逢甲大學101學年度碩士班招生考試試題 編號：003 科目代碼：

科目	工程數學	適用系所	機械與電腦輔助工程學系機械工程碩士班固力組、熱流組、製造組、控制組	時間	100 分鐘

※請務必在答案卷作答區內作答。

1. The velocity of an object is given by $30/\sqrt{6t+4}$ cm/sec. How far has it traveled after 2 seconds, if its initial displacement is zero? (15%)

2. Solve the integral equation (15%)

$$y(t)=t+\int_0^t y(\alpha)d\alpha+\int_0^t (t-\alpha)y(\alpha)d\alpha$$

3. Determine the general solution of the homogeneous system (20%)

$$y_1'+y_1+3y_2'=0$$

$$3y_1+y_2'+2y_2=0$$

4. Find a parametric equation for the normal line of the surface $x^2+y^2+2z^2=1$ at the point $(1,1,-1)$. (15%)

5. Use Green's theorem to evaluate $\oint_C \frac{1}{3}y^3dx+(xy+xy^2)dy$, where C is the boundary of the region in the first quadrant determined by the graphs of $y=0$, $x=y$, $x=1-y$. (20%)

6. Use Stoke's theorem to evaluate the line integral $\oint_C \vec{F}\cdot d\vec{r}$ for $\vec{F}=(x-y)\vec{i}+(y-z)\vec{j}+(z-x)\vec{k}$ and C the triangle with vertices $(1,0,0)$, $(0,1,0)$, $(0,0,1)$. Assume C is oriented counterclockwise as viewed from above. (15%)