編號： 282 **國立成功大學104學年度碩士班招生考試試題**

系所組別：交通管理科學系乙、丙組

考試科目：微積分 考試日期：0212，節次：2

※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

計算題：每題 10 分，合計 100 分

1. Evaluate $\lim_{x\to 3}\dfrac{x}{x-3}\cdot\int_3^x \dfrac{\sin t}{t}dt$

2. Find the values of the constants a and b such that $\lim_{x\to 0}\dfrac{\sqrt{ax+b}-1}{x}=\dfrac{5}{3}$.

3. For what values of the constans a and b is (1,3) a point of inflection of the curve $y=ax^3+bx^2$.

4. Evaluate $\int \dfrac{dx}{\sqrt{1-e^{-2x}}}$

5. Evaluate $\int_0^1\int_{\sqrt{y}}^1 \dfrac{ye^{x^2}}{x^3}dxdy$

6. Evaluate $\int_1^\infty \dfrac{\tan^{-1}x}{x^2}dx$ or show that it is divergent.

7. Find the absolute maximun and minimun values of the function

$$f(x,y)=4xy^2-x^2y^2-xy^3$$

on the set D the closed triangular region in xy-plane with vertices (0,0),(0,4) and (4,0).

8. Find a power series representation for the function $f(x)=x^2\cdot\tan^{-1}(x^3)$ and determine the interval of convergence.

9. Let R be the region in the first quadrant bounded by the curve $y=x^3$ and $y=2x-x^2$. Find the volume obtained by rotating R about the y-axis.

10. Find the area of the region that lies inside the cardioid $r=1+\cos\theta$ and outside the circle $r=3\cos\theta$.