

Instructions:

- * Answer **all** the questions.
- * Write your **Index Number** in the space provided in the answer sheet.
- * Instructions are also given on the back of the answer sheet. Follow those carefully.
- * In each of the questions **1** to **50**, pick one of the alternatives from (1), (2), (3), (4), (5) which is **correct or most appropriate** and mark your response on the answer sheet with a cross (x) in accordance with the instructions given on the back of the answer sheet.
- * Use of calculators is **not allowed**.

Name: _____ Class: _____ Index No: _____

(1) Which of the following cannot be considered as system software?

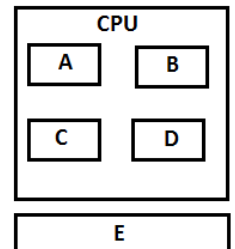
1. Compiler 2. Interpreter 3. Windows 10 4. Web browser 5. Ubuntu

(2) Consider the following with regard to data processing:

- A. Video streaming
B. E-bay purchasing
C. Ceylon Electricity Board (CEB) bill processing
D. GPS tracking systems
1. A and B only 2. A, B and C only 3. B, C and D only
4. A, B and D only 5. All A, B, C and D

(3) Consider the following diagram:

According to the diagram given, what would be the components indicated by the labels A, B, C, D and E respectively?



1. RAM, L1 cache, L2 cache, Memory Management Unit (MMU) and Hard Disk
2. Program Counter, L1 cache, MMU, Arithmetic and Logic Unit (ALU) and RAM
3. Control Unit (CU), ALU, RAM, Registers and Hard Disk
4. RAM, Read Only Memory (ROM), L1 cache, Program Counter and Hard Disk
5. MMU, ALU, RAM, CU and Hard Disk

(4) Consider the following paragraph:

While a program was running inA..., it was interrupted by an I/O event so the values available in registers at that moment were copied toB..... Instructions of the next process which were inC..... were fetched into the CPU, decoded into commands byD..... and executed byE.....

Which of the following is the correct combination for A, B, C, D and E respectively?

1. A –CPU, B –Virtual Memory(VM) C –Random Access Memory (RAM), D –Control Unit(CU) E –Arithmetic & Logic Unit (ALU)
2. A –CU, B –VM C –RAM, D –CU E –ALU
3. A –CPU, B –Process Control Block (PCB) C –Ready Queue, D –CU E –ALU
4. A –CPU, B –RAM C –CU, D –ALU E –PCB
5. A –CU, B –VM C –RAM, D –ALU E –CPU

(5) What is the correct result of bit-wise XNOR operation between the two binary numbers 10001110_2 and 11001011_2 ?

1. 11001111
2. 00110000
3. 01000101
4. 10001010
5. 10111010

(6) What is the correct 2's complement binary representation of decimal –50 ?

1. 00110010
2. 11001101
3. 11001110
4. 10110010
5. 10110001

(7) What is the correct decimal equivalent of 77.7_8 ?

1. 65.125_{10}
2. 63.625_{10}
3. 67.7_{10}
4. 63.875_{10}
5. 63.125_{10}

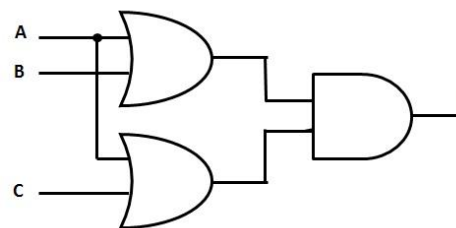
(8) Which of the following represents decimal 620 in Binary Coded Decimal (BCD)?

1. 1001101100_{BCD}
2. 001001101100_{BCD}
3. 110100_{BCD}
4. 011000100000_{BCD}
5. 000000110100_{BCD}

(9) Consider the following Karnaugh map and the logic circuit implemented based on it where A, B and C are the inputs and Z is the output.

		AB			
		00	01	11	10
C	0	e	f	1	1
	1	g	h	1	1

(a) Karnaugh map



(b) Logic circuit based on Karnaugh map

For the logic circuit to correctly implement the logic function represented in the Karnaugh map, what should be the values of e, f, g, h?

