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

UNIVERSITY OF GHANA

BSC INFORMATION TECHNOLOGY SECOND SEMESTER SUPPLEMENTARY EXAMINATIONS: 2020/2021

DEPARTMENT OF COMPUTER SCIENCE

CSCD 101: INTRODUCTION TO COMPUTER SCIENCE I (3 Credits)

INSTRUCTION: ***Attempt ALL questions. Write your answer in the corresponding space in the summary table below. Submit the summary table together with all the question paper at the end of the exams.***

TIME ALLOWED: *TWO (2) HOURS*

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

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

56. 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

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

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

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

60. 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

61. You can find the number of modes supported by a fibre using the following formula,

$$= \frac{\left[\frac{\pi d}{\lambda}\sqrt{n_1^2 - n_2^2}\right]^2}{2}$$

Compute the number of modes that will be supported by a fibre with core diameter of $20mm$, a core refractive index of 1.5 and a cladding index of 1.48 if it is excited by light of frequency 0.25MHz_. *Write your answer against the question number.*

62. 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

63. 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

64. 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

65. 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

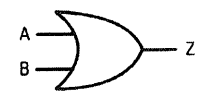
66. In a class A address system, how many bits are used for the host?
    a. 8
    b. 16
    c. 24
    d. 32

67. In a class B address system, how many bits are used for the host?
    a. 8
    b. 16
    c. 24
    d. 64

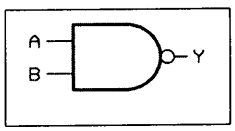
68. In a class C address system, how many bits are used for the host?
    a. 8
    b. 16
    c. 24
    d. 128

The diagrams below (A-D) represent some logic gates. Questions 69 – 72 are based on these diagrams.

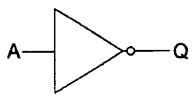
A



B



C



D

None of the above diagrams

69. Which diagram represents a NOT gate? C

70. Which diagram represents a NAND gate? D

71. Which diagram represents an AND gate? B

72. Which diagram represents an OR gate? A

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

73. 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

74. 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

75. 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

Consider the following scenario and use it to answer the questions which follow (Q76 – 82):
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.

76. 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:

77. Car_travel = _____IF day = weekend

78. Train_travel = _____IF day = weekday AND distance ≤ 200

79. 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

80. 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

81. 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

82. 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 83 – 85 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 summarises 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

83. 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	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

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	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

84. 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

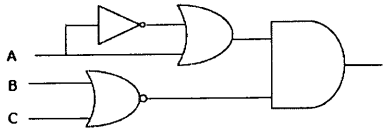
Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

D

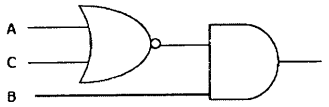
Inputs			Output
A	B	C	F1
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

85. 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.

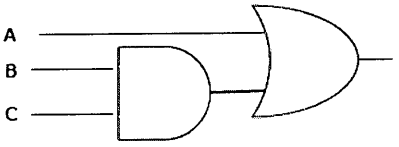
A



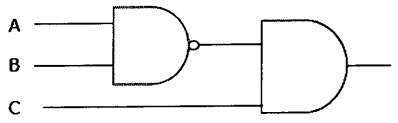
B



C



D



86. A register is a storage unit with limited capacity of just a few bytes. TRUE or FALSE?

87. A register is part of the processor (or microprocessor or CPU). TRUE or FALSE?

88. A register has a very short access time. TRUE or FALSE?

89. A register may be special purpose or general purpose. TRUE or FALSE?

90. An assembly language or machine code language program can access an individual register. TRUE or FALSE

91. A _____ is a connection point for external devices
bus. Bus
b. Input
c. Pen drive
d. Port

92. What is the correct full form of VLSI?
a. Very Large Scale Integration
b. Very large Software Integration
c. Very large Scale Implementation
d. Very Large Software Implementation

93. Which of the following are also known as the Knowledge Information processing System?
    a. Fourth Generation Computers
    b. Fifth Generation Computers
    c. Laptops
    d. Servers

94. Which among the following statement is correct?
    a. Machine Language was developed after Assembly Language
    b. Assembly Language was developed prior to Machine Language
    c. Both Assembly and machine languages were developed together
    d. First generation computers used machine language and second generation computers used assembly language

