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TCS-802

B. Tech. (CSE) (Eighth Semester)
Mid Semester EXAMINATION, June, 2017
ADVANCED COMPUTER ARCHITECTURE

Time : Two Hours]

[Maximum Marks : 60

Note : (i) This question paper contains *three* questions with alternative choice.

(ii) All questions are compulsory.

(iii) Each question carries four Parts (a), (b), (c) and (d). Attempt either Parts (a) and (b) *or* (c) and (d) of each question.

(iv) Each Part carries **ten** marks. Total marks assigned to each question are **twenty**.

1. (a) Discuss Flynn's Taxonomy of computer architecture. 10

(b) How are CISC processors different from RISC processors ? 10

Or

(c) State Amdahl's law and explain the concept of overall speed up. 10

(d) Suppose that we want to enhance the processor used for web serving. The new

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processor is 10 times faster on computation in the web serving application than the original processor. Assuming that the original processor is busy with computation 40% of the time and is waiting for I/O 60% of the time. What is the overall speedup gained by incorporating the enhancement ? 10

2. (a) What is Data Hazard in pipelining and how to handle it ? Explain with an example. 10
- (b) The delays of various pipeline stages required in a processor to execute instructions are shown below :

Stage	Symbol	Delay
Instruction Fetch	IF	10 ns
Decode	ID	6 ns
ALU Operation	EX	8 ns
Data Memory Read/Write	M	10 ns
Register File Write	WB	4 ns

If the latch delay is 2 ns, ignoring other pipeline overheads, compute the pipeline Speedup and Throughput with respect to non-pipelined processor. 10

Or

- (c) What do you know about RAW and WAW hazards in pipelining concept ? 10

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(d) Answer the following :

(i) Discuss Shore's classification on Computer Architecture. 5

(ii) Discuss the WAR hazard in pipelining. 5

3. (a) Discuss conditional and unconditional branch hazards in pipelining with an example. 10

(b) Justify the statement - for a pipelining processor with number of stages = k , the maximum speed-up can be ' k ' (with expressions). 10

Or

(c) What is 'Instruction pipelining' ? Explain these terms in pipelining concepts : speed-up, throughput and efficiency. 10

(d) Consider a 4-stage pipeline with below mentioned data (I = instructions, S = resource/stages) : [Times are in ns]

	S1	S2	S3	S4
I1	2	3	2	1
I2	1	2	1	2
I3	2	2	3	2
I4	1	2	2	1

(i) How much time is required to complete the execution of these instructions ? 5

(ii) Calculate the Speed-Up, efficiency and throughput. 5

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