

# 國立屏東教育大學 101 學年度學士班轉學考試

## 微積分 試題

(應用數學系/資訊科學系/應用物理系/電腦與智慧型機器人學士學位學程)

\*注意事項：

- (1) 本試題共 1 頁，答案請「橫式」書寫，並依規定上下翻頁，否則不予計分。  
(2) 不必抄題，但請依序將題號標出，並寫在答案紙上。

1. Find  $\frac{dy}{dx}$  if  $4x^2y - 3y = x^3 - 1$ . (10%)

2. Solve  $\frac{dy}{dx} = \frac{x + 3x^2}{y^2}$ . (10%)

3. Evaluate  $\int_{-2}^5 \int_0^{3x+2} \int_y 4dzdydx$ . (10%)

4. Find the volume bounded by  $3x + 6y + 4z - 12 = 0$ ,  $xy$ -plane,  $xz$ -plane and,  $yz$ -plane. (10%)

5. Prove that  $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{3^n}{n!}$  converges absolutely. (10%)

6. Find the derivative of  $f(x) = \sin[\cos(x^2)]$ . (10%)

7. Find the equation of the tangent line to the curve  $y^3 - xy^2 + \cos xy = 2$  at the point  $(0,1)$ . (10%)

8. Find  $\int x \sin x dx$ . (10%)

9. Find  $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2 + x}$ . (10%)

10. What is the interval of convergence for  $\sum_{n=0}^{\infty} \frac{(x-1)^n}{(n+1)^2}$ . (10%)