STUDENT ID: ..... SIGN:.....

UNIVERSITY OF GHANA

BSC INFORMATION TECHNOLOGY FIRST SEMESTER EXAMINATIONS: 2021/2022

DEPARTMENT OF DISTANCE EDUCATION

DCIT 101: INTRODUCTION TO COMPUTER SCIENCE (3 Credits)

Instruction: ***Attempt ALL questions. Write your answer in the summary table below.***

TIME ALLOWED: *TWO (2) HOURS*

Summary table for answers (Your answers must be provided in the table below)

1		18		35		52		69		86		Bonus	
2		19		36		53		70		87		B1	
3		20		37		54		71		88		B2	
4		21		38		55		72		89		B3	
5		22		39		56		73		90		B4	
6		23		40		57		74		91		B5	
7		24		41		58		75		92			
8		25		42		59		76		93			
9		26		43		60		77		94			
10		27		44		61		78		95			
11		28		45		62		79		96			
12		29		46		63		80		97			
13		30		47		64		81		98			
14		31		48		65		82		99			
15		32		49		66		83		100			
16		33		50		67		84					
17		34		51		68		85					

1. A/an _____ is a signal from a device attached to a computer or from a program within the computer that causes the operating system to stop and figure out what to do next.
    a. Software
    b. Hardware
    c. Instruction
    d. Interrupt
2. A program in a state of execution is called a/an
    a. File
    b. Process
    c. Software bug
    d. Interrupt
3. The _____ combines modules into one program
    a. Compiler
    b. Linker
    c. Translator
    d. Assembler
4. The highest award in the field of computing is named after which of the following personalities?
    a. Douglas Howard
    b. Gordon Moore
    c. Alan Turing
    d. Grace Hooper
5. Which of the following is the fundamental principle that underpins the operation of modern computers
    a. Fetch-execute cycle
    b. Fetch-execute decode cycle
    c. Stored program concept
    d. None of the above

6. _____ is available under a license that permits users to use, change, and improve the software, and to redistribute it in modified or unmodified form.
    a. Application
    b. Operating System
    c. Freeware
    d. Open Source Software

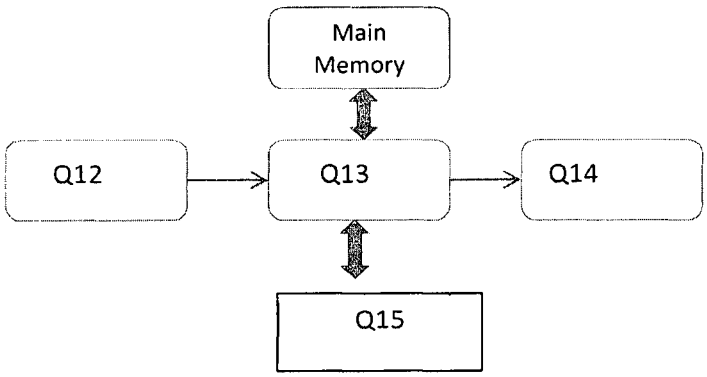
7. A computer's _____ consists of electronic devices; the parts you can see and touch
    a. Software
    b. Hardware
    c. Firmware
    d. Freeware
8. A _____ is volatile, meaning it holds data when the power is on. When the power goes off, it loses its contents.
    a. RAM
    b. ROM
    c. Hard drive
    d. Solid State Hard Drive

9. Which word best completes the following sentence: A program is a set of _____ that is written in the language of the computer.
    a. Codes
    b. Signs
    c. words
    d. instructions

10. The electronic and mechanical elements of the computer are known as what?
    a. Devices
    b. Peripherals

c. Hardware
d. Software

11. What term is used to describe all the various programs that may be used on a computer system.
    a. Codes
    b. Software
    c. Instructions
    d. Programs



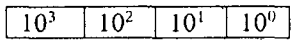
The above depicts a block diagram of a basic computer system. Use the options below to correctly label the parts.

