



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

FIRST SEMESTER EXAMINATIONS, NOV/DEC 2017

COURSE NO: CE 271

COURSE NAME: Computer Organization and Architecture

CLASS: CE II

TIME: 3 HOURS

Name: _____ Index Number: _____

Answer all Questions in this Section A(Circle your answers) and any other TWO from Section B

1. For two variables, $n=2$, the number of possible Boolean functions is
 - a. 4
 - b. 8
 - c. 16
 - d. 12
2. 64K memory contains how many words of 8 bits each?
 - a. 65,536
 - b. 64,536
 - c. 65,436
 - d. 65,336
3. The simplest way to determine cache locations in which to store memory blocks is the
 - a. Associative Mapping technique
 - b. Direct Mapping technique
 - c. Set-Associative Mapping technique
 - d. Indirect Mapping technique
4. Which one of the following CPU registers holds the address of the instructions (instructions in the program stored in memory) to be executed next?
 - a. MAR (Memory address register)
 - b. MBR (Memory Buffer Register)
 - c. AC (Accumulator)
 - d. PC (Program Counter)
5. What are the major components of a CPU?
 - a. Control Unit, Register Set, Arithmetic Logic Unit
 - b. Control Unit, Memory Unit, Arithmetic Logic Unit
 - c. Memory Unit, Arithmetic Logic Unit, Auxiliary Memory
 - d. Register Set, Control Unit, Memory Unit
6. Which of the following Addressing Modes specifies a register, which contains the memory address of the operand?
 - a. Indirect Addressing Mode
 - b. Register Addressing Mode
 - c. Register Indirect Addressing Mode
 - d. Index Addressing Mode
7. Which of the following is false related to Stack?
 - a. Stack Pointer points to the top most element of the stack
 - b. Only PUSH and POP operations are applicable
 - c. Implements FIFO
 - d. Useful for nested loops, subroutine calls etc

8. What is the octal equivalent of given binary number, 011001?
- a. 32
 - b. 31
 - c. 34
 - d. 33
9. Of the following, identify the memory usually written by the manufacturer
- a. RAM
 - b. DRAM
 - c. SRAM
 - d. ROM
10. DMA stands for
- a. Direct Memory Address
 - b. Direct Main Address
 - c. Direct Memory Access
 - d. Direct Main Access
11. CISC stands for
- a. Control Instruction Set Completeness
 - b. Complex Instruction Set Conversion
 - c. Complex Instruction Set Computer
 - d. Control Instruction Set Computer
12. Consider that the program is executed from main memory until it attempts to reference a page that is still in auxiliary memory. Identify this condition
- a. Page Found
 - b. Page Fault
 - c. Page Hit
 - d. Page Miss
13. The decimal number equivalent to 1100011 will be
- a. 98
 - b. 100
 - c. 96
 - d. 99
14. The expanded form of ASCII is
- a. American Standard Code for Information Inventory
 - b. American Standard Code for Information Interchange
 - c. American Standard Code for Interchange Information
 - d. American Standard Code for Inventory Interchange
15. Which one of the following is a memory whose duty is to store most frequently used data?
- a. Main memory
 - b. Cache Memory
 - c. Cache memory
 - d. ROM
 - e. PROM
16. Name the organization in which, the control information is stored in the control memory to initiate the required sequence of micro-operations
- a. Computer
 - b. Hardwired
 - c. Internal
 - d. Micro programmed
17. How many bytes equal Petabyte (PB)?
- a. Quadrillion
 - b. Million
 - c. Trillion
 - d. Billion

18. The pipelining process is also called as
- Superscalar operation
 - Assembly line operation
 - Von Neumann cycle
 - None of the mentioned
19. Each stage in pipelining should be completed within ____ cycle
- 1
 - 2
 - 3
 - 4
20. The situation where in the data of operands are not available is called
- Data hazard
 - Stock
 - Deadlock
 - None of the above
21. . The last on the hierarchy scale of memory devices is
- Main memory
 - Secondary memory
 - TLB
 - Flash drives
22. The algorithm to remove and place new contents into the cache is called
- Replacement algorithm
 - Renewal algorithm
 - Updation
 - Recall Algorithm
23. . The stalling of the processor due to the unavailability of the instructions is called as
- Control Hazard
 - Structural hazard
 - Input Hazard
 - An Output Hazard
24. The correspondence between the main memory blocks and those in the cache is given b
- Hash function
 - Mapping function
 - Locale function
 - Assign function
25. The techniques which move the program blocks to or from the physical memory is called as
- Paging
 - Virtual memory organisation
 - Overlays
 - Framing
26. The main aim of virtual memory organisation is
- To provide effective memory access
 - To provide better memory transfer
 - To improve the execution of the program.
 - All of the above
27. The computer architecture aimed at reducing the time of execution of instructions is
- CISC
 - RISC
 - ISA
 - ANNA
28. The RISC processor has a more complicated design than CISC
- True
 - False
29. Any condition that causes a processor to stall is called as

- a. Hazard
 - b. Page Fault
 - c. System Error
 - d. Installation
30. The time lost due to branch instruction is often referred to a
- a. Latency
 - b. Delay
 - c. Branch penalty
 - d. Stall

SECTION B

- 1**
- a. Give a brief history of Computer from the first generation to the fourth generation.
 - b. Why study computer organization and architecture?
 - c. Convert the following to the appropriate bases
 - i. 190 to base 3
 - ii. 0.11_2 to base 10
 - iii. 0.8125_{10} to base 2
 - d. Differentiate between Symmetric multiprocessors (SMP) and massively parallel processors (MPP)
- 2**
- a. Describe any three Memory Addressing Schemes
 - b. Differentiate between RISC and CISC.
 - c. What do you understand by Instruction Level Parallelism?
 - d. Discuss the idea behind VLIW
- 3**
- a. Differentiate between Microprogramming and Hardwired Controls
 - b. Give three reasons why an instruction pipeline may stall, or be flushed out.
 - c. Discuss any two-replacement algorithms
 - d. What are the most common deceptive practices of Computer Performance assessment?
- 4**
- a. Consider a system with a main memory access time of 200ns supported by a cache having a 10ns access time and a hit rate of 99%, Calculate the Effective Access Time.
 - b. Discuss the following:
 - i. Cache Hit
 - ii. Cache Miss
 - iii. Hit Ratio
 - c. State Amdahl's Law. Hence, suppose we can upgrade a CPU to make it 50% faster for 10,000 or upgrade its disk drives for GHS7,000 to make them 250% faster. Processes spend 70% of their time running in the CPU and 30% of their time waiting for disk service. An upgrade of which component would offer the greater benefit for the lesser cost?
 - d. What are the advantages of the harmonic mean method of assessment of Computer over the geometric mean?
- 5**
- a. Discuss the classification of Computers according to Flynn Johnson
 - b. Differentiate between Superscalar and Superpipeline
 - c. Discuss the idea of Branch Prediction and Speculative Execution
 - d. Briefly discuss the major Components of a Computer