Total No. of Questions : 12]

SEAT No. :

[Total No. of Pages : 4

P3143

B.E. (Semester - II)
COMPUTER
Advanced Computer Architecture
(2008 Pattern)

Time : 3 Hours] *[Max. Marks : 100*

Instructions to the candidates:

1) ***Answers to the two sections should be written in separate answer books.***
2) ***Answer any three questions from each section.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of Calculator is allowed.***
6) ***Assume suitable data if necessary.***

SECTION - I

Q1) a) What do you mean by Coarse grain parallelism and Fine grain parallelism? With examples of each category, explain how Multitasking OS achieves parallelism? **[10]**

b) Prove that 'n' stage pipeline processor can be at most 'n' times faster than a corresponding non-pipelined serial processor. **[8]**

OR

Q2) a) Discuss the different ways of classifying the parallel computing systems. **[10]**

b) State and explain Explicitly Parallel Instruction computing (EPIC) Features. **[8]**

P.T.O.

Q3) a) Consider the following pipe line reservation table : **[10]**

	0	1	2	3	4	5	6
S1	X		X				X
S2				X		X	
S3			X		X		

i) Determine latencies in the forbidden list F and Collision vector C.

ii) Draw the state transition diagram.

iii) List all simple cycles and greedy cycles.

iv) Determine minimum constant latency and minimum average latency.

v) Let the pipeline clock period be $\tau = 20$ ns. Determine the maximum throughput of the pipeline.

b) Explain the following terms with respect to pipeline processors . **[6]**

i) Hazards

ii) Internal Forwarding

OR

Q4) a) With the help of suitable flowchart / diagram explain in detail branch prediction logic implemented in Pentium architecture. **[8]**

b) What is meant by pipeline, superscalar and super pipeline processor? What are the various factors placing constraints on new start of pipeline processes? **[8]**

Q5) a) With suitable example, discuss the efficiency of vector processing over scalar processing. **[8]**

b) Draw a 3-cube n/w as multistage network. State and obtain the permutation cycles for all the routing functions. **[8]**

OR

Q6) a) Discuss characteristics of vector processors. Explain implementation of following loop in conventional scalar processor and vector processor. **[8]**

```
DO  100          I = l, N

        A (I) = B(I) + C(I)

100  B(I) = 2*A(I+1)
```

b) Explain following pipelined vector processing methods with respect to vector summation computation. **[8]**

i) Vertical Processing

ii) Vector Looping

How intermediate results are handled in both the cases?

SECTION - II

Q7) a) What are the cache write policies used for cache updating? With state diagram explain the Write Once cache coherency protocol. **[9]**

b) List different dynamic priority arbitration algorithms used in bus based multi- processor systems and discuss any 2 such algorithms in brief. **[9]**

OR

Q8) a) Compare the shared memory system architecture with distributed systems. What are the desirable processor characteristics used in multi-processor systems? **[9]**

b) With neat diagram explain the design of crossbar switch. Compare the crossbar switch Interconnection Network with multi-ported memory model. **[9]**

Q9) a) What are multi-threaded architectures? Discuss the various performance parameters of multi-threaded processor architectures. **[8]**

b) Compare between synchronous and asynchronous message passing. **[8]**

OR

Q10) a) What is latency hiding? Explain any Two methods used for Latency Hiding in multi-threaded architectures. **[8]**

b) With example explain message passing parallel programming. What is SPMD Programming? **[8]**

Q11) a) Explain following communication functions used in MPI **[8]**

i) MPI_Scatter( )

ii) MPI_Gather( )

iii) MPI_Bcast( )

iv) MPI_Allgather( )

b) With standard functions discuss how message passing is facilitated in PVM. **[8]**

OR

Q12) a) With standard constructs discuss the important features of CCC parallel programming language. **[8]**

b) Compare between synchronous and Asynchronous parallel algorithms for multiprocessor systems and discuss standard primitives used. **[8]**