亞洲大學

97學年度碩士班入學招生考試試題紙

學系別	考試科目	考試日期	時　　間
資訊工程學系碩士班 資訊科學與應用學系碩士班 資訊傳播學系碩士班A組 生物資訊學系碩士班 資訊與通訊學系碩士班	數學(A) (線性代數、離散數學)	97.4.26	10:40-12:20

1. Show that if five integers are selected from the first eight positive integers, there must be a pair of these integers with a sum equal to 9.(10%)

2. Show that $\binom{m+n}{r} = \sum_{k=o}^{r} \binom{m}{r-k}\binom{n}{k}$, where m, n, and r are nonnegative integers with $r \le m$ and $r \le n$. (10%)

3. Find the coefficient of x^7 in the power series of $x^3/(1 + 2x)$. (10%)

4. How many edges and how many leaves does a complete m-ary tree of height h have? (10%)

5. Solve the recurrence relation
   $a_n = a_{n-1} + 6a_{n-2}$ for $n \ge 2$, $a_0=3$, $a_1=6$. (10%)

6. Finding the LU-Factorization of the matrix (15%)

$$A = \begin{pmatrix} 1 & -3 & 0 \\ 0 & 1 & 3 \\ 2 & -10 & 2 \end{pmatrix}$$

7. Find a basis for the row space, a basis for the column space, and a basis for the nullspace for the following matrix. (15%)

$$\begin{pmatrix} 1 & 3 & 2 \\ 2 & 1 & 4 \\ 4 & 7 & 8 \end{pmatrix}$$

8. Find the matrix A representing the linear transformation operator on R^2 that rotates each vector by angle θ in the clockwise direction. (10%)

9. Let S be the subspace of R^3 spanned by $\mathbf{x} = (1, -1, 1)^T$. Find a basis for $S^{\perp}$. (10%)

※ 試題請隨卷繳回