

TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF MATHEMATICS & PHYSICS

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN NUTRITION AND DIETETICS, DIPLOMA IN COMMUNITY
HEALTH AND MANAGEMENT, DIPLOMA IN PHARMACEUTICAL
TECHNOLOGY, DIPLOMA IN ANALYTICAL CHEMISTRY, DIPLOMA IN
FOOD QUALITY AND ASSURANCE, DIPLOMA IN MICROBIOLOGY AND
DIPLOMA IN SCIENCE AND LABORATORY TECHNOLOGY.

AMA 2101: MATHEMATICS FOR SCIENCE

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Dec 2016

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 and leave in index form;

i) $\frac{\sqrt{xy} \cdot x^{\frac{1}{3}} \cdot y^{\frac{1}{4}}}{\sqrt[12]{x^{10}y^9}}$ (4 marks)

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

b). Rationalize and express in the form $a + b\sqrt{c}$.

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

c). Prove the identities

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

ii). $\sin 2\theta = \frac{2 \tan \theta}{1 + \tan^2 \theta}$ (4marks).

d). Solve for x

$$\frac{27^{x+1}}{3^{-x}} = 729 \quad (4 \text{ marks})$$

e). Expand and simplify

$$(a - b)^3 + (a + b)^3 \quad (4 \text{ marks})$$

f). A committee of five members is to be selected from 7 members of group A and 8 members of group B.

Determine how many committees can be formed altogether. (3 marks)

Question TWO

a). A survey was carried out on the height of growing girls for different age groups and the following data was obtained.

AGE(months)	5	15	25	35	55	65	75
Height(cms)	60	85	95	120	165	180	195

i). Using the graph page provided , plot the graph of height against age. (4marks)

ii). From the graph, determine the age of the girls of height 145 cm and the height of the girls of age 61 months.

(4 marks)

b). Solve for x

$$\frac{5}{2} \log x - \frac{1}{4} \log x^2 = \log 2 + \frac{1}{2} \log 4 \quad (6 \text{ marks})$$

c). Find the value of K if the remainder when the polynomial $2x^4 + 11x^3 - Kx^2 + 4x + 12$ is divided by $x - 3$ is 60 (6 marks)

Question THREE

a). Out of 125 students in Medical department taking Diploma courses, 25 students were found to have failed mathematics at O-Levels.

i). Determine the possible probability of those who had passed mathematics. (3 marks)

ii).If the whole Faculty of applied and Health sciences has a population of 3640 students. Find the likely number of students to have passed mathematics. (2 marks)

b). In a certain laboratory,500 life specimens were kept. After sometime it was found that they were increasing at an average rate of 15 specimens per week. Determine their population at the end of the 20th week. (6 marks)

c). In triangle ABC,AB=4.2 cm, BC=5.1cm and AC=7.2 cm. Determine angle B. (6 marks)

d).How many odd numbers greater than 600,000 can be made from the digits ,5,6,7,8,9,0 if repetitions are not allowed. (3 marks)

Question FOUR

a). Given a quadratic equation $ax^2+bx+c=0$. Show that $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ (8 marks).

b). Toga invested ksh.30000 in a certain bank at compound interest 8 % per year. Determine

i). The value of the investment after 17 years correct to the nearest shilling. (3 marks)

ii). The time it takes for the investment to reach ksh.145,000 to the nearest whole year. (6 marks)

c).Find the sum of the first twenty terms of the arithmetic progression series -4 -1 +2..... (3marks)

Question FIVE

a).Simplify

$$\sqrt{50} + \sqrt{98} - 2\sqrt{18} + \sqrt{8} \quad (3 \text{ marks})$$

b).The following raw data represents the mass in kilograms of a sample of patients in a certain clinic,

66 67 58 66 56	73 62 70 75 68	61 72 63 65 62	70 75 79 73 80	66 64 65 67 64
68 61 71 64 68	76 63 77 59 60	69 72 61 78 77	70 79 66 74 71	59 67 57 67 62.

i).Give the size of the sample (1 mark)

ii).Group the data into a classes. (4 marks)

iii).Using the grouped data, determine the mean and the median . (12 marks)

c).Rewrite $R = t \sqrt{\frac{k+p}{k-p}}$ in logarithms form. (3marks)