10y > 200$

B. $x + y \leq 25$
$4x + 10y \leq 200$

C. $x + y \geq 25$
$4x + 10y \geq 200$

D. $x + y \geq 25$
$4x + 10y \leq 200$

8. Which of the following expressions is a factor of the polynomial, $P(x) = 2x^3 + x^2 - 2x - 1$?

A. $2x + 1$
B. $x + 2$
C. $x + 1$
D. $x - 2$

9. Solve for x and y in the system:

$$\begin{cases} 3x + 5y = -3 \\ 2x + 3y = -1 \end{cases}$$

A. $x = 4,\ y = 3$
B. $x = 4,\ y = -3$
C. $x = -4,\ y = 3$
D. $x = -4,\ y = -3$

10. The first term of a finite linear sequence is 5 and the last term is 224. If the common difference is 3, find the number of terms in the sequence.
A. 70
B. 72
C. 73
D. 74

11. What is the sum of the first 20 terms of the sequence 1, 7, 13, 19, ...?
A. 1140
B. 1150
C. 1160
D. 2320

12. What is the remainder when $P(x) = 4x^3 - 2x^2 + 6x - 11$ is divided by $(x - 2)$?
A. 24
B. 25
C. 36
D. 41

13. A binary operation, Δ, is defined on the set R, of real numbers by $a\Delta b = \frac{a}{b} - \frac{b}{a}$ where $a, b \in R$ *and* $a, b \neq 0$. Evaluate $\sqrt{5}\Delta\sqrt{3}$.

A. $\frac{-8\sqrt{15}}{15}$

B. $\frac{-2\sqrt{15}}{15}$

C. $\frac{2\sqrt{15}}{15}$

D. $\frac{8\sqrt{15}}{15}$

14. Solve the following inequality: $3 + x > 7x - 2 > 5x - 10$.
A. $-4 < x < \frac{5}{6}$
B. $4 < x < -\frac{5}{6}$
C. $-4 < x < -\frac{5}{6}$
D. $-\frac{5}{6} < x < 4$

15. What value of x satisfies the logarithmic equation $\log_x 1024 = 5$?

A. 3
B. 4
C. 6
D. 9

16. The operation, Δ is defined on the set of positive real numbers by $a \Delta b = ab^2 - a$.
If $5 \Delta n = 40$, what is the value of n?

A. $\sqrt{7}$
B. $2\sqrt{7}$
C. $3\sqrt{3}$
D. 3

17. If the 2nd and 5th term of a linear sequence are 20 and 53 respectively, what is the common difference?

A. 11
B. 12
C. 13
D. 15

18. The determinant of $\begin{pmatrix} 4 & 3 \\ 5 & 7 \end{pmatrix}$ is .....

A. -13
B. -1
C. 1
D. 13

In a class of 32 girls, 18 play football, 14 play hockey and 8 play both games.

Use the information above to answer questions 19 and 20.

19. How many girls play *one or two* of the games?

A. 18
B. 24
C. 25
D. 27

20. How many girls play *none* of the two games?

A. 8
B. 14
C. 18
D. 22