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Roll No. \_\_\_\_\_

FOURTH SEMESTER

**B.Tech. (MC)**

**MID SEMESTER EXAMINATION**

**March-2019**

**MC206 COMPUTER ORGANIZATION & ARCHITECTURE**

**Time: 1:30 Hours**

**Max. Marks: 25**

**Note: Answer ALL questions. Assume suitable missing data, if any.**

1. Answer all the following questions:

[2x5 marks]

- [a] Differentiate between Sequential and Combinational circuits.
- [b] What are the types of Microoperations? Explain with the help of an example.
- [c] Perform arithmetic shift right on 00110101 and arithmetic shift left on 00010111.
- [d] Explain the type of instruction formats in CPU.
- [e] Multiply (+6) and (+2) using Booth's algorithm for Multiplication using a 4-bit register.

2.

- [a] What is a System Bus? Illustrate and explain different types of Multiple Bus Architectures. [3 marks]
- [b] Consider a system that can instruction set of size 12, i.e., the system can support 12 different types of instructions. The CPU has 64 registers. Each instruction format has five distinct fields: namely opcode, two fields for source register, one field for destination register, and 12-bit field for the address. Each instruction must be stored in memory. If a program contains 100 instructions, then what is the amount of memory (in bits) consumed by the program? [4 marks]

**P.T.O.**

3.

[a] Consider the following segment used to execute on a 40 MHz clock cycle processor. Program consists of 10,000 instructions as shown below:

Instruction Type	Instruction Count	Cycles per Instruction
Integer arithmetic	45,000	1
Data transfer	32,000	2
Floating point	15,000	2
Control transfer	8000	2

Evaluate program's effective CPI, MIPS rate and execution time.

[4 marks]

[b] What is Amdahl's Law? Define Speedup. Consider a hypothetical processor used in the scientific application area. Suppose the cache memory is 10 times faster than main memory and it is referenced by the CPU 70% of the time. How much performance do we gain using this cache?

[4 marks]

**END**