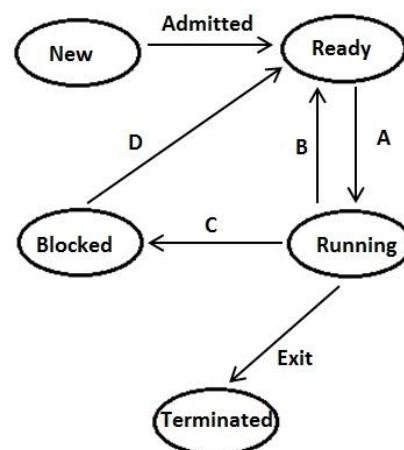
1. e=0, f=0, g=0, h=0
2. e=0, f=0, g=1, h=1
3. e=1, f=1, g=0, h=0
4. e=0, f=0, g=1, h=0
5. e=0, f=0, g=0, h=1

(10) Geethma logs into a single-processor computer and starts an installation of a computer game. While the game is being installed, she opens up a web search engine to search for some information as well.

Consider the following process state transition diagram with respect to the process corresponding to Geethma's installation program.

Consider some reasons for above state transitions:

Reason	Description
1	Geethma is reading a pop up Dialog Box before agreeing to the Terms & Conditions of the game installation program.
2	OS uses preemptive scheduling algorithm so the time allocated for web search process is over.
3	After reading the Terms & Conditions Dialog Box, Geethma clicks the OK button of the Dialog Box.
4	OS begins the second part of the web search process



Which of the following gives a correct combination of reasons for transitions A to D?

1. A-1, B-2, C-3, D-4
2. A-4, B-2, C-1, D-3
3. A-4, B-3, C-2, D-1
4. A-3, B-1, C-2, D-4
5. A-4, B-2, C-3, D-4

(11) A process control block is,

1. A computer hardware unit through which all memory references pass.
2. One huge data structure in which the details of all the running processes at any given time are stored.
3. A data structure that contains information of a particular process.
4. A block of memory reserved in random access memory which contains all process details running in a computer at any given time.
5. A third party utility software that is used to control the processes running in a computer at any given time.

(12) The block size of a disk is 2KB. A portion of its File Allocation Table (FAT) at a particular time is shown below. The portion shown gives the blocks allocated for two files namely *program.py* and *document.txt* as well.

FAT	300	301	302	303	304	305	306	307	308	309
	309	308	303	301		-1		300	305	-1

- Notes:
1. The last block of a file is indicated by – 1.
 2. The directory entry of a file contains the block number of the first block of a file.
 3. Block number 308 is one of the blocks allocated for *program.py* file.

Which of the following gives the directory entry for the *program.py* file and the disk space allocated for the *program.py* file respectively?

1. 308, 4KB
2. 307, 6KB
3. 301, 6KB
4. 302, 10KB
5. 303, 10KB

(13) Which of the following is/are correct with respect to a carrier signal?

- A. It is a low frequency signal.
 - B. The frequency of a carrier signal is constant.
 - C. The wave length of a carrier signal is constant.
1. A only 1. A and B only 3. B and C only
4. A and C only 5. All A, B and C

(14) Which of the following statements is/are correct with regard to modulation?

- A. Manchester encoding is used to modulate digital data into digital signal.
 - B. Amplitude Shift Keying is used to modulate analog data into a digital signal.
 - C. Frequency Modulation is used to modulate analog data into an analog signal
1. A only 2. A and B only 3. B and C only 4. A and C only 5. All A, B and C

(15) Which of the following is/are correct with respect to protocols used in the OSI (Open Systems Interconnection) model?

- A. HTTP is a physical layer protocol.
 - B. Transmission Control Protocol (TCP) is a Transport layer protocol.
 - C. Internet Protocol (IP) is a Network Layer protocol.
 - D. UDP (User Datagram Protocol) is a Data Link Layer protocol
1. A and D only 2. B and C only 3. B, C and D only
4. A, B and D only 5. All A, B, C and D

(16) Read the following sentence:

When data communication takes place between hosts in a network, node to node data transmission should be handled by the relevant protocols.

Which OSI layer is responsible for node to node data transmission?

1. Physical Layer 2. Data Link Layer 3. Network Layer
4. Transport layer 5. Application layer

(17) Given below are some characteristics of *Transmission Control Protocol (TCP)* and *User Datagram protocol (UDP)*:

- A. best suited for applications that do not need high reliability and where transmission time is more critical
- B. faster and requires more resources
- C. guarantees that packets are received in the same order as those sent
- D. used for World Wide Web
- E. Provides error checking and recovery mechanisms

Which of the above are the characteristics of TCP?

