

Code No: R7310402

III B.Tech I Semester(R07) Regular & Supplementary Examinations, November 2010
COMPUTER ORGANIZATION
(Common to Electronics & Communications Engineering, Electronics & Control Engineering
and Electronics & Instrumentation Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

1. What is a digital computer? Explain various types of computers? What are various components and it's functioning.
2. (a) Show the block diagram of the hardware that implements the following register transfer statement. $T2:R2 \leftarrow R1, R1 \leftarrow R2$.
(b) Explain about register transfer language.
3. How can you study the control unit of a processor? What are the methods? Explain in detail.
4. What is Multiplication algorithm? Explain with example?
5. (a) Write a note on memory hierarchy.
(b) Consider a cache consisting of 256 blocks of 8 words each, for a total of 2048 words, and assume that the main memory is addressable by a 16-bit address. The main memory has 64K words which are divided into 8192 blocks of 8 words each. Find the number of bits in Tag, Block and Word field of the main memory address for direct mapping scheme.
6. (a) Describe in brief the different modes by which data transfer can take place between a computer unit and its I/O devices. What is the difference between synchronous and asynchronous data transfer?
(b) What are peripheral devices? Give a note on video monitors.
7. A floating point multiplier is described to you as "implemented as a 4-stage pipeline".
 - (a) What does the term "4-stage pipeline" mean?
 - (b) What is the advantage of pipeline?
 - (c) Derive an expression to quantify the advantage for an n stage pipeline, where all stages involve the same delay.
8. (a) Explain the characteristics of Multiprocessors.
(b) Explain how synchronization is achieved in multiprocessor systems.

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1. Differentiate between:
 - (a) What are functional units? Discuss in detail about basic functional units of a computer?
 - (b) Explain various types of computers.
2. Explain the bus system by using 4*1 multiplexers and also explain the functioning of the bus system.
3. Explain about basic instruction cycle. What are the different phases in it. Draw flow chart.
4.
 - (a) Draw a flow chart for Multiplication algorithm.?
 - (b) How many types a number in fixed-point be represented? Explain
5.
 - (a) Describe the various types of semiconductor memories.
 - (b) What is virtual memory? What is the relation between address and memory space in a virtual memory system? Explain with the help of example.
6.
 - (a) "With the help of a DMA controller large blocks of data can be transferred at the high speed between an external device and main memory." Discuss in detail.
 - (b) What are the major differences between the central computer and peripherals?
7.
 - (a) Define in your terms the following:
 - i. Parallel processing
 - ii. Pipeline processing
 - (b) In certain scientific computations it is necessary to perform the arithmetic operation $(A_i + B_i)(C_i + D_i)$ with a stream of numbers. Specify a pipeline configuration to carry out this task. List the contents of all the registers in the pipeline for $i = 1$ through 6.
8. Compare and contrast
 - (a) Multiprocessors and multicomputer systems.
 - (b) Tightly coupled and loosely coupled multiprocessors
 - (c) Synchronous and asynchronous bus
 - (d) Static and dynamic bus arbitration

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1. What are functional units? Discuss in detail about basic functional units of a computer?
2. (a) Let p is the control function, if $p=1$ then $p = R2 \leftarrow R1$ else transfer does not occur. Explain in detail using registers.
(b) Explain about the symbolic notation used to describe the micro operations.
3. (a) Draw flow chart of instruction cycle.
(b) Draw flow chart of single bus organization processor.
4. By using Step-by-step procedure of multiplication algorithm perform (unsigned) $7*6$?
5. (a) Explain the possible operating modes of integrated circuit RAM chips.
(b) A computer employs RAM chips of 256×8 and ROM chips of 1024×8 . The computer system needs 2K bytes of RAM, 4K bytes of ROM, and four interface units, each with four registers. A memory-mapped I/O configuration is used. The two highest-order bits of the address bus are assigned 00 for RAM, 01 for ROM, and 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.
6. (a) With a neat diagram explain the connection of I/O bus to I/O devices.
(b) Explain each of the following:
 - i. Nonmaskable Interrupt
 - ii. Interrupt vector
 - iii. Interrupt handler
 - iv. Cycle stealing
 - v. Polling
7. (a) Differentiate between parallel processing and pipeline processing with suitable examples.
(b) Explain four possible hardware schemes that can be used in an instruction pipeline in order to minimize the performance degradation caused by instruction branching?
8. (a) How does multiprocessing improves the reliability of the system?
(b) Discuss Interprocessor arbitration.

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1. Differentiate between:
 - (a) Computer architecture/ Computer organization.
 - (b) Personnel Computer / Workstations.
2. Explain the register transfer with a suitable example. Construct the timing diagram for that example.
3.
 - (a) Draw flow chart for single bus organization processor.
 - (b) Draw flow chart of instruction cycle.
4. What is Division Algorithm? Explain with example?
5.
 - (a) Give a neat sketch that illustrates the components in a typical memory hierarchy and explain.
 - (b) A computer uses RAM chips of 1024 X 1 capacity.
 - i. How many chips are needed, and should their address lines be connected to provide a memory capacity of 1024 bytes.
 - ii. How many chips are needed to provide a memory capacity of 16K bytes? Explain in words how the chips are to be connected to the address bus.
6.
 - (a) What is the difference between I/O program-controlled transfer and DMA transfer?
 - (b) Explain how processor responds to an interrupt.
7.
 - (a) Give the Flynn's classification of computers.
 - (b) With the help of a flowchart, explain the working of pipeline for floating-point addition and subtraction.
8.
 - (a) What is multiprocessing? Explain its benefits.
 - (b) Explain serial arbitration and parallel arbitration procedures in detail.
