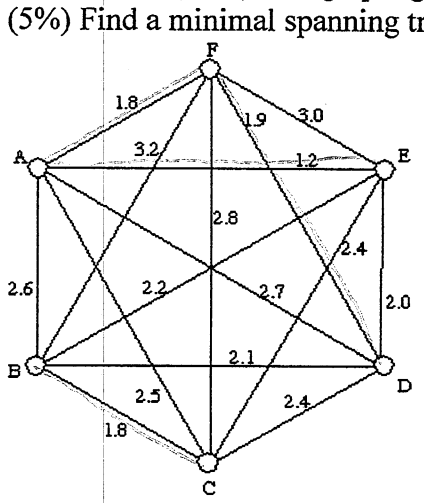
大同大學 98 學年度轉學入學考試試題

考試科目:離散數學　　所別:資訊工程學系　　

註:本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

1. (5%)
   A. Explain how to prove that a universally quantified statement is false.
   B. Explain how to prove that an existentially quantified statement is false.
2. (5%) Show that $n! \geq 2^{n-1}$ for n=1,2, …
3. (5%) List all strings over X={0,1} of length 2 or less.
4. (5%) Give an example of an antismmetric relation and an example of a relation that is not antisymmetric.
5. (5%) Find the inversve function of $f(x) = 3 \log_2 x$ where x is a real number.
6. (5%) Let X = {A, B, C, D, E}. How many strings over X of lengt 3 contain the letter A, allowing repetitions?
7. (5%) We have 50 CPUs of which four are defective. How many ways can we select a set of 4 CPUs containing at least one defective CPU?
8. (5%) Find the number of ineger solutions of x1+x2+x3=15 such that $x1 \geq 0$, $x2>0$ and $x3=1$.
9. (5%) Let G=(V, E) be a graph, give the formal definition of a subgraph G'=(V', E').
10. (5%) Find a minimal spanning tree of the following graph:



11. (10%) Regenerate the graph by the matrix shown below:

	a	*b*	*c*	*d*	*e*	*f*
a	4	1	1	1	0	2
b	1	0	1	1	1	0
c	1	1	0	1	1	3
d	1	1	1	0	1	1
e	0	1	1	1	0	1
f	2	0	3	1	1	0

12. (10%) Construct an optimal Huffman code for the set of letters in the following table.

Letter	A	B	C	D	E	F	G	H
Frequency	7	20	2	28	5	10	3	25

13. (10%) Find an explicit formula for the Fabonacci sequence, f_n, where $f_0=1$ and $f_1=1$.
14. (10%) Write a recusive postorder binary tree traversal algorithm where input BT is the binary tree to be traversed.
15. (10%) Write an algorithm that evaluates the root of a game tree using an n-level, depth-first search with alpha-beta pruning. Assume the evaluation function to be used is E and the input game tree is GT.