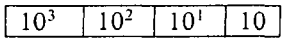
a. Output device
b. Auxiliary Storage
c. CPU
d. Control Unit

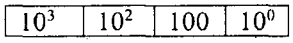
16. 1 kilobyte is equivalent to how many bytes of memory
    e. 1000
    f. 1020
    g. 8
    h. 1024
17. Which of the following is NOT a unit of measurement of memory capacity?
    a. Fb
    b. Gb
    c. Mb
    d. Tb
18. How many characters can be stored in 802 bytes of memory?
    a. 1000
    b. 1604
    c. 802
    d. 6416
19. Given that a one page document can hold 3290 characters, approximately how many pages will be required for a document that occupies 1.5Mb of memory?
    a. 1572864
    b. 478
    c. 26320
    d. 411
20. An embedded computer will perform which of the following functions?
    a. Control of traffic lights
    b. Temperature measure
    c. Humidity control
    d. All of the above
21. Software may be defined as the intangible parts of the computer, True of False?
    a. True
    b. False
22. Which of the following may not be classified as a systems software?

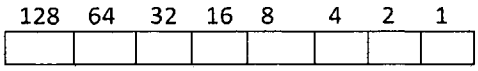
a. Commercial packages
b. Microsoft word
c. User programs
d. All of the above

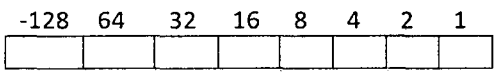
23. Which of the following is not a systems software?
    a. GUI
    b. Operating System
    c. System services
    d. Microsoft Excel
24. All of the following are functions of system software except
    a. Develop an algorithm for a problem
    b. Optimize the performance of the computer system
    c. Provide assistance with program development
    d. Simplify the use of the computer system
25. After compiling a program written in a high level language the output you obtain is known as
    a. Machine language
    b. Object code
    c. Assemble language
    d. Target code
26. All operations within the computer are performed in which of the following units?
    a. ALU
    b. Control unit
    c. Register
    d. Cache
27. Which of the following actually constitutes the computer?
    a. ALU
    b. Control unit
    c. CPU
    d. Motherboard
28. The fundamental storage unit is a bit which can be in an OFF or ON state. How many different codes are possible with 5 bits?
    a. 5x2
    b. 5^2
    c. 2^5
    d. 2^5-1
29. How many bits would you need to represent the 26 letters of the alphabet, lower case and upper case?
    a. 52
    b. 26
    c. 8
    d. 6
30. For each byte of memory, computers will have an extra bit used for error detection, this bit is known as what?
    a. Parity bit
    b. Error bit
    c. Even bit
    d. None of the above
31. A bus is a set of _____ used to connect components within the computer
    a. Lines
    b. Codes
    c. Wires
    d. Jumpers
32. Which of the following is an example of a bus?
    a. Data bus
    b. Computer bus
    c. Memory bus
    d. None of the above

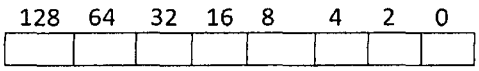
33. Which bus is used to indicate the location from which data is to be retrieved or written?
    a. Control bus
    b. Memory bus
    c. Data bus
    d. Address bus
34. Which of the following is not a feature of cache memory?
    a. It is closer to the CPU
    b. It may use a dedicated control bus
    c. It may use high speed components
    d. Has large capacity relative to main memory
35. Which of the following principles will a cache memory rely upon?
    a. Locality of reference
    b. Moore's law
    c. High speed components
    d. None of the above
36. Which of the following correctly shows the place values in denary number system?
    a. 

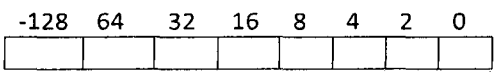
    b. 

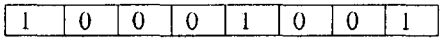
    c. 

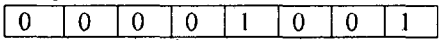
    d. None of the above
37. Which of the following is the correct representation of the place values in two's complement?
    a. 

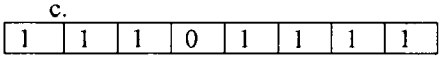
    b. 

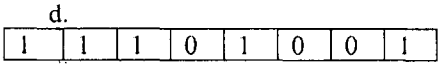
    c. 

    d. 

38. Which of the following is a correct representation the two's complement of -17?
    a. 

    b. 

    c. 

    d. 

