THEMI HILL SECONDARY SCHOOL

COVID 19 HOLIDAY

041 BASIC MATHEMATICS OPEN EXAMINATION

SERIES ONE

FORM FOUR 2020

TIME: 3:00 HOURS **04 MAY 2020**

INSTRUCTIONS

1. This paper consists of sections A and B

2. Answer all questions in section A and B.

3. All necessary working and answers for each question done must be shown clearly.

4. Mathematical tables may be used.

5. Calculator and cellular phones are not allowed in the examination room.

6. Write your examination number on every page of your answer sheet.

7. Where necessary take

$$\pi = \frac{22}{7}$$

Radius of the Earth, R = 6400 km

This paper consists of 4 printed pages

SECTION A (60 Marks)

Attempt all questions from this section

1. (a) Work out (284 + 116) ÷ 40 + 5 × 3 – 8

   (b) Simplify $\left(5\frac{1}{3}\times\frac{1}{4}\right)\div\left(1\div\left(3\frac{1}{4}-\frac{5}{8}\right)\right)$

2. (a) Solve for x in $3^{2x} = 3^{x+1}\times 27$

   (b) If $\frac{\log b}{\log 3} = \frac{\log 16}{\log 4}$ what is the value of b?

3. (a) Given that x + y = 8 and $x^2 + y^2 = 40$, find the value of xy.

   (b) If μ = {a, b, c, d, e, f, g}, A = {e, f, g} and B = {d, e, f} List all the elements of

   i) $n(AnB^c)^c$

   ii) $n((AuB)n(A^cuB^c))$

4. (a) Given that a = 3i + j, b = -2i + 3j and c = i + 4j. Find the scalar value of p and q such that pa + qb = c

(b) Use graphical method to solve $\begin{cases} x+y=4 \\ 3x-y=4 \end{cases}$

5. (a) The areas of two similar polygons are 27 cm^2 and 48 cm^2. If the length of one side of the smaller polygon is 4.5 cm. Find the length of the corresponding side of the larger polygon.

   (b) Twice the length of a rectangle is three times its width, if the perimeter of this rectangle is 320. Find the width of the rectangle.

6. (a) Convert 250 dollars to pounds if given that 1 dollar is equivalent to 9900 shillings and 1 pound is equivalent to 2200 shillings.

   (b) Given that x is direct proportional to the square root of y and inversely proportional to z. given that x = 6 when y = 100 and z = 5. Find the value of z when x = 2 and y = 16.

7. (a) Find the simple interest on sh. 18,000 for 2 years at the rate of 6%.

   (b) June 16, 1985 Sarwa started business with capital in cash 1,200,000/=

   June 17 Bought goods for cash 800,000/=

   19 Purchased shelves for cash 250,000/=

   22 Sold goods for cash 600,000/=

   24 Paid rent for cash 240,000/=

   24 Bought goods for cash 400,000/=

   25 Paid wages for cash 60,000/=

   26 Bought goods for cash 350,000/=

28 Sold goods for cash 300,000/=

28 Paid insurance for cash 100,000/=

Enter the given transactions in cash account.

8. (a) If the tenth term of arithmetic progression is twice the fourth term and the sixth term is 16. Find the sum of the fifth term and sixth term.

   (b) Find the sum of the first four terms of geometric progression if the sum of the first two terms of a geometric progression is eighteen whereas the sum of the fourth and third terms is one hundred sixty two.

9. (a) If the two sides of a right angled triangle are (2k–1) cm and k cm. Find the value of k if $\frac{1}{2}(4k + 2)$cm is hypotenuse.

   (b) From a certain point A, Minari observes the angle of elevation of the top of a church tower to be 60^0. Moving 20m further away to a point B on the same horizontal level as the bottom of the tower C, he observes the angle of elevation to be 45^0, by leaving your answer in a surd form find the distance AC.

10. (a) Factorize completely the following $(x+1)^3 - x - 1$

    (b) If (x-2) and (x+3) are two factors of the quadratic equation $x^2 + px + q = 0$, find the values of p and q.

SECTION B (40 marks)

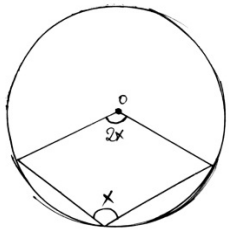
Attempt any four (4) questions from this section

11. (a) The frequency distribution table below shows the number of pupils with their ages.

Ages (years)	3-6	7-10	11-14	15-18	19-22	23-26
Frequency	32	30	19	11	5	3

Find mean age (use assumed mean A = 12.5)

(b) Find the value of x. O is the centre of the circle.



12. (a) An airplane flies from Tabora (5^0 S, 33^0 E) to Tanga (5^0 S, 39^0 E) at 332km/h along a parallel of latitude. If it leaves Tabora at 3 p.m. Find the arrival time at Tanga airport.

(b) A cone made from a semi-circle of radius 12 cm. find volume of the cone.

13. (a) Find the image of the point A(1,2) after a reflection in the line y = x

(b) If A = $\begin{pmatrix} 4 & 0 \\ 0 & 3 \end{pmatrix}$ and B = $\begin{pmatrix} -5 & 2 \\ -1 & 4 \end{pmatrix}$ find 2A + B

14. The doctor prescribes that in order to obtain vitamin A and B, a patient should have the right portion of food 1 and food 2. Food 1 contains 14 units of vitamin A and 15 units of vitamin B per kilogram, while food 2 contains 7 units of vitamin A and 20

units of vitamin B per kilogram. The doctor emphasized that he must take at most 8 kg of food 1 and at most 10kg of food 2. If the minimum daily intake required is 70 units of vitamin A per kilogram and 120 units of vitamin B per kilogram. What are the least number of portions of food 1 and food 2 that will fit the doctor prescription?