

Introduction to Minicomputers

FINAL EXAMINATION

Circle the letter on your answer card that corresponds to the response that *best* answers or complete each of the 50 items on this test.

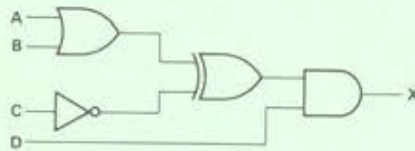
1. Digital computers are controlled by
 - a. connections on a patch-panel.
 - b. electrical voltages.
 - c. manually entered commands.
 - d. stored programs.

2. Analog computers represent data by
 - a. discrete digits.
 - b. 0 and 1.
 - c. electrical voltages.
 - d. connections on a patch-panel.

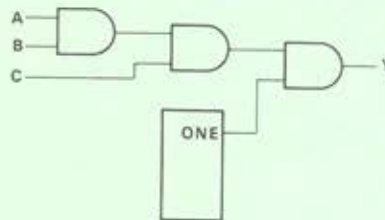
3. The components that are generally considered to be part of the computer mainframe are the
 - a. CPU and main memory.
 - b. input and output units.
 - c. main memory and auxiliary storage.
 - d. central processor and auxiliary storage.

4. A time interval of 8 microseconds expressed as a fraction of a second would be
- a. 8/1,000.
 - b. 8/10,000.
 - c. 8/1,000,000.
 - d. 8/1,000,000,000.
5. The _____ is equivalent to half a word.
- a. instruction
 - b. byte
 - c. location
 - d. bit
6. A 16K memory actually consists of _____ individual memory locations.
- a. 16,000
 - b. 16,096
 - c. 16,384
 - d. 16,896
7. Codes such as ASCII are used primarily to
- a. permit binary machines to represent alphabetic characters and decimal digits.
 - b. permit computers to translate the data sent between two digital devices.
 - c. prevent confidential data from being used by unauthorized personnel.
 - d. convert binary information into octal notation.

8. The octal equivalent of the binary number 101011100010 is
- 4562.
 - 5322.
 - 5342.
 - 5702.
9. If even parity is being used, the one binary number that contains a data error is
- 01011010.
 - 11010001.
 - 11011010.
 - 11011101.
10. In the circuit below, if $A = 1$, $B = 0$, $C = 0$, and $D = 1$, the value of X is



- 0.
 - 1.
11. In the circuit below, if $A = 1$, $B = 0$, $C = 1$, and the ONE output of the flip-flop = 1, the value of Y is



- 0.
- 1.

12. The name of the small semiconductor memory used to reduce the access time of core memory for recently referenced locations is
- a. cache memory.
 - b. interleaved memory.
 - c. non-volatile memory.
 - d. read-only memory.
13. The major advantage of semiconductor memory over core memory is
- a. cost.
 - b. power consumption.
 - c. speed.
 - d. volatility.
14. The major advantage of core memory over semiconductor memory is
- a. cost.
 - b. non-volatility.
 - c. size.
 - d. speed.
15. In flowcharting, a process to be repeated until some condition is met is represented by a
- a. branch.
 - b. loop.
 - c. hexagon.

16. An algorithm is a
- sequence of steps to be followed in reaching a solution.
 - flowcharting technique.
 - type of computer program.
17. The diamond-shaped flowcharting symbol represents
- a predefined process.
 - initialization.
 - a decision.
 - input or output.
18. Add $101001_2 + 111011_2$.
- 1001100_2
 - 1010010_2
 - 1100100_2
 - 1101100_2
19. Subtract $3421_8 - 1067_8$.
- 2332_8
 - 2334_8
 - 2352_8
 - 2354_8
20. Express -74_8 in 8-bit two's complement format.
- 11000110
 - 11010100
 - 11000100
 - 11100110

21. Convert 11011110 from *two's complement format* to octal.

- a. -41_8
- b. -42_8
- c. -136_8
- d. -137_8

22. The octal value that is stored in memory location 211 after the following program is executed is

```
200 CLA
201 ADD 210
202 CMA
203 IAC
204 ADD 207
205 STR 211
206 HLT
207 0614
210 0263
211 ????
```

- a. 0331.
- b. 0351.
- c. 0614.
- d. 1077.

23. The central processor will execute the following program loop _____ times.

```
205 ADD 300
206 ISZ 301
207 JMP 205
. .
. .
. .
300 0063
301 7771
```

- a. 6
- b. 7
- c. 301
- d. 7771

24. The mathematical expression that is solved when the computer executes the following program is

```
200 CLA
201 ADD 212
202 CMA
203 IAC
204 STR 212
205 ADD 211
206 ISZ 212
207 JMP 205
210 HLT
211 A
212 B
```

- a. $A + B$.
- b. $A * B$.
- c. $A - B$.
- d. $B - A$.