39. If the denary number 373 is to be converted to a binary representation, how many bits will be needed?
    a. 2
    b. 4
    c. 9
    d. 8

40. Given that data can only be stored using an integer number of bytes, how bytes are required to store the number 373?
    a. 1
    b. 2
    c. 3
    d. 4

The following relates to Q41 – 43. Binary representation is used for many different data values. Consider the binary pattern

1 0 1 0 0 1 1 0

41. What is its value if it represents an 8-bit two's complement?
    a. -90
    b. -38
    c. 6A
    d. A6
42. What is its value if it represents an 8-bit sign and magnitude integer?
    a. A6
    b. -90
    c. 6A
    d. -38
43. What is its value if it represents a hexadecimal number?
    a. A6
    b. -90
    c. 6A
    d. -38
44. Which of the following is NOT a reason why computer scientists write binary numbers in hexadecimal?
    a. Less likely to make a mistake when copying or converting a digit string
    b. Easier to convert from binary to hex or vice versa, than from binary to denary
    c. Fewer digits are used to represent any number
    d. None of the above

A sensor is an input device designed to sense some physical characteristics of its surroundings. Use this information to answer Q45 – Q48

45. Which of the following is an application for which a pressure sensor might be suitable?
    a. Computer controlled oven that uses actuators to switch it on and off
    b. In computer-controlled greenhouse to open or close windows
    c. Access control systems for example vehicles barrier or approaching traffic lights
    d. To control the illumination of an enclosed space
46. Which of the following is an application for which a light sensor might be suitable?
    a. Computer controlled oven that uses actuators to switch it on and off
    b. In computer-controlled greenhouse to open or close windows
    c. Access control systems for example vehicles barrier or approaching traffic lights
    d. To control the illumination of an enclosed space
47. Which of the following is an application for which a temperature sensor might be suitable?
    a. Computer controlled oven that uses actuators to switch it on and off
    b. In computer-controlled greenhouse to open or close windows
    c. Access control systems for example vehicles barrier or approaching traffic lights
    d. To control the illumination of an enclosed space
48. Which of the following is an application for which a wind speed sensor might be suitable?
    a. Computer controlled oven that uses actuators to switch it on and off
    b. In computer-controlled greenhouse to open or close windows
    c. Access control systems for example vehicles barrier or approaching traffic lights
    d. To control the illumination of an enclosed space

49. A communication channel that allows information, in the form of electromagnetic signals, to be carried from sender to a receiver is known as
    a. Copper cable
    b. Transmission medium
    c. Fibre
    d. Wireless

50. Which of the following is not an example of guided media?
    a. Fibre
    b. Copper
    c. Twisted pair cable
    d. Bluetooth

51. The following are examples of unguided media except
    a. Fibre optic
    b. Microwave
    c. Radio waves
    d. Infrared

52. The following are features of guided media except
    a. High Speed
    b. Low data rate
    c. Used for comparatively shorter distances
    d. Secure

53. A fibre optic cable may support which of the following modes of propagation?
    a. Single mode
    b. Multimode
    c. Both single mode and multimode
    d. None of the above

54. All of the following are features of HTTP except
    a. HTTP is connection oriented
    b. HTTP is media independent
    c. HTTP is stateless
    d. None of the above

55. Bit streaming is defined as
    a. A continuous flow of bits over a communication path
    b. A connectionless flow of bits over a communication path
    c. A connection-oriented flow of bits over a communication path
    d. None of the above

56. Real time bit streaming may be used in which of the following scenarios
    a. Movie playback
    b. Music streaming (not live radio)
    c. Video streaming sites such as YouTube
    d. None of the above

57. The following are all types of internet address except
    a. Private IP addresses
    b. Public IP addresses
    c. Commercial IP addresses
    d. Static IP addresses

Different modes of addressing are used in accessing data or instructions from memory or allowing operations to be performed in the CPU.

58. Which of the following correctly describes IMMEDIATE addressing mode?
    a. the operand contains the address of the value to be used
    b. the operand is the actual number to be used
    c. the actual address is calculated using two base points
    d. none of the above

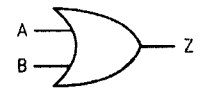
59. Which of the following correctly describes INDIRECT addressing mode?

a. the operand contains the address of the value to be used
b. the operand is the actual number to be used
c. the actual address is calculated using two base points
d. none of the above

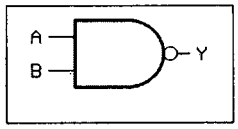
60. Which of the following correctly describes RELATIVE addressing mode?
a. the operand contains the address of the value to be used
b. the operand is the actual number to be used
c. the actual address is calculated using two base points
d. none of the above

The diagrams below (A-D) represent some logic gates. Questions 61 – 64 are based on these diagrams.

