國立高雄師範大學 114 學年度暑假轉學生招生考試試題

系所別：電機工程學系二年級

科　目：微積分（全一頁）

※注意：1. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上，於本試題上作答者，不予計分。
2. 限用藍色或黑色之筆作答，以其他顏色作答者不予計分。

1. Calculate $\int_0^{\pi/2} sin^3 x cos^2 x dx$. (10 points)

2. $y = \frac{e^{2x} tanx}{\sqrt{x^2+1}}$, calculate $\frac{dy}{dx}$. (10 points)

3. Use Euler's formula to calculate $\sum_{n=0}^{\infty} \frac{cos(n\theta)}{2^n}$. (15 points)

4. Calculate $\iint_R e^{-(x^2+y^2)} dA$, where R is the area of the annular region enclosed by $x^2 + y^2 = 1$ and $x^2 + y^2 = 4$. (15 points)

5. Find a power series representation for $f(x) = \tan^{-1}x$ and its radius of convergence. (10 points)

6. Find parametric equations for the tangent line to the curve of intersection of the paraboloid $z = x^2 + y^2$ and the ellipsoid $4x^2 + y^2 + z^2 = 9$ at the point $(-1, 1, 2)$. (10 points)

7. Find the volume of the solid that is enclosed by the cone $z = \sqrt{x^2 + y^2}$ and the sphere $x^2 + y^2 + z^2 = 2$. (15 points)

8. Find $\iint_R cos\left(\frac{y-x}{y+x}\right) dA$ where R is the trapezoidal region with vertices (1, 0), (2, 0), (0, 2), and (0, 1). (15 points)