

الزمن: 3 ساعات

الامتحان (5) أسئلة في صفحة واحدة و المطلوب الإجابة عن كل الأسئلة

	Marks
<p>[1](a) Find <math>A + B</math> and <math> AB </math>, if possible, where <math>A = \begin{bmatrix} 1 &amp; 4 &amp; 2 \\ 0 &amp; -2 &amp; 1 \end{bmatrix}</math>, <math>B = \begin{bmatrix} 1 &amp; 1 \\ 2 &amp; 2 \\ 3 &amp; 1 \end{bmatrix}</math></p> <p>(b) Determine the interval of convergence of the series <math>\sum_{n=1}^{\infty} \frac{n}{\sqrt{n+1}} (x-2)^n</math></p> <p>(c) Using binomial theorem, find <math>\sqrt[3]{6}</math></p> <p>(d) Test the series <math>\sum_{n=1}^{\infty} \frac{n}{n^4+4}</math></p>	12
<p>[2](a) Compute <math>S_{10}</math>, <math>S_{\infty}</math> from: <math>\sum_{r=1}^n \frac{2}{r^2+3r+2}</math></p> <p>(b) If <math>z_1 = 2 + 2i</math>, <math>z_2 = i</math>. Find <math>z_1 + z_2</math>, <math>(z_1)^8</math>, <math>\sqrt[4]{z_2}</math></p> <p>(c) Determine the extrema of the function <math>f(x, y) = x^2 + y^2 - 2x + 6y</math></p> <p>(d) If <math>f(x, y) = x^3 + y^3 + xy^2</math>. Show that <math>xf_x + yf_y = 3f</math></p>	12
<p>[3](a) Find the envelope of the curves: <math>(y-c)^2 + x^2 = 9</math></p> <p>(b) Find <math>\bar{U} + \bar{V}</math>, <math>\bar{U} \cdot \bar{V}</math>, <math>\bar{U}_x \bar{V}</math> where <math>\bar{U} = i + 2j + 2k</math> and <math>\bar{V} = i - 2j + k</math></p> <p>(c) If <math>\bar{U} = (xy + z)i + (x + zy)j + (y \sin x)k</math>. Find <math>\bar{U}_x</math>, <math>\bar{U}_y</math>, <math>\bar{U}_z</math>, <math>\nabla \cdot \bar{U}</math> and <math>\nabla \times \bar{U}</math></p>	12
<p>[4] Compute the following integrals:</p> <p>(a) <math>\int_0^1 \int_0^y (12yx^2) dx dy</math></p> <p>(b) <math>\int_0^3 \int_0^{\sqrt{9-x^2}} \frac{1}{\sqrt{x^2+y^2}} dy dx</math></p> <p>(c) <math>\int_{(0,0)}^{(1,1)} (x + 2y) dx + (x - y) dy</math>, through the curve <math>x = y^3</math></p>	12
<p>[5](a) Find the first and second partial derivatives of the function <math>f(x, y) = 3x^4 + \sin(xy)</math></p> <p>(b) Verify Green's theorem for the integral <math>\oint_C (x^2 + y) dy + (x + y^2) dx</math>,</p> <p>where C is formed by: <math>y = x^3</math>, <math>y = x</math>, <math>x \geq 0</math>.</p>	4 8