UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program : Third Semester - Spring

Paper: Elementary Mathematics-II (Calculus)

Course Code: MATH-211

Roll No.

Time: 3 Hrs. Marks: 60

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Solve the following:

(6x5=30)

(i) Find the domain and range of the function $f: \mathbb{R} \to \mathbb{R}$ where

$$f(x)=\frac{1}{\sqrt{4-x^2}}.$$

(ii) Differentiate w.r.t.x if

$$y=x^2\sin^2(2x^2).$$

(iii) Evaluate the integral:

$$\int x\cos(x)\,dx$$

(iv) Evaluate the integral:

$$\int \frac{\cos(t)}{3 + \cos(t)} \, dt.$$

(v) Find $\frac{dy}{dx}$, if

$$y^3 + x^3 - 9xy = 0.$$

(vi) Evaluate the indicated limit:

$$\lim_{x\to 0}\frac{\tan(3x)}{\sin(8x)}$$

Q.2. Solve the following:

(3x10=30)

(i) Find
$$\frac{dy}{dx}$$
 if $y = \sin\left(\arctan\left(\frac{x}{\sqrt{x^2 + 1}}\right)\right)$

- (ii) Evaluate $\int e^x \sin(3x) dx$
- (iii) For what value of m the following function is continous at x = 3.

$$f(x) = \begin{cases} x^2 - 1, & x \le 3\\ 2ax, & x > 3 \end{cases}$$