**TEST 2 QUESTION PAPER**

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**INSTRUCTIONS**

1. Answer ALL the questions in a booklet/answer sheet provided
2. Write clearly and neatly.
3. Number the answers clearly according to the question paper.

**PERMISSIBLE MATERIALS**

1. Non-Programmable Calculator without the cover

**THIS QUESTION PAPER CONSISTS OF _3_ PAGES** (Including this front page)
SECTION A (CIRCLE THE CORRECT ANSWERS ONLY)

QUESTION 1 (20 marks)

1.1 The value of \( y \) in the equation \( 4(5 + 2y) - 3y = 15 \) is: [2]
   A. 5  B. -1√√  C. -5  D. 1

1.2 At present a mother is 32 years older than her daughter. Six years ago she was three times as old as her daughter was then. What is the present age of the daughter? [2]
   A. 22 years√√  B. 48 years  C. 32 years  D. 20 years

1.3 Of the 20 students in a class, 17 play soccer and 10 play volley ball. How many students play both soccer and volley ball? [2]
   A. 27 Students  B. 7 Students√√  C. 20 Students  D. 3 Students

1.4 If \( A = \{x^2: \text{ } x \text{ is an integer and } 1 \leq x < 4 \} \) and \( B = \{2x: \text{ } x \text{ is an integer and } 2 \leq x \leq 7 \} \)
   Find \( A \cap B : \) [3]
   A. \( A \cap B = \{6\} \)  B. \( A \cap B = \{6, 8\} \)  C. \( A \cap B = \{4, 8\} \)  D. \( A \cap B = \{4\}√√

1.5 If \( S = \{1, 2, 3, 4, \ldots, 10\} \) and \( A = \{7, 8, 9, 10\} \), which of the following is true: [2]
   A. set \( A \) is a subset of \( S \)√√  B. set \( S \) is a subset of \( A \)  C. \( \bar{A} = \emptyset \)  D. None of the above

1.6 Given that \( A = \{a, b, c\} \) then \( n(A) : \) [2]
   A. \( \{a, b, c\} \)  B. 3√√  C. 0  D. 8

1.7 Given \( \begin{pmatrix} 2 & 0 \\ -3 & -9 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 10 \\ 3 \end{pmatrix} \), what is the value of \( x \)? [2]
   A. 10  B. 5√√  C. 3  D. 2

1.8 Given \( A = \begin{pmatrix} 2 & 5 \\ 7 & 1 \end{pmatrix} \), \( B = \begin{pmatrix} 1 \\ 0 \end{pmatrix} \), and \( C = \begin{pmatrix} 3 & 9 \end{pmatrix} \), which of the following matrix multiplication is possible? [2]
   A. \( BA \)  B. \( AC \)√√  C. \( AB \)  D. \( C^2 \)

1.9 If the determinant of matrix \( A = \begin{pmatrix} 2 & y \\ 5 & 4 \end{pmatrix} \) is 3, find the value of \( y \). [2]
   A. 1√√  B. -1  C. 3  D. 5
1.10 Given \( B = \begin{bmatrix} 2 & 3 \\ 2 & 4 \end{bmatrix} \) then \(|B|\) is:  
A. 1  
B. -1  
C. 3  
D. \(2\sqrt{2}\) \(\sqrt{\sqrt{}\}) \[2\]

SECTION B (SHOW ALL YOUR WORK IN EACH QUESTION ON THE SPACE PROVIDED)

QUESTION 2 (30 marks)

2.1

2.1.1 \(\frac{4}{x+1} = \frac{7}{3x-2}\)

\[4(3x - 2) = 7(x + 1)\]

\[12x - 8 = 7x + 7\]

\[12x - 7x = 7 + 8\]

\[\frac{5x}{5} = \frac{15}{5}\]

\[x = 3\] \[3\]

2.1.2 \(2x - \frac{x}{4} = 7\)

\(\times 4;\) \(8x - x = 28\)

\[\frac{7x}{7} = \frac{28}{7}\]

\[x = 4\] \[3\]

2.2

\(x = 130 - 40 = 90\)

\(y = 200 - 90 = 110\)

\(z = 560 - 40 - 90 - 110 = 320\) \[6\]

2.3 \(A = \begin{bmatrix} 7 & 5 \\ 8 & 6 \end{bmatrix}, B = \begin{bmatrix} 4 & 2 \\ 5 & -6 \end{bmatrix}, C = \begin{bmatrix} 4 \\ -2 \end{bmatrix}, D = (2 \quad 3)\)
2.3.1 \[2A - 3B = 2 \begin{pmatrix} 7 & 5 \\ 8 & 6 \end{pmatrix} - 3 \begin{pmatrix} 4 & 2 \\ 5 & -6 \end{pmatrix} = \begin{pmatrix} 14 & 10 \\ 16 & 12 \end{pmatrix} - \begin{pmatrix} 12 & 6 \\ 15 & -18 \end{pmatrix} = \begin{pmatrix} 2 & 4 \\ 1 & 30 \end{pmatrix}\]

\[\text{[4]}\]

2.3.2 \[B^2 = \begin{pmatrix} 4 & 2 \\ 5 & -6 \end{pmatrix} \begin{pmatrix} 4 & 2 \\ 5 & -6 \end{pmatrix} = \begin{pmatrix} 4 \times 4 + 2 \times 5 & 4 \times 2 + 2 \times -6 \\ 5 \times 4 + -6 \times 5 & 5 \times 2 + -6 \times -6 \end{pmatrix} = \begin{pmatrix} 26 & -4 \\ -10 & 46 \end{pmatrix}\]

\[\text{[4]}\]

2.3.3 \[CD = \begin{pmatrix} 4 \\ -2 \end{pmatrix} \begin{pmatrix} 2 & 3 \end{pmatrix} = \begin{pmatrix} 4 \times 2 & 4 \times 3 \\ -2 \times 2 & -2 \times 3 \end{pmatrix} = \begin{pmatrix} 8 & 12 \\ -4 & -6 \end{pmatrix}\]

\[\text{[2]}\]

2.3.4 \[DC = \begin{pmatrix} 2 & 3 \end{pmatrix} \begin{pmatrix} 4 \\ -2 \end{pmatrix} = (2 \times 4 + 3 \times -2) = (2)\]

\[\text{[2]}\]

2.3.5 \[\det(A) = 7 \times 6 - 8 \times 5 = 2\]

\[\text{[2]}\]

2.3.6 \[\det(2A)\]

\[2A = 2 \begin{pmatrix} 7 & 5 \\ 8 & 6 \end{pmatrix} = \begin{pmatrix} 14 & 10 \\ 16 & 12 \end{pmatrix}\]

\[\det(2A) = 14 \times 12 - 16 \times 10 = 8\]

Or

\[\det(2A) = 2^2 \det(A) = 4 \times 2 = 8\]

\[\text{[4]}\]