

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Questions: 09]

[Total No. of Pages: 02]

Uni. Roll No.

Program: B.Tech. (Scheme 2018)
Semester: 3rd
Name of Subject: Computer Architecture
Subject Code: PCEC-105
Paper ID: 16035
Scientific calculator is not allowed

MORNING

19 JUN 2023

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice.
- 3) Any missing data may be assumed appropriately.

Part – A

[Marks: 02 each]

Q1.

- a) List the four main components of any general-purpose computer.
- b) Define 'Amdahl's law'.
- c) Cite two differences between computer architecture and computer organization.
- d) Describe briefly the process of 'scheduling'.
- e) Justify why MFLOPS is better than MIPS.
- f) Discuss the advantages of parallel decoding in computer architecture.

Part – B

[Marks: 04 each]

- Q2. Discuss in detail the 'bus structure' with the aid of diagram.
- Q3. Describe briefly the term 'interrupts'. Discuss its classes.
- Q4. Explain the 'Fetch-Decode-Execute' cycle.
- Q5. Explain how 'pipelining' improves performance in computer architecture.
- Q6. Compare the architectures: "RISC" and "CISC".
- Q7. Consider the execution of a program that result in the execution of 2 million instructions on a 400-MHz processor. The program consists of four major types of instructions. The instruction mix and the CPI for each instruction type are given below, based on the result

of a program trace experiment. Determine the effective CPI, MIPS Rate and execution time for the machine.

MORNING
19 JUN 2023

| Instruction Type | Instruction Count (Millions) | Cycles Per Instruction |
|----------------------------------|------------------------------|------------------------|
| Arithmetic and logic | 1 | 60% |
| Load/store with cache hit | 2 | 18% |
| Branch | 4 | 12% |
| Memory reference with cache miss | 8 | 10% |

Part – C

[Marks: 12 each]

Q8. With the aid of neat sketch, discuss in detail the memory structure and organization of cache memory.

OR

- Describe the three principal constituents of a computer system at the integrated circuit level.
- Elaborate on 'Flynn's taxonomy in computer architecture'

Q9. Describe briefly the concept of operating system. Explain in detail the different types.

OR

- Consider a dynamic RAM that must be given a refresh cycle 64 times per ms. Each refresh operation requires 150ns; a memory cycle requires 250ns. Compute the percentage of the memory's total operating time that must be given to refreshes.
- Explain in detail the different Multicore Organizations.
