

系別：工組三年級

科目：工程數學

可否使用計算機			
可		否	✓

本試題共 / 頁

1. Please find the *general solution* of problem (a) and (b).

(a) $y' + 3y = 8$ (20%)

(b) $(2y + e^y + 6x^2)y' + 4 + 12xy = 0$ (20%)

2. Show the differential equation is *exact or not exact*, if not exact find an *integrating factor* and *general solution* of different equation.(20%)

$$6xy + 2y + 8 + xy' = 0$$

3. Solve the initial value problem:

$$y'' + 3y' + 2y = \sin(2t), y(0) = 2, y'(0) = -1 \text{ (20\%)}$$

4. Find the eigenvalues of the matrix B and, for each eigenvalue, a corresponding eigenvector. Also check that eigenvectors associated with distinct eigenvalues are orthogonal. (20%)

$$B = \begin{bmatrix} 0 & 1 & 0 \\ 1 & -2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$