SCOBA

S3 Mathematics

INSTRUCTIONS:

- *Attempt ALL questions in both sections.*
- *Silent, non programmable scientific calculators and mathematical tables with a list of formulae may be used.*

SECTION A

1. Use factors to evaluate:
   $617\times 793 + 786 \times 793 + 597 \times 793$

2. Given that $f(x) = \frac{2x+1}{x^2-4}$ find
   i) $f(-1)$

   ii) values of x for which $f(x)$ is meaningless.

3. Express $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}}$ in the form $a + b\sqrt{c}$ and state the values of a, b and c.

4. Given that A = $\begin{pmatrix} 5 & -1 \\ 2 & 3 \end{pmatrix}$ *and* $B = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$ find det (A + B).

5. If y is directly proportional to the cube of x and that y is 250 when x = 10, find the value of y when x = 2.

6. Mary is five years younger than John and Peter is twice as old as Mary. The sum of their ages is 49. Find Peter's age.

7. Given the vectors **a** = $\binom{2}{1}$, **b** = $\binom{0}{3}$ and **c** = $\binom{8}{13}$, find the values of the constants P and q such that **c** = P**a** + q**b.**

8. Solve the quadratic equation; $6x^2 + 19x + 3 = 0$.

9. Given that $\log_{10} 2 = 0.301$ and $\log_{10} 3 = 0.477$. Find without using tables or calculators the value of $\log_{10} 72$.

10. Solve the equtaion $\frac{x}{2} - \frac{x+1}{4} = \frac{x}{3} + 2$.

SECTION B

11. a) Given that P = $\begin{pmatrix} 6 & -2 \\ 4 & 1 \end{pmatrix}, Q = \begin{pmatrix} 0 & 3 \\ 4 & -1 \end{pmatrix}$ *and* $R = \begin{pmatrix} 2 & 0 \\ 3 & 5 \end{pmatrix}$ and that M = PQ – R

find i) Matrix M

ii) the inverse of M

b) Use matrix method to solve the simulteneous equation

$y - 2x = 3$

$2y + x = 11$.

12. The table below shows the marks scored by 50 candidates in an English test.

Marks	20 – 29	30 - 39	40 – 4s9	50 – 59	60 – 69	70 – 79	80 – 89
Number of students	3	7	16	14	6	3	1

a) i) Represent the information on a histogram.

ii) Use your histogram to estimate the modal mark.

b) Use the table to estimate the mean mark using a working mean of 44.5.

13. a) Given that $f(x) = \frac{3}{2x+1}, find$

i) $f(1)$

ii) $f^{-1}(x)$

iii) $f^{-1}(-2)$

b)Given that $g(x) = x^2 + 1$ and h$(x) = x - 3$, find the value of x for which $gh(x) = hg(x)$.

END.