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)
THIRD YEAR, END-OF-FIRST SEMESTER EXAMINATION, AUGUST 2023

18TH AUGUST 2023   METHODS OF TEACHING MATHEMATICS   9:00 AM – 9:40 AM

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 <u>first 40 minutes.</u>

SECTION A
(20 MARKS)

Answer ALL questions in this Section.

Items 1 to 20 are stems followed by four options lettered A to D. Read each item carefully and circle the letter of the correct or best option.

1. Which of these statement(s) about odd numbers should a BS7 learner indicate as **true**?
    I.   Odd numbers are numbers which are not divisible by 2.
    II.   The sum of consecutive odd numbers gives square numbers.
    III. Successive odd numbers have differences of 2.

    A. I and II only
    B. I and III only
    C. I, II, and III
    D. II and III only

2. Which of the following numbers would a teacher teaching B7 learners generate using the Sieve of Eratosthenes activity? .... numbers
    A. Even
    B. Figurative
    C. Odd
    D. Prime

3. Which of these numbers would you assist a BS7 learner to identify as **a prime** number?
    A. 49
    B. 56
    C. 81
    D. 91

4. A BS8 learner should be led by his/her mathematics teacher to indicate which of the following as the proper factors of 60?
   A. 2, 3, 5, 6, 12, 15, 20.
   B. 1, 5, 10, 20, 30, 60.
   C. 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30.
   D. 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

5. To a BS8 learner, which of the numbers would the divisibility law of 3 **not** apply?
   A. 225
   B. 237
   C. 330
   D. 445

6. Given that the prime factorization of $X = 2^5 \times 3^1$ and the prime factorisation of $Y = 2^3 \times 3^3 \times 5^1$, which of the prime factorisations should a BS8 mathematics teacher assist his/her learners to state as the Least Common Multiple (L.C.M) of X and Y?
   A. $2^2 \times 3^1 \times 5^0$
   B. $2^3 \times 3^2 \times 5^1$
   C. $2^5 \times 3^1$
   D. $2^5 \times 3^3 \times 5^1$

7. Which of these should a mathematics teacher in BS8 lead his/her learners to indicate as the Highest Common Factor of X and Y, given that $X = 2^5 \times 3^1$ and $Y = 2^3 \times 3^3 \times 5^1$?
   A. $2^3 \times 3^1 \times 5^0$
   B. $2^3 \times 3^2 \times 5^1$
   C. $2^3 \times 3^3 \times 5^1$
   D. $2^6 \times 3^3 \times 5^1$

8. B7 students should be led by their mathematics teacher to identify which of the sets listed below as infinite set?
   I.   {Natural numbers}
   II.   {Rational Numbers less that 15}
   III. {Multiple of 3}

   A. I and II only
   B. I and III only
   C. I, II, and III
   D. II and III only

9. A B7 student must indicate which of the following sets is/are the complement(s) of {odd numbers}.
   I.   {Even numbers}
   II.   {Composite numbers}
   III. {Prime numbers}

   A. I only
   B. II only
   C. III only
   D. II and III only

10. Given the sets $A = \{2, 4, 8, 10\}$ and $B = \{3, 5, 8, 10, 15\}$ are the subsets of the Universal set $U = \{$Natural numbers up to 15$\}$, which of the options should a B9 learner indicate as $A \cap B^c$ given that B^c is the complement set of B?

    A. $\{2\ 4, 6, 10\}$
    B. $\{1, 3, 5, 7, 9, 13\}$
    C. $\{2, 4, 6\}$
    D. $\{\quad\}$

11. Which of the following statement(s) must a B9 mathematics teacher assist his/her students to discover about subsets of a given set?

    I.   That the null set is a subset of every set.
    II.   That the set is a subset of itself.
    III. That a set with n number of subsets has $2n$ number of subsets.