1. A, B and C only 2. C, D and E only 3. A, C and D only
4. B, D and E only 5. A, C and E only

(18) Consider the IP address 195.50.254.0/28. Which of the following can be the IP addresses assigned to two hosts in the same subnet?

1. 195.50.254.1 and 195.50.255.1 2. 195.50.254.0 and 195.50.254.1
3. 195.50.254.14 and 195.50.254.15 4. 195.50.254.45 and 195.50.250.49
5. 195.50.254.66 and 195.50.254.78

(19) Consider the following paragraph with three blanks labeled A, B and C:

In a Local Area Network, each network interface is assigned with aA..... IP address and the router connected to the LAN is assigned with aB..... IP address. The address translation from public to private and vice versa is done byC.....

Which of the following is the correct combination for the blanks A, B and C?

1. A –private, B –public, C –Address Resolution Protocol (ARP)
2. A –private, B –public, C –Network Address Translation Protocol (NAT)
3. A –public, B –private, C –ARP
4. A –public, B –private, C –NAT
5. A –public B –private C –Internet Protocol (IP)

(20) Consider the information system types in List A and some examples in List B:

A1 –Transaction Processing System

A2 –Decision Support System

A3 – Executive Support System

B1 – A system that helps the management of a farmland to determine the best time to plant, fertilize and reap their crops.

B2 – A train tickets booking system

B3 – A financial analysis system that supports to take capital investment decisions.

A good matching between lists A and B is:

1. A1 –B1, A2 –B2, A3 –B3
2. A1 –B2, A2 –B1, A3 –B3
3. A1 –B3, A2 –B2, A3 –B1
4. A1 –B2, A2 –B3, A3 –B1
5. A1 –B3, A2 –B1, A3 –B2

(21) Which of the following is **incorrect** about the *Waterfall Model*?

1. It is a sequential model.
2. Requirements shall be clearly defined at the requirements analysis phase.
3. New user requirements can be well accommodated at any stage of the development process.
4. Project cannot be progressed before the completion of one phase.
5. Development team will have a better understanding about the project goals at the early stages

(22) Which of the following are the major components of an Expert system?

1. User Interface, Query, Advice
2. Knowledge from an expert, Non-expert user, Advice
3. Non-expert user, Inference engine, Knowledge Base
4. Non-expert user, Expert system, Knowledge from an expert
5. User Interface, Inference Engine, Knowledge Base

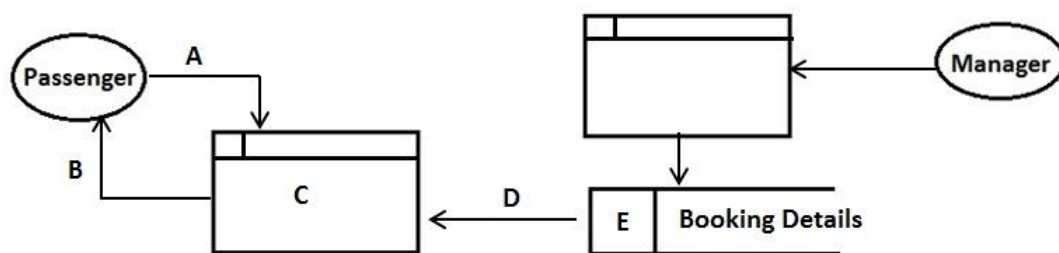
(23) Consider the following characteristics with regard to system development methodologies:

- A. Diagrammatic representation of the system which is already available.
- B. Much emphasis given to system analysis phase
- C. System is modeled as a collection of objects

Which of the above is/are considered as the characteristics of Structured System Analysis and Design Methodology (SSADM)?

- 1. A only
- 2. A and B only
- 3. B and C only
- 4. A and C only
- 5. All A, B and C

(24) A computerized Airline Reservation System is to be modified to accommodate new user requirements. A portion of the DFD drawn is given below. [Answer the questions 24 and 25 considering the given diagram]



Which of the following contains the suitable replacements for A, B, C and D in the above diagram?

