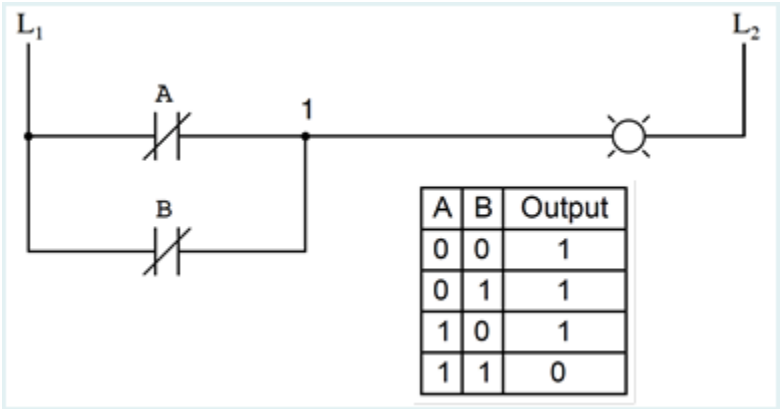
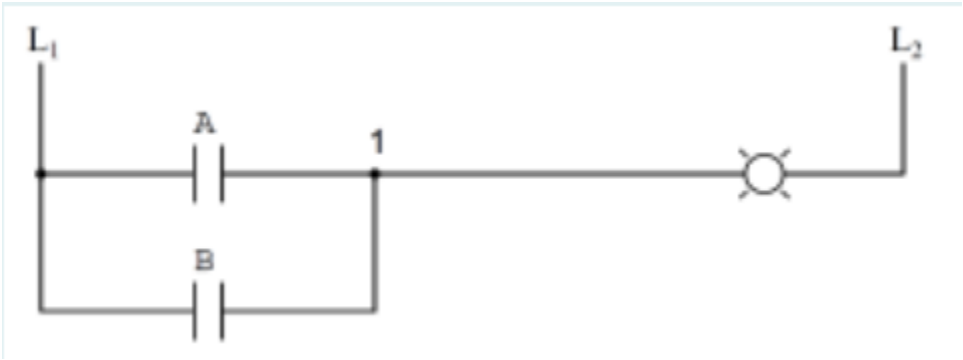
1. What is(are) the advantage(s) of C Language over Assembly Language?
    a. **C is transportable to other microprocessor architectures**
    b. Hand assembly coding is much faster in C
    c. C does not need a compiler to be assembled in to an executable program.
    d. All the answers
    e. The Assembler creates much faster executable code
2. What is(are) the advantage(s) of Assembly Language over C Language?
    a. C does not need a compiler to be assembled in to an executable program.
    b. Hand assembly coding is much faster in C
    c. All the answers
    d. C is transportable to other microprocessor architectures
    e. **The Assembler creates much faster executable code**
3. How many bit(s) is/are required to represent a range of decimal numbers from 0 to 9?
    Answer: 4
4. How many bytes are in single precision IEEE floating point format numbers (32bit)?
    Answer: 4
5. How many nibbles are in extended precision IEEE floating point format numbers (80bit)?
    Answer: 20
6. The Ladder Logic diagram would represent which of the following?



A	B	Output
0	0	1
0	1	1
1	0	1
1	1	0

    Answer: NAND
7. The Ladder Logic diagram would represent which of the following?



    Answer: OR
8. Logic1 What logical operation clears a bit?
    Answer: ANDing

9. In the PIC18 with TRISD = 0b11110000 and LATD = 0xAA, what value will be on Port D and shown on the LEDs?

   Answer: 0A

10. What is -32.75$_{10}$ in base two number system?

    Answer: -100000.11000

11. PIC5. In the PIC what bit mask would need to be applied to configure bit 4 of Port D to input? Assume ORing bit operation is applied.

    Answer: 0xA8

12. The acronym PLC, is defined as which of the following?

    Answer: Programmable Logic Controller

13. Ladder Logic is used in_____

    Answer: PLCs

14. ROL2. Rotating an 8 bit register left eight times changes the value of the register by what?

    Answer: It would be the same

15. On the Raspberry Pi platform, what is the processor used on the board?

    Answer: ARM

16. A “pull up” resistor is used in digital circuits to do what?

    Answer: To keep the signal “tied” high until the line is active (goes low)

17. SHL1. Shifting an 8 bit register left one time changes the value of the register by what?

    Answer: Multiply by 2

18. SHR2. Shifting an 8 bit register right seven time changes the value of the register by what?

    Answer: Zero (WRONG) multiply by 2

19. With a POPA instruction, what will be the order of the accumulator, base, count, and data registers restored from the stack?

    Answer: BDCA

20. The instruction MOV CX, SI is what addressing mode?

    Answer: Register

21. Given:

```
13A7:0110 CD 20 30 20 54 68 69 73-50 30 73 20 74 68 65 20
13A7:0120 66 69 72 73 74 20 4D 69-64 74 65 72 6D 0D 24 D9
13A7:0130 00 C6 00 00 00 00 00 00-00 00 00 00 00 00 00 00
```

    An input buffer is at memory location 0111, what is the buffer size (in decimal)?

