MACHAKOS UNIVERSITY

UNIVERSITY EXAMINATION 2020/2021
SCHOOL OF PURE AND APPLIED SCIENCES
DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE
FIRST SEMESTER FIRST YEAR FOR
CRAFT CERTIFICATE IN MECHANICA/AUTOMOTIVE ENGINEERING TECHNOLOGY
1920/104-   MATHEMATICS;

1 a) Using the graphical method, solve the quadratic equation $y=2x^2-12x+16$, for $0 \le x \le 5$.
(4mks)

b) Determine the equation of the line passing through point (18,6) and has a gradient of -12
(4mks)

c) The ages of 6 students in a class are:

17,15,18,21,14,19

Determine the median age
(2mks)

d) Make U subject of the formula:

$$y = \frac{UV}{U+2w}$$ (4mks)

e) What is the simple interest earned on sh.35,000 at 14.5% per annum for 3 years.(6mks)

f) The length L cm of a wire varies directly as the temperature T°C. The length of the wire is
5cm when the temperature is 65°C.calculate the length of the wire when
temperature is 69°C   (4mks)

g) Plot the graph for $y = sin2x \ for \ 0^0 \le x360^0$ (6mks)

2 a) Given the arithmetic sequence 4,11,18 … …write down the first term and the 6th term
of the sequence (4mks)

b) The sum of the first three terms of a geometric sequence is 26.if the common ratio is 3,
find the sum of the first six terms of these sequence
(6mks)

c) Given the following matrix: B= $\begin{pmatrix} 7 & -3 \\ -2 & 4 \end{pmatrix}$

Determine the value of B^{-1} and the determinant of B
(4mks)

d) Given the matrix

A=$\begin{pmatrix} -4 & 3 \\ 5 & 2 \end{pmatrix}$ and B=$\begin{pmatrix} 7 & -3 \\ -2 & 4 \end{pmatrix}$

Determine (i) $(A^T)^{-1}$ (4mks)

        (ii) 2A+3B   (4mks)

3 a)The following is a distribution table of profits of companies in the same industry

Profit(ksh 000's)	Number of companies
0-10	5
10-20	15
20-30	40
30-40	20
40-50	16
50-60	4

     Calculate the:

   i)   Mean
   ii)   Median
                           (8mks)

   (b) Solve the following inequality

     $(5x + 5)/-10 \leq 2x - 1$ (2mks)

4.The sum of the first 6 terms of an arithmetic series is 46 and the 10th them of the same series is 102.

Determine   i)   the first term

    iii)   the common difference
    iv)   The 12th term of the series   (10mks)