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: January , 2017**

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

Question 1

Find $\mathbf{y`}$ from the following: 18

(a) $y = 2x^4 - \cos 2x$ (b) $y = x^{-3}.\sin x$ (c) $y = \sin 3x - \sec x^3$

(d) $y = \tan x + \tan^4 x$ (e) $y = \frac{x}{3} + \frac{\cos x}{x^4}$ (f) $y = 3 + (x^5 + x)^7$

Question 2

Find the limits: 8

(a) $\lim_{x\to\pi} \frac{\sin x}{1+\cos x}$ (b) $\lim_{x\to 0} \frac{x^6}{x^4+\sin^4 x}$ (c) $\lim_{x\to 0} \frac{\tan x}{x^3 - x}$ (d) $\lim_{x\to\infty} \frac{x - x^7}{2 + x + x^7}$

Question 3

(a)Sketch the curve of each function : $f(x) = \frac{1}{\sqrt{1-x^2}}$, $g(x) = \frac{x^2}{x-2}$ 10

(b)State and verify the mean value theorem, $f(x) = x + \frac{3}{x}$, in [1, 3]. 4

(b) Write the Maclurin's expansion of the function : $f(x) = \frac{x}{1-x}$ 4

Question 4

(a)State the definition of the parabola. 2

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

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

Also, write it in parametric form.

(d)Write the equation of parabola with focus F(2, 1) and directrix x – 2y = 0. 3

Question 5

(a) State the definition of the hyperbola. 2

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

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

(d)Find vertex , focus and sketch the parabola : $x^2 - 4x - 8y + 20 = 0$. 5

Good Luck *Dr. Mohamed Eid*