    Answer: 32

22. What type of program is this?

```
AX=0000 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=1376 ES=1376 SS=1376 CS=1376 IP=0115 NV UP EI PL NZ NA PO NC
1376:0115 0100 ADD [BX+SI],AL DS:0000=CD
```

    Answer: EXE program

23. If CX is 0001, what will CX be after a “LOOPNZ” instruction?

    Answer: 0000

    Explain: LOOPNZ use either ECX or CX depending on the BITS sending and it decrements the CX value and jumps to the location specified in the target operand if CX

is not 0 and ZF is 0. In our case as CX is not zero it will decrement by one which results in 0000

24. Given:

```
13A7:0110 CD 20 30 20 54 68 69 73-50 30 73 20 74 68 65 20
13A7:0120 66 69 72 73 74 20 4D 69-64 74 65 72 6D 0D 24 D9
13A7:0130 00 C6 00 00 00 00 00 00-00 00 00 00 00 00 00 00
```

An input buffer is at memory location 0118, how many bytes are in the buffer (in decimal)?

Answer: 80

25. On the PPE board, what number(s) on the key pad is(are) pressed for an output port value of 08h and an input port value of 2Fh?

Answer: 0

26. A “POP” instruction:
    a. **increments the Stack Pointer, SP**
    b. stores the returning address
    c. points to the data inputted from the keyboard
    d. decrements the Stack Pointer, SP
    e. increments the IP
27. If the SP is F00F, what is the SP value after a “POP CX” instruction?

Answer: F011

28. Which of the following is not a valid command for moving a number into a register in MASM?

Answer: MOV AX, AADDH

29. Given the short sequence of instructions (code), what is the value in AX after the program is run?

Program Listing
Mov BX, 0001
Push BX
Mov AX, 0500
POP AX

Answer: 0001

30. Given the short sequence of instructions (code), what is the value in BX after the program is run?

Program Listing
Mov BX, 0001
Push BX
Mov AX, 0500

POP AX

Answer: 0001

31. Given the short code, what is the value in AX after the program is run?

Program Listing
Mov BX, 0005
Push BX
Mov AX, 0100
POP AX

Answer: 0005

32. AND'ing 8FHex and 02Hex will result in which of the following Hex numbers?

Answer: 02

33. If 10Hex is XORed with 2FHex would result in which of the following decimal numbers?

Answer: 0

34. If 10Hex is ADDed with 2FHex would result in which of the following Decimal numbers?

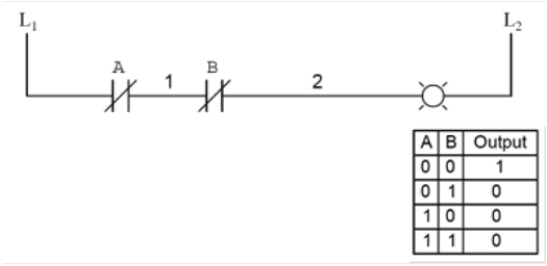
Answer: 63

35. The acronym PWM used for motor control, is defined as which of the following?

Answer: Pulse Width Modulation

ATTEMPT 02

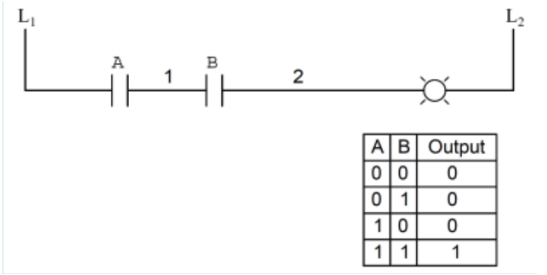
1. What is(are) the advantage(s) of C Language over Assembly Language?
   C is transportable to other microprocessor architectures
2. What is(are) the advantage(s) of Assembly Language over C Language?
   The Assembler creates much faster executable code
3. How many bit(s) is/are required to represent a range of decimal numbers from 0 to 99?
   7
4. How many nibbles are in single precision IEEE floating point format numbers (32bit)?
   8
5. How many bytes are in extended precision IEEE floating point format numbers (80bit)?
   10
6. The Ladder Logic diagram would represent which of the following?



A	B	Output
0	0	1
0	1	0
1	0	0
1	1	0

Answer: NOR

7. The Ladder Logic diagram would represent which of the following?



A	B	Output
0	0	0
0	1	0
1	0	0
1	1	1

Answer: AND

8. Logic2 What logical operation sets a bit?
   a. None
   b. ANDing
   c. XORing
   d. ORing
9. In the PIC18 with TRISD = 0b11111111, what is the configuration of the Port D?
   a. Bit 8 of port D is set to output
   b. Port D is set as an output port
   c. Port D is set as an input port
   d. Port D is set to 127 decimal
   e. Bit 8 of port D is set to input
10. 18 hexadecimal would be what value in decimal?
    24

