2017

M.Sc.

1st Semester Examination

COMPUTER SCIENCE

PAPER—COS-102

Subject Code—26

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

(Advanced Computer Architecture)

Answer any *four* questions.   4×10

1. Consider the reservation table of a three stage pipeline processor.

— time →

Stage		1	2	3	4	5	6	7	8
	S_1	×					×		×
	S_2		×		×				
	S_3			×		×		×	

(Turn Over)

(a) List forbidden and non-forbidden latencies.

(b) Construct collision vector.

(c) Draw state diagram.

(d) List all simple and greedy cycles.

(e) Calculate MAL.   2+4+3+1

2. (a) Explain control hazard with an example.

   (b) Explain a technique to reduce control hazard.

   (c) Compare WAR, RAW and WAW data hazards.

                                                     2+3+5

3. (a) Define speed up ratio, efficiency and through put of a K stage pipeline.

   (b) Calculate the maximum efficiency of a K stage pipeline.

   (c) The time delays of a 4-stage pipeline are 60 ns, 70 ns, 90 ns and 80 ns. The latch delay is 10 ns. Determine clock period and frequency of the pipeline.

                                                     3+3+4

4. (a) Explain inclusion property of memory hierarchy.

   (b) Distinguish write-through and write-back policy to maintain coherence property of memory hierarchy.

   (c) Consider a three level memory hierarchy $(M_1 - M_3)$ with effective access time 10.04 μs as shown below :

Memory level	Access time	Hit ratio
M_1 (Cache)	$t_1 = 25$ ns	$h_1 = 0.98$
M_2 (Main Memory)	$t_2 = ?$	$h_2 = 0.9$
M_3 (Disk)	$t_3 = 4$ ms	

   Find out the access time of M_2 (i.e t_2)

5. (a) Compare NUMA and COMA model of multiprocessor.

   (b) Draw and explain UMA model of multiprocessor system.

   (c) Discuss snoopy protocol of multiprocessor.

                                                        3+4+3

6. Answer any *two* questions :   2 × 5

(a) RISC ;

(b) Carry lookahead adder ;

(c) Locality of reference ;

(d) Structural hazard.

[Internal Assessment — 10 Marks]

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