

長庚大學108學年度研究所碩士班招生考試試題

系所：光電工程研究所碩士班

考試科目：工程數學

注意：請詳細閱讀下列試題，並請標明題號依試題順序將答案書寫於答案卷上。 本試題共 | 頁：第 | 頁

以下共5題，每題 20分，合計 100分。

1. Please list two partial differential equations from the following equations:

(A)

$$\frac{\partial u}{\partial y}(x, 0) = \frac{\sin nx}{n},$$

(B)

$$Lu = \sum_{v=1}^n A_v \frac{\partial u}{\partial x_v} - B = 0,$$

(C)

$$y(x) = \frac{y_0}{(x_0 - x)y_0 + 1}$$

(D)

$$m \frac{d^2 x(t)}{dt^2} = F(x(t))$$

2. $x^2 + (x + y - 15) i = 0$, solve for $x = ?$ and $y = ?$

(Hint: $x^2 = 0$ and $x + y - 15 = 0$)

3. For the Laplace's equation $L\{y\} = \frac{2s+1}{s^2+s-6}$

Solve $y(t) = ?$ (Hint: $s^2 + s - 6 = (s+3)(s-2)$)

4. Vector $\mathbf{A} = 3i - 2j + k$, $\mathbf{B} = i + 5j - 4k$

Please evaluate $\mathbf{A} \cdot \mathbf{B}$ and $\mathbf{A} \times \mathbf{B}$

5. Which trigonometric functions have the value of 1? (Choose two answers)

(A) $\sin(\pi/4)$ (B) $\cos(\pi/4)$ (C) $\tan(\pi/4)$ (D) $\cot(\pi/4)$