

Dec 2015

Total No. of Questions : 6]

SEAT No. :

P4340

[Total No. of Pages : 2

[4860]-1308

M.E. (Computer)

**ADVANCED COMPUTER ARCHITECTURE**  
**(510103) (2013 Credit Pattern) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 50



Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume Suitable data if necessary.

Q1) a) Draw the dependence graph and analyze the various dependencies among the following statements in a given program- [5]

S1:  $A = B + D$

S2:  $C = A \times 3$

S3:  $A = A + C$

S4:  $E = A/2$

b) Distinguish between vector and array processors. State the operational model of SIMD Computer clearly specifying its tuples. [4]

OR

a) Discuss the features and performance of Interconnection Networks used in multiprocessor systems. [5]

b) State the concept of fine grain and coarse grain scheduling. How the grain size affects on the parallelism observed in multiprocessor systems? [4]

Q2) a) Compare the SIMD architecture with MIMD. Comment on the performance of both w.r.t. parallel processing. [4]

b) Derive the Amdahl's law for speedup performance. Comment on the major observations and conclusions drawn w.r.t. the speedup obtained. [4]

OR

a) Define the term Degree of Parallelism (DOP). Describe Average Parallelism in terms of DOP. [4]

b) What is principle of Scalability? How the terms Speedup and Efficiency w.r.t. scalability reflect the performance of parallel computer systems? [4]

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$\frac{t_s}{t_s + (t_p/n)}$

- ✓ Q3) a) Explain Two virtual memory models used with multiprocessor systems. [4]  
b) Discuss the important features of Superscalar processor architectures. What do you mean by k-issue processor? [4]

OR

- ✓ 4 a) State the 4-level memory hierarchy defined for a computer system. How the data transfer takes place between adjacent levels of a memory hierarchy? [4]  
2 b) Explain in brief, the use of Reservation stations and Hardware scoreboarding for dynamic instruction scheduling in pipeline processors. [4]

- ✓ Q4) a) What are multi-threaded architectures? Discuss the various performance parameters of multi-threaded processor architectures. [4]  
3 b) Explain the hierarchical cache/bus architecture used for designing a scalable multiprocessor system. [4]

OR

- a) Discuss and compare between store-and-forward routing and wormhole message routing schemes. [4]  
b) Explain in brief the concept of vector chaining and vector looping implemented in Cray architecture. [4]

- ✓ Q5) a) With example explain shared memory parallel programming model. What is the use of synchronization primitives? [4]  
3 b) Explain the features of C-Linda. State and define different Linda primitives. [4]

OR

- a) State and explain different collective communication functions designed for MPI. [4]  
b) Discuss with example any Three optimizing/Vectorizing functions designed for optimizing compilers. [4]

- ✓ Q6) a) Compare between grid and cloud computing. What is cloud middleware? [5]  
b) Discuss important features of Neural Networks. How Neural Networks architectures can be used for distributed parallel computing? [4]

OR

- ✓ 4 a) With block diagram, explain the architecture of grid computing model. [5]  
3 b) Explain different services offered by Cloud. What is the difference between public and private cloud? [4]

