


<b>Ministry Of Higher Education</b> <b>Higher Institute of Engineering</b> <b>6<sup>th</sup> of October City</b> <b>Department of Basic Science</b>	 <b>مدينة الثقافة و العلوم</b>	<b>1<sup>st</sup> Level: Final Exam</b> <b>Mathematics: (Calculus II)</b> <b>Course Code, BAS 115</b> <b>Date: May, 2011</b>	
Time 3 Hours	الامتحان (5) أسئلة في صفحة واحدة و المطلوب الإجابة عن كل الأسئلة		Marks
[1](a) Find $A + B$ , $A + B^t$ , and $ AB $ , if possible, where	$A = \begin{bmatrix} 1 & 2 & 1 \\ 0 & -2 & 1 \end{bmatrix}$ , $B = \begin{bmatrix} 1 & 1 \\ 0 & 2 \\ 3 & 2 \end{bmatrix}$		6
(b) Determine the interval of convergence of the series	$\sum_{n=0}^{\infty} \frac{x^n}{2^n}$		3
(c) Using binomial theorem, expand	$\frac{1}{1-2x}$		3
[2](a) Test the series: (i)	$\sum_{n=1}^{\infty} \frac{2}{n+3}$	(ii) $\sum_{n=1}^{\infty} \frac{n}{3^n}$	2 + 2
(b) If $z_1 = 2 + 2i$ , $z_2 = 3 - i$ . Find	$z_1 + z_2$ , $z_1 \cdot z_2$ , $(z_1)^8$		3
(c) Determine the extrema of the functions:			
(i)	$f(x, y) = x^2 + 2y^2 - 2x + 6y$	(ii) $f(x, y) = 3x + 12y - x^3 - y^3$	4 + 4
[3](a) Find the envelope of the curves:	$(x-a)^2 + y^2 = 1$		4
(b) Compute $S_{10}$ , $S_{\infty}$ from:	$\sum_{r=1}^n \frac{1}{r^2 + r}$		4
(c) If $f(x, y, z) = x^3 + xy^3 + yz^3$ . Find	$\frac{\partial z}{\partial x}$ , $\frac{\partial z}{\partial y}$ .		4
[4] Compute the following integrals:			12
(a)	$\int_0^1 \int_0^2 (y + 3x^2) dx dy$	(b) $\int_0^2 \int_0^x (2yx^2) dy dx$	(c) $\int_{-2}^2 \int_0^{\sqrt{4-x^2}} \frac{1}{\sqrt{x^2 + y^2}} dy dx$
(d)	$\int_{(0,0)}^{(2,4)} (x + 2y) dx + (x - y) dy$ , through the curve $y = x^2$		
[5](a) Find the first partial derivatives of the function	$f(x, y, z) = x^4 z^3 + y^2 \sin x + 3z^2$		3
(b) Verify Green's theorem for	$\oint_C (x^2 - y) dx + (x + 2y) dy$ , $C$ is $(x-1)^2 + y^2 = 1$ , $y \geq 0$		6