11. PIC3. In the PIC with a bit mask = 0xFF, what bit mask operation would be applied to LATD to switch the LED output?
    a. **Oring**
    b. ANDing
    c. None
    d. XORing
12. The letters “NO” labeled on relays and PLCs means which of the following?
    a. Indicates the system is functional
    b. **Normally Open**
    c. Normal Operation
    d. Normally Off
    e. Not On the controller
    f. No Opcode
13. The letters “NC” labeled on relays and PLCs means which of the following?
    a. Normal Code
    b. **Normally Closed**
    c. Not a Computer
    d. Not Closed
    e. No Code
14. ROL1. Rotating an 8 bit register left one time changes the value of the register by what?
    a. Zero
    b. Multiply by 4
    c. Divide by 2
    d. **Multiply by 2**
    e. Is the same
15. On the Raspberry Pi platform, what is the programming language used?
    a. Spin
    b. x86 assembly
    c. Forth
    d. **Various Open source Languages**
    e. Java
    f. F
    g. C#
    h. Raspberry Ruby Pi
    i. Pi Basic
16. A “pull down” resistor is used in digital circuits to do what?
    a. To keep the signal “tied” high until the line is active (goes low)
    b. To keep the voltage at 0Volts
    c. To make sure the digital line is always high
    d. To keep the voltage at 1Volt
    e. **To keep the signal line “tied” low until the line is active (goes high)**
17. SHL2. Shifting an 8 bit register left eight times changes the value of the register by what?
    a. Multiply by 4

b. Divide by 2
c. Multiply by 2
d. Is the same
e. Zero

18. SHR1. Shifting an 8 bit register right one time changes the value of the register by what?
    a. Multiply by 4
    b. Multiply by 2
    c. Divide by 2
    d. It remainIs the same
    e. Zero
19. With a PUSHA instruction, what will be the order of the accumulator, base, count, and data registers stored on the stack?
    a. ACDB
    b. ABCD
    c. BDCA
    d. DBAC
    e. DCBA
    f. AX
    g. BX
20. The instruction MOV CX, [SI] is what addressing mode?
    a. Register
    b. Direct
    c. Register Indirect
    d. Scaled Index
    e. Immediate
21. Which of the following is a valid x86 command for multiplying a number?
    a. MUL BX
    b. MUL CL,BL
    c. MUL 10h
    d. MUL BX, 0C40Fh
    e. MUL AX, BADh
22. If CX is 0000, what will CX be after a “LOOPNZ” instruction?
    a. DX
    b. 0000
    c. FFFF
    d. BX
    e. AX
    f. 0003
    g. 0001
    h. 0002

23. What register(s) does the “LOOPNE” instruction look at to determine how many times to loop?
    a. AX
    b. BX
    c. SF and ZF
    d. ZF
    e. OF and CF
    f. DX
    g. CX
    h. SF and OF
24. You are trying to rebuild a HELLO project program in MASM and you get the following error:
    “LINK : fatal error L1089: HELLO.lrf : cannot open response file”.
    What would be the reason for such an error?
    a. MASM isn’t installed correctly on the computer being used
    b. No listing file was selected (or requested)
    c. No source file is identified (no .asm file)
    d. No ” .mak “ file specified
    e. No project was setup
25. What is the numeric sequence of the key pad columns on the PPE board?
    a. 1,2,4,8,
    b. 378,379
    c. 2,4,6,8
    d. 37,2F,1F
    e. 1,2.3.4
    f. 08, 10, 20
26. A “PUSH” instruction:
    a. increments the IP
    b. increments the SP
    c. points to the data inputted from the keyboard
    d. decrements the SP
    e. stores the returning address
27. If the SP is F00F, what is the SP value after a “PUSH CX” instruction?
    a. F010
    b. F00D
    c. F00C
    d. F011
    e. F012

28. You are trying to rebuild a HELLO project program in MASM and you get the following error:
"LINK : warning L4021: no stack segment".
What would be the reason for such an error?
    a. **No project template for COM was selected**
    b. MASM isn't installed correctly on the computer being used
    c. No " .mak " file specified
    d. No source file is identified (no .asm file)
    e. No project was setup
29. Given the short sequence of instructions (code), what is the value in **AX** before the **POP AX** instruction?

Program Listing
Mov BX, 0001
Push BX
Mov AX, 0500
POP AX

Answer: 0500

30. Given the short sequence of instructions (code), what is the value in **BX** after the program is run?

Program Listing
Mov BX, 0100
Push BX
Mov AX, 0500
POP AX

Answer: 0100

31. Given the short sequence of instructions (code), what is the value in **AX** after the program is run?

Program Listing
Mov BX, 0001
Push BX
Mov AX, 0500
POP AX

Answer: 0001

32. The acronym PWM used for motor control, is defined as which of the following?

Pulse Width Modulation

33. If 10Hex is ADDed with 2FHex would result in which of the following Decimal numbers?

63

34. If 10Hex is XORed with 2FHex would result in which of the following decimal numbers?

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35. AND'ing 8FHex and 02Hex will result in which of the following Hex numbers?

02