Roll No:.....

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- December 2018

Vivek

M.Tech. I Semester

COURSE CODE: 10M11CI114 MAX. MARKS: 35

COURSE NAME: HIGH PERFORMANCE COMPUTER ARCHITECTURE

COURSE CREDITS: 03 MAX. TIME: 2Hr

Note: *All questions are compulsory. Each question carries equal marks. Carrying of mobile phone during examinations will be treated as case of unfair means.*

---

1. (a) In system Interconnect architecture define the followings:
   i. Node Degree and Network Diameter
   ii. Bisection Width
   iii. Data-Routing Functions
   iv. Permutation
   v. Perfect Shuffle and Exchange
   vi. Hypercube Routing Function
   vii. Broadcast and Multicast

   (b) List the Quality of services for Network Performance

2. (a) Give the summary of Static network characteristics.
   (b) Give the summary of Dynamic network characteristics.

3. A uniprocessor computer can operate in either scalar or vector mode. In vector mode. computations can be performed nine time faster than in scalar mode. A certain benchmark program took time T to run on this computer. Further. it was found that 25% of T was attributed to the vector mode. In the remaining time. The machine operated in the scalar mode.
   i. Calculate the effective speedup under the above condition as compared with the condition when the vector mode is not used at all. Also calculate α, the percentage of code that has been vectorized in the above program.
   ii. Suppose we double the speed ratio between the vector mode and the scalar mode by hardware improvements. Calculate the effective speedup that can be achieved.
   iii. Suppose the same speedup obtained in part I must be obtained by compiler improvements instead of hardware improvements. What would be the new vectorization ratio α that should be supported by the vectorizing compiler for the same benchmark program?

4. (a) Explain the Harmonic mean speedup for a multiprocessor.

(b) Explain the hypothetical workload and performance.

5. (a) What is Scaled matrix multiplication using global versus local computation models?
(b) Explain the applicability and the restrictions involved in using Amdahl's law. Gustafson 's law. and Sun and Ni's law to estimate die speedup performance of an n-processor system compared with that of a single-processor system. Ignore all communication overheads.

Unit Test-3 Examination: December 2018