Instruction Sets

MODULE TEST

You may wish to review the exercises or audio-visual material before taking this module test. Once you begin the test, do not refer to the course materials.

There are ten questions.

1. In Part A below, circle the *two* letters that identify the names of instruction word fields.

   In Part B, write the letter of the field being defined in the space provided.

   Part A
   The two fields of an instruction word are:

   a. Instruction field

   b. Operand field

   c. Program field

   d. Word-size field

   e. Operation field

   f. Mnemonic field

   Part B

   1. The ___ tells the CPU where to find the data that are to be processed.

   2. The ___ holds a binary code that tells the CPU exactly what to perform next.

2. Match each of the terms below with its definition.

Term	Definition
Operand	_____
Op Code	_____
Instruction Mnemonic	_____
Accumulator	_____

Definitions

a. A 3- or 4-letter abbreviation that programmers use in place of the binary operation code.

b. An item of data to be acted upon by an instruction.

c. A special storage area contained in the CPU.

d. A predefined binary code that tells the CPU what operation it is to perform.

3. Match each of the following instruction formats with its decription.

a. No operand field
b. Single operand field
c. Two operand fields
d. Three operand fields

___ If the instruction calls for an addition, the sum is placed in a memory location formerly occupied by one of the operands.

___ Memory is not referenced; the instruction operates directly on the contents of the AC.

___ If the instruction calls for an addition, the contents of a memory location are added to the contents of the AC.

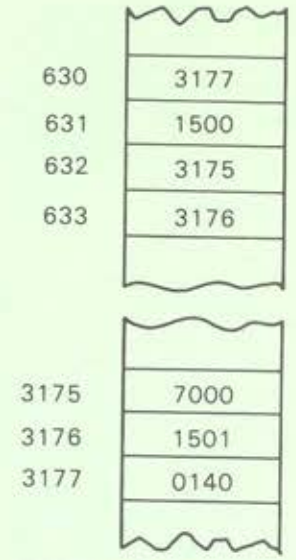
___ Not widely used in minicomputers because it requires a large word size.

4. The computer word size places a limit on the maximum number of memory locations that can be directly addressed. Three techniques that may be used to overcome this addressing limitation are: multiple-word instructions (MW), special registers (SR), and memory pages (MP).

   Match each of the descriptions below with the technique it describes by writing the correct abbreviation in the space provided.

Description	Technique
Part of the CPU.	____
Sometimes used for purposes other than addressing main memory.	____
Segments of main memory.	____
Used in place of single-word instructions.	____
Size of each is chosen so that CPU can address any location by using the available address bit in the instruction.	____

5. The diagram at the right specifies the contents of various memory locations. The table below lists several instructions that reference these memory locations. For each instruction, specify the addressing method (direct or indirect), the operand address and the operand.



Instruction	Addressing Method	Operand Address	Operand
ISZ I 632			
ADD 631			
ADD I 630			
ADD I 633			
ISZ 630			

6. Write a simple program that adds A, B, and C and then stores the answer (X) in memory location 333.

Known Factors:	A is stored in location 330. B is stored in location 331. C is stored in location 332.
Restrictions:	Use only the instructions defined in the lesson "Typical Instruction Set." Use 200 as the starting address of the program.

Address	Instruction or Data

7. Write a program that solves the mathematical expresssion Y = A – (B * 2) and then stores the answer (Y) in memory location 352.

Known Factors:	A is stored in location 350. B is stored in location 351.
Restrictions:	Use only the instructions defined in the lesson "Typical Instruction Set." Use 200 as the starting address of the program.

Address	Instruction or Data

8. Write a program that multiplies 150_8 by 75_8 and then stores the answer in memory location 332. Use a program loop in your solution.

Known Factors:	The operand 150_8 is stored in memory location 330; the operand 75_8 is stored in location 331.
Restrictions:	Use only the instructions defined in the lesson "Typical Instruction Set." Use 200 as the starting address of your program.

Address	Instruction or Data

9 Circle the *letter* of the mathematical expression that is solved by the following program.

```
200     CLA
201     ADD 216
202     CMA
203     IAC
204     STR 216
205     ADD 215
206     ISZ 216
207     JMP 205
210     STR 215
211     ADD 215
212     ADD 215
213     ADD 217
214     HLT
215     A
216     B
217     C
```

Answers

a. (2 + A * B) + C

b. (2 * A + C) + B

c. (2 * B * C) + A

d. (2 * A * B) + C

e. (2 * A + B) + C

10. Indicate whether each of the following statements refers to a conditional instruction (C) or an unconditional instruction (U) by writing the correct letter in the space provided.

Statement	Instruction Type
If y is negative, branch to 277.	_____
Branch to location 215 if x = 0.	_____
Skip the next instruction in the sequence if A is positive.	_____
Skip the next instruction in the sequence.	_____
Jump to location 307.	_____