

Department of Energy and Sustainable Energy Answer All questions Duration: 1 hour	Mathematics 1 Mid-Term Exam 30 Marks November 25, 2014
[1] Find the limits: (a) $\lim_{x \rightarrow 0} \frac{\tan x}{3^x - 1}$ (b) $\lim_{x \rightarrow 0} \frac{x - \sin x}{x - \tan x}$ (c) $\lim_{x \rightarrow \infty} \frac{x^2 - 2x}{3 - 2x^2}$ [2] Find y' from the following: (a) $y = 2x^3 + e^x + 2^x$ (b) $y = 2^{x^3} + \sinh x$ (c) $y = \log x \cdot \cos x^3$ (d) $y = 4 + \ln(x + \sin x)$ (e) $y = \tanh x \cdot \sec x$ (f) $y = (x + \ln x)^8$ [3](a) Determine the maximum and minimum points of : $f(x) = x + e^{-x}$ (b) Write the Maclurin's expansion of : $f(x) = x + \ln(x + 1)$ [4] Find the integrals: (a) $\int (3 + x^3 - 3^x) dx$ (b) $\int (2 \cos x + \sinh 3x) dx$ (c) $\int (x^2 - 3)^2 dx$ (d) $\int (x \cdot e^{x^2} + 4^{-x}) dx$ (e) $\int (3 \tan x + \tanh 2x) dx$ (f) $\int \left(\frac{1+2^x}{3^x}\right) dx$	

Good Luck

Dr. Mohamed Eid

Department of Energy and Sustainable Energy Answer All questions	Mathematics 1 Mid-Term Exam 20 Marks Duration: 1 hour
[1] If $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$. Find, if possible, $A + B$, $A.B$, $A.B^t$. [2] If $A = \begin{bmatrix} 2 & 3 \\ 1 & 0 \\ -2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$. Find, if possible, $A + B$, $A.B$, A, $A.B$ [3] Find the eigenvalues and the eigenvectors of of: $A = \begin{bmatrix} 2 & 3 \\ 2 & 1 \end{bmatrix}$ [4] Determine the type of solution of the linear system: $x + y + z = 2$, $x - 2y + z = 3$, $2x - y + 2z = 0$.	

Good Luck

Dr. Mohamed Eid