



University of Technology
Building and Construction Eng. Dept.
Final Exam -2010/2011

Subject : Mathematics I
Branch : All Branches

Class: 1st stage
Time : 3 Hours



ملاحظات 1- الاجابة على ثمانية اسئلة فقط 2- توزع الدرجة الكلية على الاسئلة بالتساوي

Q.1 Find the area bounded by the curve
 $y = x^2 - 2x$ and the line $y = x$.

Q.2 A.) Find det. A if

$$A = \begin{vmatrix} 1 & 2 & -1 & 0 \\ 2 & 6 & -3 & 0 \\ 4 & -1 & -2 & 3 \\ 0 & 1 & 1 & 0 \end{vmatrix}$$

B.) Find $\int_0^{\ln 4} e^x \sinh x \, dx$

Q.3 Find $\int \frac{dx}{x^2 - 2x - 3}$

Q.4 Find $\int x \ln(5 - x) \, dx$

Q.5 Answer the following:

A.) Given the complex number $Z = -8i$, find the three cubic roots of Z

B.) Given $Z = \frac{3+2i}{\frac{1}{2}(1+i)^2}$ find Real of (Z) and Imaginary of (Z) .

Q.6 A.) Using vectors show that the triangle ABC is right at A if
 $A(1,2,0)$, $B(3,0,1)$ and $C(2,2,-2)$.

B.) Find the value of K that makes $f(x)$ continuous at $x=5$

$$f(x) = \begin{cases} \frac{x^2 - 25}{x - 5} & \text{when } x \neq 5 \\ K & \text{when } x = 5 \end{cases}$$

Q.7 A.) find $\int \frac{\sin x \, dx}{\sqrt{1 + \cos^2 x}}$

B.) find the domain only for $y^2 + x^2 - 2x - 3 = 0$

Q.8 Graph and find the domain and range for $y = \sin^2(x) - 3$

Q.9 A.) find $\int \frac{\ln(x^2+x) - \ln x + e^{\ln 4}}{e^{\ln(x+1)}} \, dx$

B.) if $y = \tan^{-1} \frac{x-2}{x+2}$ show that $\frac{dy}{dx} = \frac{2}{x^2+4}$

Q.10 A.) Find the equation of the lines tangent to the curve
 $y = x^3 + x$, where the slope is equal to 4.

B.) find $\frac{dy}{dx}$ if $y^{x^2} = x^{x^x}$.