ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD
(Department of Mathematics & Statistics)

Course: Mathematics for Computing-I (3401)

Level: BS (CS)   **Semester: Autumn, 2013**
Total Marks: 100   **Pass Marks: 50**

ASSIGNMENT No. 1
(Units 1–3)

All questions carry equal marks.

Q.1   a.   Solve the inequality and sketch the solution on a co-ordinate line $x^2 - 3x + 2 \geq 0$.

     b.   For what value of P, the point (P, 4) lies on the line which passes through the points (1, 5) and (2, -3).

Q.2   a.   Determine whether the following lines are parallel, perpendicular or none $Ax + By + C = 0, \quad Bx + Ay + D = 1$.

     b.   Identify the conic represented by $x^2 + y^2 + 2x - 4y = 4$.

Q.3   a.   Find the domain and range of the function $f(x) = \frac{1}{1-\sin x}$.

     b.   Show that the functions $f(x) = x + 1$ and $g(x) = \frac{1}{x}$ satisfy $fog(x) = gof(x)$.

Q.4   a.   Classify the following functions as even, odd or none:
   i. $f(x) = x^2 - 4$ ii. $f(x) = \sin^3 x$

     b.   Evaluate the following limits;
   i. $\lim_{x \to 4} \frac{3-x}{x^2-2x-8}$ ii. $\lim_{x \to \infty} \frac{2x-1}{5x+1}$

Q.5 Find the derivatives of the following functions:

i. $f(x) = \frac{2x-1}{5x+1}$

ii. $g(t) = t^2 tan2t$

iii. $h(x) = \left(x - \frac{1}{x}\right)^2$

iv. $f(x) = \frac{x}{x^2+7}$

ASSIGNMENT No. 2
(Units 4–7)

Total Marks: 100   **Pass Marks: 50**

All questions carry equal marks.

Q.1 a. Locate the relative extrema for the function $f(x) = x^4 - 2x^2 + 5$

b. At a certain instant each edge of a cube is 5cm long and its volume is increasing at a rate of $2cm^3/minute$. How fast is the surface area of the cube increasing?

Q.2 a. Find the approximate solution using Newton Method for the function.
$f(x) = 2x^2 + 4x - 3 = 0$, $x < 0$

b. Verify Rolle's Theorem for the function $f(x) = cosx$, on $\left[\frac{\pi}{2}, \frac{3\pi}{2}\right]$

Q.3 a. Evaluate the integral by substitution method $\int \frac{sin\sqrt{x}}{\sqrt{x}} dx$

b. State and prove the First Fundamental Theorem of Calculus.

Q.4 a. Determine the area enclosed by the curves $y = x$, $y = 4x$, $y = -x + 2$

b. Find the volume of the solid generated when the region enclosed by $y = sinx$ and $y = 0, 0 \le x \le \pi$, is revolved about y-axis.

Q.5 a. Evaluate the following limit $\lim_{x \to 0}(1 + x)^{\frac{1}{x}}$

b. Find $\frac{dy}{dx}$ when
   i. $y = \ln(x^2 sinx)$ ii. $y = e^{x^2 sinx}$