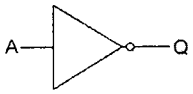
A



B



C



D

None of the above diagrams

61. Which diagram represents a NOT gate?
62. Which diagram represents a NAND gate?
63. Which diagram represents an AND gate?
64. Which diagram represents an OR gate?

65. The operating system is classified as
a. application software
b. utility software
c. both a and b
d. systems software

66. Which of the following is NOT a resource that is managed by the operating system
a. Processor
b. Main memory
c. secondary storage
d. server

Consider the following scenario and use it to answer the questions which follow (Q67 – 73):
A regular traveler travels by car if the travel is at the weekend. However, if the travel is on a weekday the traveler takes a train unless the distance is greater than 200 miles. If the distance is greater than 200 miles the traveler books a flight.

67. Which of the following is a logic proposition that may be used to describe the problem?
a. Travel at the weekend is by car
b. Travel at the weekday is by car
c. Travel at the weekend is not by car
d. All travel is by car

Individual problem statements can be extracted from this scenario and expressed using the language of Boolean algebra. Each individual statement will contain a logic expression.
Complete the following using TRUE or FALSE where appropriate:

68. Car_travel = _____IF day = weekend

69. Train_travel = _____IF day = weekday AND distance ≤ 200
70. Air_travel = _____IF day = weekday AND distance > 200

Using the following representations for the outcomes
X = Car_travel
Y = Train_travel and
Z = Air_travel
Assigning **A** to represent weekday and **B** to represent distance ≤ 200

71. Which of the following is an expression representing Car_travel
    a. X= A AND B
    b. X= Not **A**
    c. X= **A** AND NOT **B**
    d. X = NOT **A** AND **B**
72. Which of the following is an expression representing Train_travel
    a. Y= **A** AND **B**
    b. Y= Not **A**
    c. Y= **A** AND NOT **B**
    d. Y = NOT **A** AND **B**
73. Which of the following is an expression representing Air_travel
    a. Z= **A** AND **B**
    b. Z= Not **A**
    c. Z = **A** AND NOT **B**
    d. Z = NOT **A** AND **B**

Questions 74 – 76 are based on the following:
A domestic water heating system has a hot water tank and a number of radiators. There is a computerized management system which receives signals dependent on whether or not the conditions for components are as they should be. The table below summarizes the signals received:

Signal	Value	Component
A	0	Water flow in the radiators is too low
	1	Water flow in the radiators is within limits
B	0	Hot water temperature too high
	1	Hot water temperature within limits
C	0	Water level in hot water tank too low
	1	Water level in hot water tank within limits

74. Which of the following truth tables will represent the following fault condition. The water level in the hot water tank is too low and the temperature in the hot water tank is too high. The system must output a signal to switch off the system.

A

Inputs			Output
A	**B**	**C**	F1
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

B

Inputs			Output
A	**B**	**C**	F1
0	1	1	1
0	0	1	0
0	1	0	0
0	0	0	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

C

Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

D

Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

75. Which of the following truth tables will represent the following fault condition. The water flow in the radiators is too low and the temperature in the hot water tank is too high. The system must output a signal to switch off the system.

A

Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

B

Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

C

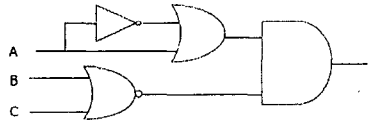
Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

D

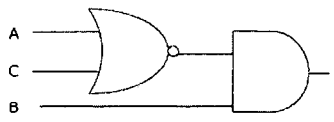
Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

76. Which of the following circuits represent a fault condition where the hot water tank temperature is within limits but the water flow in the radiators is too low and the water level in the hot water tank is too low.

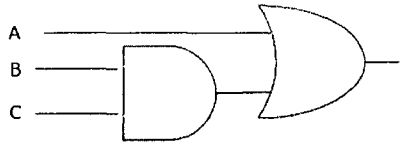
A



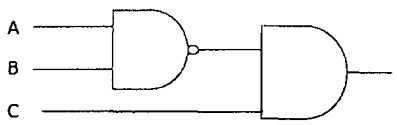
B



C



D



77. A register is a storage unit with limited capacity of just a few bytes. TRUE or FALSE?
78. A register is part of the processor (or microprocessor or CPU). TRUE or FALSE?
79. A register has a very short access time. TRUE or FALSE?
80. A register may be special purpose or general purpose. TRUE or FALSE?
81. An assembly language or machine code language program can access an individual register. TRUE or FALSE

Given the following
LDD is the command for direct addressing, an address which holds the value to be used in the instruction
LDI is for indirect addressing, an address which holds the address which holds the value to be used in the instruction
INC increases the value of a specified register by 1
STO saves a value in a specified memory location

Trace the following assembly language program using a copy of the trace table provided. Each question (82 – 89) relates to one step in the execution of the program. Which of the options correctly represents the contents of the memory locations and the accumulator?