95. A hybrid computer exhibits the features of _____
    a. Analogue computer
    b. Digital computer
    c. Both analogue and digital computer
    d. Mainframe computer

96. Which of the following Key is not found in normal computers/laptops?
    a. Turn key
    b. Alt key
    c. Del key
    d. Shift key

97. _____ is data that has been organized or presented in a meaningful way.
    a. A process
    b. Information
    c. Software
    d. Storage

98. Which of the following stores more data?
    a. DVD
    b. CD ROM
    c. Floppy Disk
    d. CD RW

99. What is the main difference between a mainframe and a supercomputer?
    a. Supercomputer is much larger than mainframe computers
    b. Supercomputers are much smaller than mainframe computers
    c. Supercomputers are focused to execute few programs as fast as possible while mainframe uses its power to execute as many programs concurrently
    d. Supercomputers are focused to execute as many programs as possible while mainframe uses its power to execute few programs as fast as possible

100. The CPU and the memory are located on the_____ of the computer
    a. Expansion board
    b. Motherboard
    c. Storage device
    d. Output device

1. The term _____ is a branch of engineering science that studies (with the aid of computers) computable processes and structures
    a. Computer Science
    b. Data Analytics
    c. Quantum Mechanics
    d. Discrete Mathematics

2. The term _____ is a procedure of calculating, determining something by mathematical or logical methods a quantitative value
    a. Computer Science
    b. Data Analytics
    c. Computation
    d. Computing

3. Which of the following is false about the abacus?
    a. Earliest archaeological evidence of a Greek abacus used around the 5th century BC.
    b. Earliest documents illustrating the use of the Chinese abacus (suan pan) from the 13th century AD
    c. Schoty is a form of Abacus from Afghanistan
    d. Choreb is a form of Abacus

4. How long did it take to compute 1880 census with The Hollerith Census Machine?
    a. 5 years
    b. 2 years
    c. 1 year
    d. 10 years

5. What year range was IBM punch card used ?
    a. 1990's
    b. 2000's
    c. 1970's
    d. 1980's

6. Who developed the Harvard Mark 1?
    a. Howard Aiken
    b. George McKnight
    c. Isaac Newton
    d. Alan Turing

7. Which of the following statements is/are false about Ada Lovelace?
    a. Referred to as the world's first programmer
    b. Translated Menabrea's Sketch of the Analytical Engine to English
    c. Described how the machine might be configured

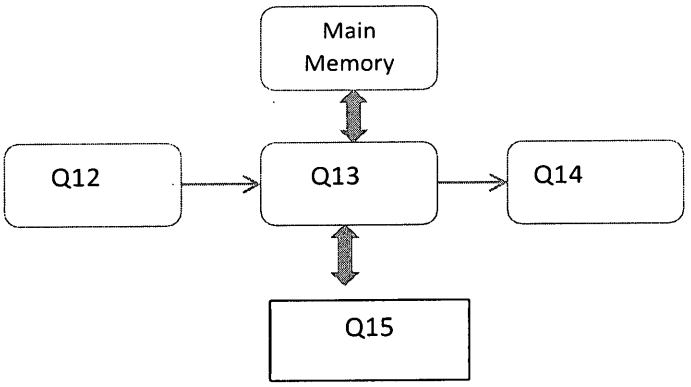
d. Developed the notion in 1950 of a test for machine intelligence now called the Turing Test

8. Who published the draft on stored program concept and is recognized as the inventor of the concept?
   a. John von Neumann
   b. Richard Feynman
   c. Grace Hopper
   d. Jack Kilby

9. 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

10. The set of instructions that tells the computer what to do is
    a. Softcopy
    b. Software
    c. Hardware
    d. Hardcopy

11. A device, which is not connected to the CPU, is called as ---
    a. On-line device
    b. Off-line device
    c. Device
    d. None of the above



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
e. Input

16. 1 kilobyte is equivalent to how many bytes of memory
    a. 1000
    b. 1020
    c. 8
    d. 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. Which of the following is NOT a recognized classification of a computer?
    a. Minicomputer
    b. Supercomputer
    c. Microprocessor
    d. Mainframe

