Basic Science Department Mathematics I Code: Math 101 Final Exam: August 18, 2014 Time Allowed: **2** Hours	Modern University For Technology & Information Faculty of Engineering	Academic year: 2013 / 2014 Semester: Summer Examiners: Dr. Mona Samir Dr. Mohamed Eid
Answer **All** Questions		No. of Questions: 4 Total Mark: 40

ممنوع إستخدام المحمول كألة حاسبة. يُسمح **فقط** بإستخدام الألة الحاسبة العادية

Do not use Mobile as Calculator. Only use regular Calculator

Question 1

(a) Find any maximum, minimum and inflection points of the function : 3

$f(x) = 3x^4 - 4x^3$.

(b) Find the Taylor series for the function: $f(x) = \cos 2x$, at $x = \frac{\pi}{2}$. 3

(c) Evaluate: $\lim_{x\to 0} (x^x)$. 2

Question 2

Find $\frac{dy}{dx}$ 12

(a) $y = \cot^4(\log x^2) - \operatorname{sech}(7^{2x^9})$

(b) $y = \operatorname{cosech}^{-1}(\ln 5x^4) + x.\sqrt[4]{x+15}$

(c) $e^{x^4+y^2} - \tan^{-1}(y^2) = \tanh x^2$

(d) $y = \frac{\sec^{-1}(2x) - \sin(6x)}{x^3+1}$

Question 3

Find the integrals: 10

(a) $\int (2x^3 - 2^x)\, dx$ (b) $\int (\frac{1}{x} + \frac{1}{x^3})\, dx$ (c) $\int x.(1 + \frac{1}{2}x^2)^9\, dx$

(d) $\int x.\cos x\, dx$ (e) $\int \ln x\, dx$

Question 4

(a) Find the integrals: (i) $\int \frac{x}{x^2-3x+2}\, dx$ (ii) $\int (\cos x + \sin x)^2\, dx$ 4

(b) Find the area of region bounded by $y = x^2 - 1$, x-axis, x in $[0, 2]$. 3

(c) Find the volume V_x of the solid generated by rotating, about x-axis, the region between $y = x^2 + 3$, x in $[0, 1]$. 3

Good luck *Dr. Mona Samir* *Dr. Mohamed Eid*

الإسم: الكود:

Find the integrals:

(1) $\int (2x^2 + 3)\, dx$ (2) $\int (2x^2 + 3)^2\, dx$ (3) $\int (x^{-1} + x^{-3})\, dx$

(4) $\int (3^{2x} + 3^x)\, dx$ (5) $\int (\frac{2}{x-3} + \frac{2x+1}{x^2+x})\, dx$ (6) $\int \frac{x}{x^2-6x+5}\, dx$

Answer

Quiz 2 **الكود:** **الإسم:**

Find the integrals:

(1) $\int(\cos 2x + 3\sin x)\,dx$

(2) $\int(sin^2 2x + cos^2 2x)\,dx$

(3) $\int(sin^2 2x + cos^2 x)\,dx$

(4) $\int(\sin 2x\,.\cos x)\,dx$

(5) $\int(\sin 2x\,.\sin x)\,dx$

(6) $\int \cos x\,.(3+\sin x)^6\,dx$

Answer

Quiz 3 **الكود:** **الإسم:**

Find the integrals:

(1) $\int x.\log x\, dx$ (2) $\int (x+1)\sin x\, dx$ (3) $\int x.\cos 2x\, dx$ (4) $\int x.4^x\, dx$

Answer