25. When the CPU performs an ADD instruction, the two operands for the calculation are located in the
- a. buffer register and the accumulator.
 - b. buffer register and the arithmetic-logic circuits.
 - c. accumulator and the arithmetic-logic circuits.
26. The component of the CPU that points to the memory location that the CPU is currently referencing is the
- a. program counter.
 - b. address register.
 - c. buffer register.
 - d. control logic.
27. The component of the CPU that performs the actual calculations is the
- a. accumulator.
 - b. control logic.
 - c. arithmetic-logic circuits.
 - d. instruction decoder.
28. The peripheral device that can access information the fastest is the
- a. card reader.
 - b. fixed-head disk unit.
 - c. magnetic tape unit.
 - d. moving-head disk unit.

29. The medium that can store the largest amounts of information in the smallest space is the
- cards.
 - disk cartridge.
 - magnetic tape.
 - paper tape.
30. A soft copy output device commonly used in terminals is the
- card punch.
 - display.
 - paper tape punch.
 - printer.
31. The element of file organization that identifies the common characteristic of members of a class is called a
- key field.
 - character.
 - record.
32. In a direct access file, records are inserted by
- reorganizing the entire file.
 - reorganizing the entire index.
 - manipulating pointer fields.
33. A binary search is used to
- save space.
 - save computer time.
 - eliminate addressing conflicts.

34. An advantage of the indexed sequential file organization is that it is the
- most efficient in use of storage.
 - easiest form to update.
 - most flexible.
35. The communication path that permits addresses, data, and control information to be transferred between the computer mainframe and peripherals is (are) the
- bus.
 - interface.
 - X-Y coordinate wires.
 - data control lines.
36. Of the following functions the one that is *not* performed by a typical interface is
- converting parallel to serial.
 - interrupting programs.
 - addressing memory.
 - updating the instruction register.
37. The abbreviation DMA stands for the function that
- permits direct addressing of memory by the CPU.
 - permits sharing of the bus by both memory and CPU.
 - permits large blocks of data to be transferred directly between memory and an I/O device.
 - permits data to be stored sequentially in memory.

38. When transmitting data in serial fashion
- a. one bit is transferred at a time.
 - b. transmission is relatively fast.
 - c. a number of lines are used.
 - d. a full word is transferred at one time.
39. The high-level language statement that would convert into these assembly language instructions is

```
CLA
ADD C
ADD B
CMA
IAC
ADD A
STR X
```

- a. $X = C + B - A.$
 - b. $X = A - B + C.$
 - c. $X = A + B - C.$
 - d. $X = A -(B + C).$
40. _____ is *not* an advantage of using a symbolic language over a machine language.
- a. Increased programmer efficiency
 - b. Increased self-documentation
 - c. Increased execution efficiency
 - d. Decreased chance of errors

41. Machine code is generated during
- the assembler's first pass.
 - the assembler's second pass.
 - the assembler's third pass.
 - execution.
42. Of the following statements about compilers and interpreters, the one that is FALSE is:
- Program development is faster with interpreters than with compilers.
 - Interpreted programs execute faster than compiled programs.
 - Compilers are more flexible than interpreters.
 - Compilers generate object code which must be linked in order to execute while interpreters generate results.
43. The assembler that allows programmers to define their own instructions is the
- absolute assembler.
 - relocatable assembler.
 - macroassembler.
44. The high-level language that was designed specifically to express complex algebraic equations is
- BASIC.
 - COBOL.
 - FORTRAN.

45. The I/O technique that uses a wait loop is the
- programmed data transfer.
 - program interrupt data transfer.
 - DMA data transfer.
46. Of the following statements about polling and multiple interrupt levels, the one that is FALSE is:
- Polling is a faster technique than using multiple interrupt levels.
 - Polling is more flexible because it uses a software table.
 - Multiple interrupt levels require more complex hardware.
 - In both techniques, the ready device with the highest priority will always be serviced next.
47. The I/O technique that is the most efficient for transferring large blocks of data is the
- DMA data transfer.
 - program interrupt data transfer.
 - programmed data transfer.
48. The operating system component that performs actual data transfers is the
- device handler.
 - interrupt handler.
 - library manager.
 - executive.

49. Of the following statements about batch, timesharing, and real-time systems, the one that is FALSE is:
- a. Timesharing systems service many users at terminals by executing programs in a round-robin manner.
 - b. Batch systems use computer resources efficiently because programs are executed sequentially without operator intervention required between them.
 - c. Real-time systems applications often include payroll, mailing lists, and inventory control.
 - d. Batch systems applications are characterized by programs requiring large amounts of CPU and I/O time.
50. The operating system component that maintains a queue of programs waiting to execute is the
- a. library manager.
 - b. scheduler.
 - c. storage allocator.
 - d. executive.