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

Prep. Year: Final Exam
Mathematics: (Calculus I)
Course Code, BAS 111
Date: 17 / 1 / 2008

الامتحان (5) أسئلة (درجاتها متساوية) فى صفحة واحدة و المطلوب الإجابة عن كل الأسئلة الزمن: 3 ساعات

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(1)(a)Write the membership table of the statement: $S=(A-B)\cup(B-C)$

(b)Evaluate the following limits:

(i) $\lim\limits_{x\to 0}\dfrac{x^2}{2-e^{-x}-e^{x}}$ (ii) $\lim\limits_{x\to 0}\dfrac{\sin x}{x^2+4x}$ (iii) $\lim\limits_{x\to\infty}\dfrac{x^2+x-3}{x^3+3x+2}$ (iv) $\lim\limits_{x\to 0} x^x$

(2)(a)Find y` in the following: (i) $y=2x^4+e^x.\cos x$ (ii) $y=(x^2+3)^4+\dfrac{\tan x}{1+2x}$

(iii) $y=3^x+\sin^{-1}x+(\sin x)^{-1}$ (iv) $y=3+x\ln(2x+3)$

(b) Find y` from the equation: $x^2+y^2+\cos(xy)=0$

(c) Find y` where $y = t^2+\cosh t$, $x = t + \sinh 2t$

(3)Trace the curve of each of the following functions:

(a) $f(x)=x^3-12x$ (b) $f(x)=\dfrac{2}{1+x^2}$ (c) $f(x)=\dfrac{1}{(x-1)^2}$

(4)Evaluate the integrals: (a) $\int\dfrac{x}{x^2-4x-5}\,dx$ (b) $\int\dfrac{2x}{\sqrt{1+x^2}}\,dx$ (c) $\int\dfrac{2}{x+x\ln x}\,dx$

(d) $\int x\sin x\,dx$ (e) $\int[2+\cos x]^2\,dx$ (f) $\int_0^1[x^2+2]^2\,dx$

(5)(a)Evaluate the integral: $\int_2^5\dfrac{\ln x}{x+1}\,dx$, using trapezoidal rule, with $\Delta = 0.5$

(b)Find the area of the region between the curve $y=\dfrac{1}{1+e^x}$, x- axis, $x\in[0,\ 1]$

(c)Evaluate the volume of the solid generated by revolving the region bounded by the curve $y=1+e^x$, x-axis and $x\in[1,\ 2]$ about x-axis.

Good Luck Dr. Mohamed H. Eid