UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

FIRST SEMESTER EXAMINATIONS, NOV/DEC 2018

COURSE NO: MA 171
COURSE NAME: TRIGONOMETRY AND COORDINATE GEOMETRY
CLASS: MA I **TIME:** 3 HOURS

Name**:** _____Index Number: _____

ANSWER ANY THREE QUESTIONS

Q1. (a) Let $p \neq 0, h$ and k be any numbers. Show that an equation of a parabola with focus F (h, k + p) and directrix y = k – p is $(x-h)^2 = 4p(y-k)$

(b) Find the vertex, focus, directrix, and the endpoints of the latus rectum of the parabola $y^2 + 14x - 6y - 47 = 0$. Sketch the graph of the equation.

Q2. (a) (i) Explain the term an orthogonal circle.

(ii) The tangents to the circle $x^2 + y^2 - 2x - 6y + 5 = 0$ at the point (3,4) meets the x- axis at the point F. Find the distance of F from the center of the circle.

(b) The tangents of compound angles can be deduced from the formulae for the sines and cosines of compound angles. Prove that $\tan(A-B) = \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$

Hence, If $\tan A = \frac{2}{3}$ and $\tan B = \frac{3}{4}$, both A and B being acute angles, find the value of $\tan(A-B)$ without using tables.

Q3. (a) Find the first 4 terms of the expression $(2+3x)^5$, hence evaluate $(2.15)^5$ correct to 3 significant Figures

(b) Express $\dfrac{5x^2 - 10x + 11}{(x-3)(x^2+4)}$ in partial fractions

Q4. (a) Prove by mathematical induction that $1 + 7 + 13 + ... + (6n-5) = n(3n-2)$

(b) Discuss the graph of the equation $9x^2 + 5y^2 + 36x - 30y + 36 = 0$

EXAMINERS: C.C NYARKO/ *DANSO-ADDO*