- 1. A –Request Booking Details, B –Supply Booking Details, C –Booking Counter, D –Seat availability
- 2. A – Booking Details, B –Booking details, C –Booking Counter, D –Seat availability
- 3. A –Booking request, B –Rejection email, C –Handle Passenger Bookings, D-Seat availability
- 4. A –Passenger Registration, B –Issue Membership Card, C –Booking Counter, D –Booking Details
- 5. A –Passenger NIC, B –Confirm Passenger NIC, C –Booking Counter, D –Booking information

(25) What could be the label for 'E' in the above diagram?

- 1. D3
- 2. C1
- 3. M1
- 4. T(M)
- 5. T(M)1

(26) Which of the following are the correct modules of SSADM in the correct order?

- 1. Strategy Planning, Feasibility Study, System Analysis, System Design, Implementation, Maintenance
- 2. Strategy Planning, Feasibility Study, System Analysis, System Design
- 3. Feasibility Study, System Analysis, System Design, Implementation, Maintenance
- 4. Feasibility Study, Requirements Analysis, Requirement Specification, Logical System Specification, Physical Design
- 5. Strategy Planning, Feasibility Study, Requirements Analysis, Requirement Specification, Logical System Specification, Physical Design, Implementation, Maintenance

(27) Which of the following is correct with regard to the deployment of a system?

1. Direct Deployment incurs high costs for the client.
2. Pilot Deployment is not well fitted to a bank security system
3. Phased deployment is good for introducing an Enterprise Resource Planning System for an Airbus manufacturing company.
4. Direct Deployment is good for any type of project.
5. Parallel Deployment is better for a large and complex system

(28) Which of the following statements is correct with regard to software testing?

1. Black box testing cannot be implemented by the client of the system under consideration.
2. The end users carry out the white box testing.
3. Black box testers do not need a programming knowledge to conduct a black box testing.
4. Integration testing takes place before unit testing.
5. Acceptance testing must be done by a selected team of software developers.

(29) Consider the following statements with regard to different database models:

- A. Relational database model is the most popular database model in the world at present.
- B. In hierarchical model, data stored in a table at a lower level cannot be accessed directly.
- C. In a network database model, there will be more than one path for a selected data store.

Which of the above statements is/are correct?

1. A only
2. A and B only
3. B and C only
4. A and C only
5. All A, B and C

* Consider the following tables to answer the questions from 30 to 33:

Member

membership_id	name	ISBN	date_borrowed
1520	Sadiska	978-93-5019-561-1	2022-11-01
1530	Imasha	978-93-8067-432-2	2022-11-01
1620	Buddika	978-93-5163-389-1	2022-10-20
1530	Imasha	978-93-5019-561-1	2022-11-15
1500	Mahima	978-93-8067-432-2	2022-11-20

Book

ISBN	book_title
978-93-5019-561-1	Introduction to Computer
978-93-8067-432-2	Client Server Computing
978-93-5163-389-1	Data Structure using C
0-078-82199-1	The Java Handbook
1-565-92183-6	Java in a Nutshell

(30) Which of the following is most suited to be qualified as the primary key of the Member table with respect to the given details?

1. membership_id
2. ISBN
3. membership_id and ISBN
4. ISBN and name
5. name and date_borrowed

(31) Consider the following statements with regard to the Member and Book tables given above:

- A. Member table has partial dependency
- B. Member table has transitive dependency
- C. The tables above have a many-to-many relationship

Which of the above statements is/are correct?

- 1. A only
- 2. A and B only
- 3. B and C only
- 4. A and C only
- 5. All A, B and C

(32) Which of the following SQL statements will generate an error when executed?

- 1. SELECT ALL FROM Member;
- 2. SELECT * FROM Member WHERE membership_id = 1520;
- 3. SELECT ISBN, book_title FROM Book WHERE book_title LIKE 'Data%';
- 4. SELECT Member.name FROM Member ORDER BY name;
- 5. SELECT name FROM Member ORDER BY name DESC;

(33) Consider the following statements with regard to the above tables:

- A. Both ISBN and date_borrowed attributes in the Member table should be taken away to a new table in the normalization process.
- B. Both Member and Book tables are in 2NF
- C. There is data redundancy in Book table

Which of the above statements is/are correct?

- 1. A only
- 2. A and B only
- 3. B and C only
- 4. A and C only
- 5. All A, B and C

(34) Which of the following statements is incorrect with regard to the keys used in relational databases?

- 1. There cannot be two primary keys in a given database.
- 2. Primary key values must be unique.
- 3. Primary key field cannot have NULL values.
- 4. There can be more than one candidate key in a relation.
- 5. Foreign key of a relation should reference to a primary key of a table.

