Department of Basic Science Level: 1 Examiner: Dr. Mohamed Eid Time allowed: 3 hours	*Pyramids higher Institute* P.H.I. For Engineering And Technology معهد الأهرامات العالى للهندسة و التكنولوجيا	Prep. Year: Final Exam Course: Mathematics 1 Course Code: BAS 013 A Date: May , 2017

The Exam consists of one page　　**Answer all questions**　　**No. of questions: 5**　　**Total Mark: 70**

Question 1

Find **y`** from the following:　18

(a) $y = 4x^3 - \tan x$

(b) $y = x^{-4} . \cos x$

(c) $y = \sqrt{x} + x^4 . \sin x$

(d) $y = x + (\tan x)^4$

(e) $y = \dfrac{2}{5} + \dfrac{\cos x}{x^5}$

(f) $y = 2 - (x + \sin x)^{-3}$

Question 2

Find the limits:　8

(a) $\displaystyle\lim_{x \to 1} \frac{\sqrt[3]{x} - 1}{x^5 - 1}$

(b) $\displaystyle\lim_{x \to 0} \frac{x^4}{x^3 + \tan^3 x}$

(c) $\displaystyle\lim_{x \to 0} \frac{x^2}{1 - \cos x}$

(d) $\displaystyle\lim_{x \to \infty} \frac{2x - 3x^8}{1 + x + x^8}$

Question 3

(a) Find the extrema of the functions : $f(x) = 2 + x^3$, $g(x) = 1 + 6x^2 + 2x^3$　10

(b) Write the Maclurin's expansion of the function : $f(x) = 2x + \cos x$　5

Question 4

(a) State the definition of the circle.　2

(b) Write the equation of circle where the points $(3, 2)$, $(0, -1)$ are ends of diameter.　3

(c) Find the center and radius of the circle : $x^2 + y^2 - 4x + 2y - 4 = 0$.　3

(d) Find the vertex , focus and sketch the parabola : $x^2 - 4x + 4y - 4 = 0$.　6

Question 5

(a) State the definition of the ellipse.　2

(b) Find the angle between the lines : $3x^2 - 2xy - y^2 = 0$ and separate them.　3

(c) Find center, vertices and sketch the ellipse : $9x^2 + y^2 - 18x + 6y + 9 = 0$.　5

(d) Find center, vertices and sketch the hyperbola : $4x^2 - y^2 - 16x + 6y + 3 = 0$.　5

Good Luck　　　　　　　　　　　　　　　　*Dr. Mohamed Eid*