21. 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

22. Software may be defined as the intangible parts of the computer, True of False?
    a. True
    b. False

23. 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

24. Which of the following is not a systems software?
    a. GUI
    b. Operating System
    c. System services
    d. Microsoft Excel

25. 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

26. 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

27. All operations within the computer are performed in which of the following units?
    a. ALU
    b. Control unit
    c. Register
    d. Cache

28. Which of the following actually constitutes the computer?
    a. ALU
    b. Control unit
    c. CPU
    d. Motherboard

29. 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

30. 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

31. 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

32. A bus is a set of _____ used to connect components within the computer
    a. Lines
    b. Codes
    c. Wires
    d. Jumpers

33. Which of the following is an example of a bus?
    a. Data bus
    b. Computer bus
    c. Memory bus
    d. None of the above

34. 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

35. 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

36. 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

37. Which of the following principles is used by cache memory
    a. Data locality
    b. Spatial locality
    c. High speed components
    d. None of the above

38. Which of the following correctly shows the place values in denary number system?
    a.

10^3	10^2	10^1	10^0

    b.

10^3	10^2	10^1	10

    c.

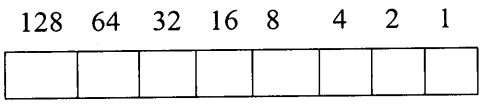
10^3	10^2	100	10^0

    d. None of the above

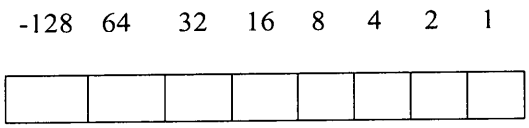
39. Which of the following steps correctly shows how to convert the following 00011110101010100 into hexadecimal?
    a. Divide the binary into groups of four starting from the left most, write the denary for each group, convert each denary into its hexadecimal equivalent
    b. Divide the binary into groups of four starting from the right most, write the denary for each group, convert each denary into its hexadecimal equivalent
    c. Divide the binary into groups of four starting from the left most, add zeros if the last group is not four bits, write the denary for each group, convert each denary into its hexadecimal equivalent
    d. None of the above

40. Write down the hexadecimal equivalent of the binary number in Q39 above _____

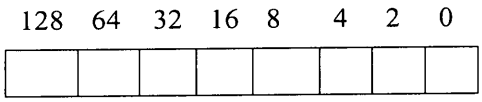
41. Which of the following is the correct representation of the place values in two's complement?
    a.



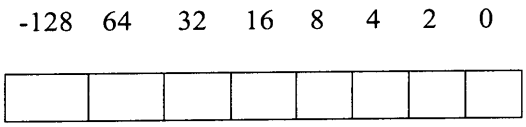
    b.



    c.



    d.



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

1	0	0	0	1	0	0	1

    b.

0	0	0	0	1	0	0	1

    c.

1	1	1	0	1	1	1	1

d.

1	1	1	0	1	0	0	1

43. 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

44. 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

45. A bitmap has an image stored that has resolution of 1024 x 768 and a colour depth of 8. Another file contains a five-minute soundtrack stored using a sampling rate of 100 samples per second and a sampling resolution of 16. What is the size of the bitmap image file?
    a. 6,291,456
    b. 60,000
    c. 1024
    d. 786432

46. Which of the following is an example for which lossless compression is essential?
    a. Text document
    b. Sound
    c. Video
    d. Image

47. Which of the following is not true about bitmapped graphics?
    a. They are used to capture scanned images from paper document
    b. They can be used to scan photograph
    c. They can be used for drawings for specialist applications such as flowcharts and object-oriented class diagrams
    d. None of the above

The following relates to Q48 – 50. Binary representation is used for many different data values. Consider the binary pattern

1 0 10 0 1 1 0

48. What is its value if it represents an 8-bit two's complement?
    a. -90
    b. -38
    c. 6A
    d. A6

49. What is its value if it represents an 8-bit sign and magnitude integer?

a. A6
b. -90
c. 6A
d. -38

50. What is its value if it represents a hexadecimal number?
    a. A6
    b. -90
    c. 6A
    d. -38

51. 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 Q52 – Q55

52. 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

53. 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

54. 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

55. 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