

Paper Id: 130502Roll No:

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B.TECH
(SEM V) THEORY EXAMINATION 2019-20
COMPUTER ARCHITECTURE AND ORGANIZATION

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14
- a. A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with Multiplexers. What size of multiplexers is needed?
 - b. What is a cache memory?
 - c. What is instruction cycle?
 - d. Discuss floating point number representation.
 - e. Explain concept of memory transfer.
 - f. What is meant by synchronous and asynchronous communication?
 - g. Describe magnetic disk?



SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21
- a. A computer employs RAM chips of 256 x 8 and ROM chips of 1024 x 8. The computer system needs 2K bytes of RAM, 4K bytes of ROM, and four interface units, each with four registers. A memory-mapped I/Configuration is used. The two highest-order bits of the address bus are assigned 00 for RAM, 01 for ROM, 10 for interface registers.
 - (i) How many RAM and ROM chips are needed?
 - (ii) Draw a memory-address map for the system.
 - (iii) Give the address range in hexadecimal for RAM, ROM, and interface.
 - b. Describe the following organizations of cache memory:
 - (i). Associative mapping (ii). Direct Mapping (iii). Set associative mapping
 - c. What are the advantages of assembly language? How is it different from high-level language?
 - d. Discuss control word with suitable example.
 - e. Explain DMA transfer in detail with the help of diagram.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7
- (a) Discuss Booth's algorithm. Multiply (-7) and (3) using Booth's algorithm.
 - (b) Design a digital circuits that perform four logic operations exclusive-OR, exclusive-NOR, NOR and NAND. Use two selection variables. Show logic diagram of one typical stage?
4. Attempt any *one* part of the following: 7 x 1 = 7
- (a) Discuss stack organization. Explain the following in details.
 - (i) Register stack (ii) Memory stack
 - (b) What is Virtual Memory? Why is it necessary to implement virtual memory? What is use of page replacement algorithm?

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5. Attempt any *one* part of the following: 7 x 1 = 7
- (a) Write a program to evaluate arithmetic expression $X = (A - B) * (((C - D) / F) / G)$ Using a general register computer with three, two, one & zero address instructions.
- (b) What are various addressing modes? Explain any five with help of suitable example.
6. Attempt any *one* part of the following: 7 x 1 = 7
- (a) Explain General Register Organization with the help of suitable diagram.
- (b) What is interrupt? What are the different types of interrupts?
7. Attempt any *one* part of the following: 7 x 1 = 7
- (a) Explain two ways for establishing priority of interrupt by multiple devices.
- (b) Write short notes of the followings :
- I. Isolated Vs memory mapped I/O
 - II. RISC architecture



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