# TECHNICAL UNIVERSITY OF MOMBASA

## FACULTY OF APPLIED AND HEALTH SCIENCES

## DEPARTMENT OF MATHEMATICS & PHYSICS

## UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MEDICAL LAB SCIENCES,DIPLOMA IN ENVIROMENTAL

SCIENCES AND DIPLOMA IN COMMUNITY HEALTH AND MGT.

AMA 2101: MATHEMATICS FOR SCIENCE

SPECIAL SUPPLEMENTARY EXAMINATION

### SERIES:AUGUST2017

### TIME:2HOURS

### DATE:Pick DateSep2017

**Instructions to Candidates**
You should have the following for this examination
*-Answer Booklet, examination pass and student ID*
This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.
**Do not write on the question paper.**

---

**Question ONE**

a).Simplify

i).   $\left(\frac{81}{16}\right)^{\frac{-3}{4}}$                                        (3 marks)

ii).  $\frac{4^2\sqrt{x}}{2\sqrt{x^5}}$                                        (2 marks)

b).Solve the quadratic equation by factorization

$20x^2 - 23x + 6 = 0$                                        (4 marks)

c).A committee of Five members is to be selected from Seven members of group A and Eight members of group B. Determine how many committees can be formed altogether if at least a member from each group is picked
(4marks)

d).If kshs.50000 is invested at compound interest 6% per annum.

Determine;

i).The value of the fund after 12 years. (4marks)

ii).The time correct to the nearest year it takes the fund to DOULBLE. (6 marks)

e).Simplify without using calculator/log tables

i). $\dfrac{\log 625}{\log 125}$ (3 marks)

ii). $\dfrac{21!}{17!5!}$ (3marks)

**Question TWO**

a).Solve for x $\log_{10}(4x + 3) - \log_{10}(x + 12) = \log_{10} 2$. (4 marks)

b).Rationalize and simplify completely

$\dfrac{\sqrt{2}+2\sqrt{5}}{\sqrt{5}-\sqrt{2}}$ (3 marks)

c).Without using the calculator simplify

$\dfrac{6^{\frac{1}{2}}+96^{\frac{1}{2}}}{(216)^{\frac{1}{4}}}$ ( 5 marks)

d).In a new dispensary in the city, the number of patients treated in the first week of operation was 400.If the number of patients treated per week on average increases by 25. Find;

i).How many might be treated in the dispensary in the 14$^{th}$week. (4marks)

ii).The expected total treated by the end of 20$^{th}$ (4 marks)

**Question THREE**

a).The weight of 50 students are as shown below,

| Weight (kgs) | 54 | 58 | 60 | 64 | 69 |
|---|---|---|---|---|---|
| Students no. | 8 | 12 | 14 | 10 | 6 |

Find;

i).The mean weight of the students to the nearest whole kg. (5marks)

ii).The standard deviation of the weight (6marks).

b).Samples of blood were taken from 240 expectant patients attending a pre –natal clinic. 30 of them were found to have parasites causing malaria.

i).Find the probability of those who were free of the parasites. (3marks).

ii).If the village where they hail from has a population 5400 .Determine the number of those who might be affected in the village. (2 marks ).

c).In a right angled triangle ABC, $\sec \alpha = \sqrt{3}$. Find $\sin \alpha$ $and$ $\cot \alpha$ (4 marks)

**Question FOUR**

a).Prove the following identities

i)$(1 + tan^2\theta)(1 - sin^2\theta) = 1$ (3 marks)

ii).$\sin 2\theta = \frac{2 \tan \theta}{1+tan^2\theta}$ (5 marks)

ii).$\cos 2\theta = 2cos^2\theta - 1$ (3 marks)

b).Expand $(2 + x)^{10}$ upto the term $x^5$ and hence using the first 4 terms evaluate $(2.003)^{10}$. ( 9 marks)

**Question FIVE**

a).Determine the remainder when $x^3$- $2x^2$ – 5x +6 is divided by\

i). (x-1) (4marks)

ii).(x+2) and hence factorize completely (5 marks)

b).Unbiased Coin and a Die are tossed once,

Determine:

i).The probability of drawing a Tail and an Odd number. (3 marks)\

ii).The probability of drawing a Head and Even number or a Tail and an Even number. (4 marks)

c).Plot the graph $y = 3\sin \theta$ where $0^0 \le \theta \le 360^0$ and Find $2\sin 130^0$ (5 marks).