Assembly Language Program

Memory address	Memory Content
100	LDD 201
101	INC ACC
102	STO 202
103	LDI 203
104	DEC ACC
105	STO 201
106	ADD 204
107	STO 201
108	END

.

201	10
202	0
203	204
204	5

Trace table

Question	Accumulator	Memory Addresses			
		201	**202**	**203**	**204**
	0	10	0	204	5
82					
83					
84					
85					
86					
87					
88					
89					

82. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
0	0	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	0	10	204	5

c

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	10	0	204	5

d

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
0	10	10	204	5

83. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
0	0	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
11	0	10	204	5

c

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	10	0	204	5

d

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
11	10	0	204	5

84. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
11	10	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	0	10	204	5

c

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	10	0	204	5

d

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
0	10	10	204	5

85. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
5	10	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	5	10	204	5

c

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	10	0	204	5

d

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
0	10	10	204	5

86. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
4	0	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
4	10	11	204	5

c

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	10	0	204	5

d

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
4	10	10	204	5

87. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
0	0	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	0	10	204	5

c

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
4	10	0	204	5

d

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
4	4	11	204	5

88. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
0	0	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	0	10	204	5

c

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	10	0	204	5

d

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
9	4	11	204	5

89. a.

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
9	9	11	204	5

b

Accumulator	Memory Addresses			
	201	**202**	**203**	**204**
10	9	10	204	5

c

Accumulator	Memory Addresses			
	201	202	203	204
10	10	0	204	5

d

Accumulator	Memory Addresses			
	201	202	203	204
0	10	10	204	5

90. Which of the following are facilities you would expect a file management system to have. There might be more than one correct answer, identify all the correct answers.

a. Delete a file
b. Copy a file
c. Save a File
d. All of the above

91. Which of the following are examples of utility programs associated with hard disk usage in a PC. There might be more than one correct answer, identify all the correct answers.

a. Disk formatting
b. Partition creation
c. Disk recovery
d. None of the above

Chose a word from the list below to complete the sentences in questions 92 - 95

a. Living individual
b. securely
c. Integrity
d. Privacy
e. Up to date
f. Data controller in an organization

92. Data protection laws are primarily about data _____
93. The laws concern data which is about a _____
94. The data is held by a
95. Measures should be taken to ensure that the data has _____

Select a word from the list below to complete the sentences in questions 96 - 98

a. Attribute
b. relationship
c. Tuple
d. Table
e. Entity

96. _____something about which data is recorded, a customer, a product, a customer order
97. _____the data for one row in the table
98. _____One of the data items for an object in relational database, customer name, address

The following relates to Q99 – 100

The simplest way to sort an unordered list of values is the following method.

Step1. Compare the first and second values. If the first value is larger than the second value, swap them.

Step2. Compare the second and third values If the second value is larger than the third value, swap them.

Step3. Compare the third and fourth values If the third value is larger than the value, swap them.

Step4. Keep on comparing adjacent values, swapping them if necessary, until the last two values in the list have been processed.
Step5. Repeat the above steps as many times as necessary.

Initial array:

25
34
98
7
41
19
5

Use the algorithm below to answer questions 99 – 100

99. The algorithm described above is known as _____

a. Quicksort b. Insertion sort c. Selection sort d. Bubble sort

100. complete the following sentence with the correct word:

When we have completed the first pass through the entire array, the _____ is in the correct position.

a. Smallest value b. Middle value c. Largest value d. No value

BONUS QUESTIONS

You may wish to answer the following additional questions for extra marks

A
25
34
7
41
19
5
98

B
7
19
5
25
34
41
98

C
25
7
34
19
5
41
98

D
7
25
19
5
34
41
98

Which of the above options correctly depicts the state of the array after each of the following:

B1. The first pass

B2. The second pass

B3. The third pass

B4. The fourth pass

B5. How many passes are required for the array to be fully ordered?

a. 5 b. 7 c. 8 d. 6