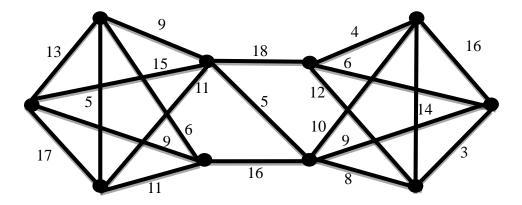# 國立嘉義大學 108 學年度
資訊工程學系碩士班招生考試試題

科目：離散數學

1. Show that for all sets S and T, $S - T = S \cap \overline{T}$ where $\overline{T}$ is the complement of T. (10 分)

2. Find a minimum cost spanning tree of the following weighted graph. (20 分)

3. A boy needs to eat breakfast and lunch, practice piano, mow the lawn, and read a book toady. In how many ways can he arrange these activities if breakfast must occur before lunch, and at least one other activity must separate the meals? (20 分)

4. Express each of the following in simplest form. (20 分)

   (A) $\sum_{i=0}^{m}\sum_{j=0}^{n}(1)$

   (B) $\prod_{i=1}^{10}(-1)^i$

   (C) $\sum_{i=1}^{n} i$

   (D) $\prod_{i=1}^{5}(-i)^{-1}$

   (E) $\sum_{i=2}^{n}\left(1 - \frac{1}{i^2}\right)$

5. Let A = {1, 3, 5} and B = {3, 4, 5} be sets. (10 分)
   (A) What is the cardinality of the power set P(A∪B)?
   (B) What is the set containing all the elements of A × B?

6. Let A = {a, b, c, d} and let R = {(a, b),(b, c),(c, d),(d, b)} be a relation on A. (10 分)
   (A) Draw the directed graph representing R.
   (B) Determine the transitive closure R* of R.

7. Find the complement of the following expressions. (10 分)
   (A) $F(x, y, z) = \overline{xy} + xy$
   (B) $F(x, y, z) = (x + y + z)(\overline{x} + \overline{y} + \overline{z})$