    A. I only
    B. I and II only
    C. II only
    D. III only

12. How many subsets should a B9 learner discover as the number of subsets of the set $\{1, 3, 5, 7, 9, 13\}$?

    A. 16
    B. 32
    C. 64
    D. 120

13. In a B9 class of 35 students, 27 claimed they liked Banku and 19 claimed they liked Fried Rice. All the students liked **at least** one of the meals. How many students liked both meals?

    A. 9
    B. 11
    C. 24
    D. 43

14. The shaded parts of the diagram below must be labelled by a B8 student as a representation of which common fraction?

    I. $\dfrac{18}{24}$

    II. $1\dfrac{6}{12}$

    III. $\dfrac{18}{12}$
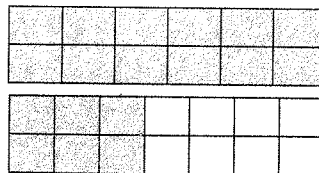
    A. I and II only
    B. I and III only
    C. I, II and III
    D. II and III only

15. Which of the following fractions should a B8 learner choose as the correct answer to the evaluation of $\frac{1}{3} + \frac{1}{2} - \frac{1}{4}$?

    A. $\frac{11}{12}$

    B. $\frac{7}{12}$

    C. $\frac{5}{12}$

    D. $\frac{1}{12}$

16. Which of the following should a B8 learner choose as the correct answer to the evaluation of $\frac{1}{3} + \frac{1}{2} \times \frac{1}{4}$?

    A. $\frac{11}{24}$

    B. $\frac{7}{12}$

    C. $\frac{5}{24}$

    D. $\frac{1}{12}$

17. Which of the options should a B8 learner choose as the correct answer to the evaluation of $\frac{1}{3} + \frac{1}{2} \div \frac{1}{4}$?

    A. $\frac{6}{12}$

    B. $\frac{7}{3}$

    C. $\frac{5}{3}$

    D. $\frac{1}{12}$

18. A B9 student is presented with this story problem to solve: "In a school, $\frac{2}{3}$ of the students eat from the school feeding programme, $\frac{1}{4}$ bring their packed lunch, and the rest go home to eat. What fraction of students goes home to eat?" Which of the following mathematical sentences would you help the student develop and use to solve the problem?

    A. $\frac{2}{3} + \frac{1}{4} - 1$

    B. $1 - \frac{2}{3} + \frac{1}{4}$

    C. $\left(\frac{2}{3} + \frac{1}{4}\right) - 1$

    D. $1 - \left(\frac{2}{3} + \frac{1}{4}\right)$

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SECTION B
[40 MARKS]

Answer any TWO questions only from this Section.

1.

a. Outline the teaching points you would use to help B7 learners to find the Highest Common Factors of 45 and 60, using the **factors approach**.   **(10 marks)**

b. Describe how you would assist your B8 learners to find the sum of $\frac{3}{4}$ and $\frac{2}{5}$ using **equivalent fraction** approach.   **(10 marks)**

2.

a. Identify **three** real life situations you would use to introduce your learners to the concept of integers. State **one** example for each.   **(6 marks)**

b. Draw **arrow diagrams** to show B8 learners the sum for each integer question:

   i. $-4 + 9$ **(7 marks)**

   ii. $-4 + (-5)$ **(7 marks)**

3.

    a.   Show, step by step, how you would assist a B9 learner to discover the rule for finding the maximum number of subsets that can be generated from a set with **n** elements. **(10 marks)**

    b.   Using a **practical approach**, describe how you would assist a student in B8 to share 50 oranges in a ratio of 2:3:5 among Fatuma, Yayo, and Selasi respectively. **(10 marks)**

4.

    a.   Describe a **practical activity** you would conduct in class to help your B7 learners to discover the formula for finding the area of a circle. **(12 marks)**

    b.   Describe **step by step** how you would assist B8 learners find the quotient of $\frac{2}{3} \div \frac{3}{4}$

          (8 marks)