UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2011/2012

COURSE NAME	:	ALGORITHM ANALYSIS
COURSE CODE	:	BIT 3173/ BIT 31703
PROGRAMME	:	BACHELOR OF INFORMATION TECHNOLOGY
EXAMINATION DATE	:	JANUARY 2012
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

Instruction : Answer **ALL** questions.

Q1 (a) Show that $4 + \sum_{i=1}^{n} i \leq 5n^2$

(4 marks)

(b) Consider the algorithm,

```
1  get the positive  integer from input
2  if n > 1
3     print " the value of n is ….."
4  for i=1 to n
5     for j =1 to i
6       print  i+j
7  print "done"
```

Estimate the time complexity for the above algorithm based on step count.

(6 marks)

Q2 (a) Transform the term $\frac{n^2(n+1)^2}{4}$ into recurrence relation (recursive form).

(6 marks)

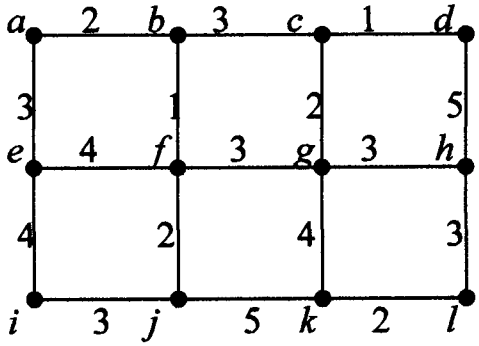
(b) Give a recursive algorithm for the term in **Q2(a)**.

(4 marks)

Q3 (a) Write a Kruskal's algorithm for minimum spanning tree (weighted graph) issue.

(4 marks)

(b) Use Kruskal's algorithm to find a minimum spanning tree in the weighted graph below.



(6 marks)

Q4 (a) Suppose that a computer can execute an operation of an algorithm in 10^{-15} seconds.

What is the largest size problems that can be solved on a such machine for different durations and running times for **Figure 1** below.

	n	n^2	n^3	2^n	n^n
1 hour					
10 hours					
100 hours					
1000 hours					

Figure 1 : The largest size problems that can be solved.

(6 marks)

(b) Convert the satisfiable statement $(A \cup B) \rightarrow (C \rightarrow D)$ into conjunctive normal form (CNF), where A,B,C and D are literals.

(4 marks)