THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following: (10x3=30)

i)   Determine whether the given function is even or odd $f(x) = x^{1/3} + 6$

ii)   Sketch $y = x^2 + 1$, $for\ -3 \le x \le 3$

iii)   Define implicit and explicit functions.

iv)   Evaluate $\lim_{x \to 0} \dfrac{Sin\ px}{Sin\ qx}$

v)   Differentiate $\sqrt{\dfrac{1-x}{1+x}}$ $w.r.t.\ x$

vi)   Evaluate $\lim_{x \to 0} \dfrac{\sqrt{x} - \sqrt{2}}{x - 2}$

vii)   Differentiate $\dfrac{(1 + \sqrt{x})(x - x^{3/2})}{\sqrt{x}}$ $w.r.t.x$

viii)   Solve $\int \sqrt{1 - Cos2x}\ dx$

ix)   Solve $\int \dfrac{e^x}{e^x + 3}\ dx$

x)   Solve $\int \dfrac{ax + b}{ax^2 + 2bx + c}\ dx$

Q.2. Solve the following: (3x10=30)

i)   (a) Find the value of k if $f(x) = \begin{cases} \dfrac{\sqrt{2x+5} - \sqrt{x+7}}{x-2} & ,\ x \ne 2 \\ k & ,\ x = 2 \end{cases}$ is continuous at $x=2$.

   (b) Prove that $\lim_{x \to \theta} \dfrac{Sin\ \theta}{\theta} = 1$

ii)   (a) Differentiate by definition $y = x^n$

   (b) Integrate $\int \dfrac{dx}{\sqrt{a^2 - x^2}}$ using suitable substitution

iii)   (a) If $y = x^4 + 2x^2 + 2$ then show that $\dfrac{dy}{dx} = 4x\sqrt{y - 1}$

   (b) Solve $\int x\ lnx\ dx$ using integration By Part.