Ministry Of Higher Education Higher Institute of Engineering 6th of October City Department of Basic Science



1st Level: Final Exam Mathematics: (Calculus II) Course Code, BAS 115 Date: 21 / 6 / 2010

مدينة الثقافة و العلوم

الزمن: 3 ساعات

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

[1](a)Find A + B and AB , if possible, where $A = \begin{bmatrix} 1 & 4 & 2 \\ 0 & -2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 1 \\ 2 & 2 \\ 3 & 1 \end{bmatrix}$	Marks
$\begin{bmatrix} 0 & -2 & 1 \end{bmatrix}$ $\begin{bmatrix} 3 & 1 \end{bmatrix}$	12
(b)Determine the interval of convergence of the series $\sum_{n=1}^{\infty} \frac{n}{\sqrt{n+1}} (x-2)^n$	
(c) Using binomial theorem, find $\sqrt[3]{6}$ (d) Test the series $\sum_{n=1}^{\infty} \frac{n}{n^4 + 4}$	
[2](a)Compute S_{10} , S_{∞} from: $\sum_{r=1}^{n} \frac{2}{r^2 + 3r + 2}$	12
(b) If $z_1 = 2 + 2i$, $z_2 = i$. Find $z_1 + z_2$, $(z_1)^8$, $\sqrt[4]{z_2}$	
(c)Determine the extrema of the function $f(x,y) = x^2 + y^2 - 2x + 6y$	
(d)If $f(x,y) = x^3 + y^3 + xy^2$. Show that $x_{f_x} + y_{f_y} = 3f$	
[3](a)Find the envelope of the curves: $(y-c)^2 + x^2 = 9$	12
(b) Find $\overline{U} + \overline{V}$ $\overline{U}.\overline{V}$, $\overline{U}x\overline{V}$ where $\overline{U} = i + 2j + 2k$ and $\overline{V} = i - 2j + k$	
(c)If $\overline{U} = (xy+z)i + (x+zy)j + (y\sin x)k$. Find \overline{U}_x , \overline{U}_y , \overline{U}_z , \overline{V} . \overline{U} and $\nabla x\overline{U}$	
[4]Compute the following integrals:	12
(a) $\int_{0}^{1} \int_{0}^{y} (12y_{x}^{2}) dxdy$ (b) $\int_{0}^{3} \int_{0}^{\sqrt{9-x^{2}}} \frac{1}{\sqrt{x^{2}+y^{2}}} dydx$	
(c) $\int\limits_{(0,0)}^{(1,1)} (x+2y) \; dx + (x-y) dy \; , \; \text{through the curve} \; \; x=y^3$	
[5](a) Find the first and second partial derivatives of the function $f(x,y) = 3x^4 + \sin(xy)$	4
(b) Verify Green's theorem for the integral $\oint (x^2 + y) dy + (x + y^2) dx$,	4
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Good luck

where C is formed by: $y = x^3$, y = x, $x \ge 0$.

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