

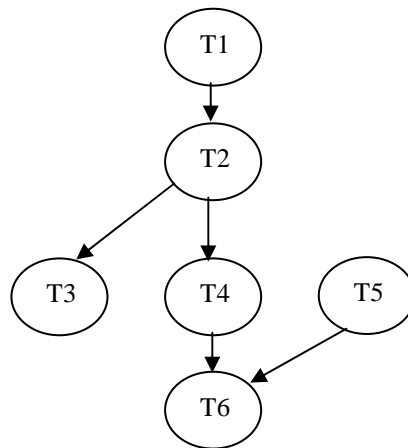
# KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

## COMPUTER ENGINEERING DEPARTMENT

### COE 308, Term 982

#### Homework #7 NOT TO BE GRADED

**Q.1.** Assume a program can be represented graphically as follows:



Where T1, T2 and T3 take 5 cycles to execute on processor X while T4, T5, and T6 take 6 cycles to execute on the same processor.

- Compute the total execution time of the program on processor X.
- Assume that you have a MIMD message-passing machine that consists of  $n$  processors X. Also assume that the communication time between any tasks in the above program is 2 cycles if they execute on different processors. Find the optimal execution time, the speedup and the efficiency of the program on the machine if  $n = 2$ . Show the corresponding schedule.
- Repeat (b) for  $n = 3$ .
- Find  $n$  such that the speedup is the highest possible.
- Find  $n$  such that the efficiency is the highest possible.

**Q.2.** Using Amdahl's theorem, compute the maximum speedup possible of a program that consists of 5% serial part (Amdahl's fraction).