

**TECHNICAL UNIVERSITY OF MOMBASA**

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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.**

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**Question ONE**

a). Determine the median of the following data, 25, 13, 56, 49, 25, 29, 47 and 66. (3 marks)

b). Given  $3^x = a$ . Express  $81^{x+3}$  in terms of a. (4 marks)

c). Without using tables or a calculator, express as a single fraction  $\frac{\ln 8 - \ln 4}{\ln 24 - \ln 12}$  (3 marks)

d). Convert into degrees  $\frac{5}{8}\pi^c$  (2 marks)

e).Simplify

$$\frac{3!12!}{8!5!} \quad (2\text{marks})$$

f). Expand and simplify the binomial expansion  $(\frac{1}{2}x + 3)^5$  upto the fourth term. (3marks)

g). In a geometrical progression, the sum of the second and third terms is 6, and the sum of the third and fourth terms is -12. Find the first term and the common ratio. (6 marks)

h). Express in the form  $a + b\sqrt{c}$ . And determine the values of a, b and c.

$$\frac{3+4\sqrt{7}}{3+\sqrt{7}} + \frac{4}{3+\sqrt{7}} - \frac{\sqrt{7}}{3+\sqrt{7}} \quad (7 \text{ marks})$$

### Question TWO.

a).The weight of 40 students is as shown below

Weight (kgs)	53	58	60	63	70
Students number	4	13	5	8	10

Find;

i). The mean weight of the students (4 marks)

ii). The variance of the weight (6 marks)

b). Show that

$$\sin 3\theta = 3 \sin \theta - 4 \sin^3 \theta \quad (10 \text{ marks})$$

### Question THREE .

a). Solve for x  $3^{2x} - 4(3^x) + 3 = 0$  (10 marks)

b).Three numbers in arithmetical progression are such that their sum is 15 and their product is 45 . Determine the three numbers. (10 marks)

#### Question FOUR

a). Evaluate without the use of a calculator and leave in the simplest form

$$\frac{(4)^{\frac{3}{2}} \times (27)^{\frac{2}{3}}}{(729)^{\frac{1}{2}} \times 16 \times (8)^{-\frac{1}{3}}} \quad (5 \text{ marks})$$

b). A newly married couple plans to have a family of three children. After consulting a gynecologist it was found that their chances of getting a boy was 0.325 and that of a girl was 0.523. Using a tree diagram determine the probability of the couple getting two girls and a boy.

(10marks)

c). Plot the curve  $y = 3 \sin \theta$  where  $-360^\circ \leq \theta \leq 360^\circ$  (5 marks)

#### Question FIVE

a). Express in individual logarithms

$$\log\left(\frac{100P^2}{R^3\sqrt{M}}\right)^2 \quad (5 \text{ marks})$$

b). Simplify

$$5C_3 \div 5C_2 \quad (4 \text{ marks})$$

c). Solve  $2x^2 - 6x - 3 = 0$  by completing the square method. (6 marks)

d). In triangle PQR,  $r=5.8\text{cm}$  and the sizes of angles P and Q are  $41^\circ$  and  $62^\circ$  respectively. Find the length of PR correct to two decimal places. (5 marks)