Reg. No.:

Name :

VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test I – May 2023

Programme	:	**B.Tech (ECM)**	Semester	:	**Fall Inter 2022-23**
Course	:	**Computer Architecture and Organization**	Code	:	**BCSE205L**
			Slot	:	**A2+TA2**
Faculty	:	**Dr. Sindhuja M**	Class Nbr.	:	**CH2022232500336**
		Dr. Sunil Kumar Pradhan			**CH2022232500337**
		Dr. Balakrishnan R			**CH2022232500338**
		Mr. Ajeyprasaath Kb			**CH2022232500340**
Time	:	**90 Minutes**	Max. Marks	:	**50**

Answer ALL the questions

Q.No.	Sub. Sec.	Questions	Marks
1.	(a)	Explain the internal structure of an IAS computer using a neat diagram.	5
	(b)	Suppose for an implementation of a **RISC ISA** there are 4 instruction types, with their frequency of occurrence and CPI as shown	5

Type	Frequency	CPI
LOAD	20%	4
STORE	8%	3
ALU	60%	1
BRANCH	12%	2

Calculate average CPI.

2.	(a)	Tabulate the difference between RISC and CISC Architectures.	5
	(b)	Draw the block diagram of the Harvard architecture and explain why is Harvard architecture faster than Von Neumann?	5

(a) Draw the flow chart of booth's algorithm.

(b) Show the steps of multiplication performed by using booth's algorithm of (-12) x (4)

3. (c) Draw the flow chart of restoring division algorithm **10**

(d) Divide the following binary format positive numbers using the restoring division algorithm: A= 10101, B= 000011, and verify your answer by converting A and B and your result (A / B) to decimal.

4. What are the advantages of hardwired control unit? Describe the design of hardwired control unit of CPU, with diagram. **10**

Let's consider three different processors P1, P2 and P3 and they execute the same instruction set. P1 processor has 3GHz clock rate and a CPI (Cycles Per Instructions) of 1.5, P2 processor has a clock rate of 2.5 GHz and a CPI of 1.0 and P3 processor has 4.0 GHz clock rate and has a CPI of 2.2.

(a) Which processor has the highest performance expressed in instructions per second?

5. **10**

(b) If the processors each execute a program in 10 seconds, find the number of cycles and the number of instructions?

(c) Let's consider a situation, where the execution time is reduced by 30%, which result an increase of 20% in the CPI. What clock rate should we have to get this time reduction?

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