

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 BUILDING TECHNOLOGY;
1704/102- MATHEMATICS

Instructions to candidates;

- . must have a scientific calculator and mathematical table.
- . question 1 is compulsory (section A)
- . choose any other 7 questions from section B.

Section A

1. a) Make U subject of the formula:

$$y = \frac{UV}{U+2W} \quad (4\text{mks})$$

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

c) The length L cm of a wire varies directly as the temperature $T^{\circ}\text{C}$. 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)

d) Plot the graph for $y = \sin 2x$ for $0^{\circ} \leq x \leq 360^{\circ}$ (6mks)

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

f) 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)

g) Given that $\log 8 = 0.9031$, $\log 12 = 1.0792$, without using mathematical tables or calculator, evaluate $\log 0.096$ (4mks)

section B

2 a) The number of livestock in different homesteads in a certain county were as follows:

5,6,4,2,1,3,8,9,5,3,8,4,6,

Find the i) Mode

ii) Median

iii) Mean (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)

3.a) express the following as a single fraction

i) $\frac{x-3}{4} + \frac{2x-3}{5}$

ii) $\frac{2x+3}{2} - \frac{x+3}{3}$ (5mks)

b) in a class of $p + 20$ students, $10 + x$ are absent during a history lesson. If those who are present are to sit in groups of five, how many such groups will there be?

(5mks)

4. a) solve the following simultaneous equations using elimination method.

$$2y - x = 5$$

$$3x + y = 3 \quad (4mks)$$

b) Using factorization method solve for the roots of x in the equation

$$2x^2 + 3x - 6 = 0 \quad (6mks)$$

5. A container in the shape of a cylinder has a radius of 1.5m. it contains water to a depth of 3.5m, a solid plastic sphere of 0.8 m is placed inside the container and the level of water rises to x m calculate x to the nearest unit

(10mks)

6. a) if y varies constantly and partially as x: if $x=16$ when $y=2$ and $x=4$ when $y=3$. find the value of x when $y=5$ (6mks)

b) Find the area in m^2 of a triangular piece of wood measuring 7cm by 5cm by 8cm

(4mks)

7) 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
- iii) mode (10mks)

b) Define the term probability as applied in mathematics
(2mks)

8.a) the sum of the first 5 terms of an A.P is 54 and the sum of the first 8 terms of the same A.P is 84.

Determine i) the first term and the common difference of the A.P.

II) the fifth term
(6mks)

b) Calculate the area of a segment formed by a radius of 6cm and subtending an angle of 73.4° (4mks)

9) a) 9 men working in a factory produces 20 pans in 6 working days. How long will it take 12 men working in the same rate to produce the same number of pans.

(5mks)

b) An alloy consists of three metals A, B and C. If the ratio of A: B=3:4 and B:C=6:7. find

i) Proportion of A:C

ii) Given the quantity of metal B in the alloy to be 36kg.determine the mass of the alloy.

(5mks)

10.a) solve each of the following inequalities (6mks)

i) $-2(x - 3) < 5(x + 1) - 12$

ii) $-3 < \frac{3}{2}(2 - x) \leq 5$

(6mks)

b) Use graphical method to solve the equation $3x^2 - 8x - 5 = 0$ for $-1 \leq x \leq 4$

(4mks)