(35) Which of the following is not a data manipulation command?

- 1. SELECT
- 2. UPDATE
- 3. DELETE
- 4. ALTER
- 5. INSERT

(36) Consider the following statements with regard to Extended Entity Relationship (EER) Diagrams:

- A. EER diagrams inherit all characteristics available in ER diagrams.
- B. A sub class in an EER diagram inherits all attributes of a base class.
- C. EER diagram entity symbol is different from an ER diagram entity symbol.

Which of the above statements is/are correct?

- 1. A only
- 2. A and B only
- 3. B and C only
- 4. A and C only
- 5. All A, B and C

(37) Which of the following statements is incorrect with regard to programming languages?

1. Python is a high level language.
2. Assembly is a low level language
3. Third generation languages are machine independent
4. A high level language program can be translated into machine code by using either a compiler or an interpreter.
5. Assembly languages are more user friendly than machine languages.

Consider the algorithm expressed by the flowchart and answer the questions

This algorithm takes an integer as the first input denoted by n . Assume that n is always greater than or equal to 1. The algorithm is expected to output the count of integers that are greater than 100 among the sequence of n inputs.

(38) For the algorithm to function correctly as expected, what should be inserted at the label A?

1. Is $x \geq 101$
2. Is $x > 99$
3. Is $i > 100$
4. Is $n > 100$
5. Is count > 100

(39) For the algorithm to function correctly as expected, what should be inserted at the label B?

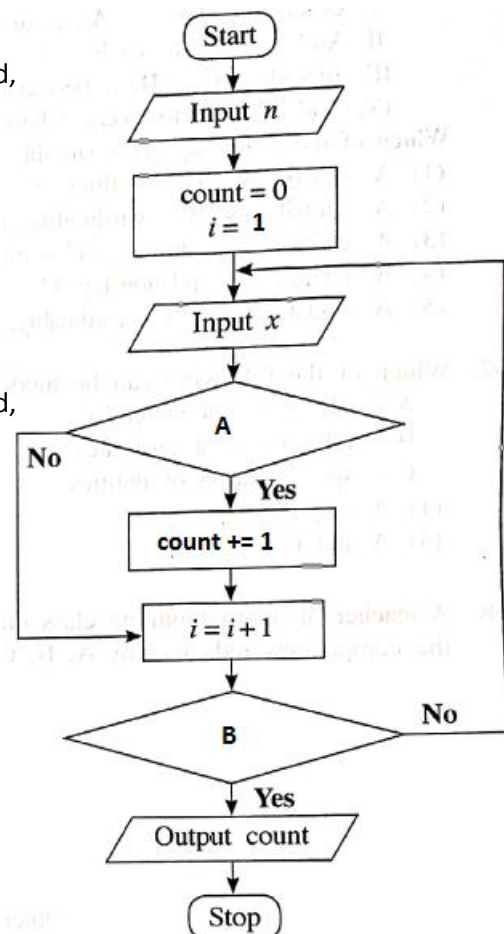
1. Is $i \geq n$
2. Is $i = (i + 1)$
3. Is $i = (n + 1)$
4. Is $n = x$
5. Is $i = 100$

(40) Which of the following Python programs will implement the algorithm in the flowchart?

- I.


```
n = input()
count, i = 0, 1
while i < n:
    x = int(input('Input x'))
    if x > 100:
        count += 1
    i = i + 1
print(count)
```
- II.


```
n = input()
count = 0
i = 1
for i in range (int(n) + 1):
    if x >= 101:
        count = count + 1
print(count)
```



```

III.  n = int(input('Enter value for n: '))
      count = 0
      i = 1
      for i in range(0, n):
          if x > 100:
              count += 1
      print(count)

```

1. I only 2. I and II only 3. II and III only 4. I and III only 5. All I, II and III

(41) What will be the output after executing the following Python code?

```

n = 8
m = (n & 7) + (2 ** 4)
print(m)

```

1. 31 2. 0 3. 16 4. 23 5. 13

(42) What will be the output of the following Python code segment?

```

x = 5
def fun(x):
    a = x + 1
    x = a
fun(x)
print(x)

```

1. 5 2. 6 3. 11 4. x 5. none

(43) What will be the output of the following Python code segment if the user inputs the string 'HELLO'?

```

message = input("\nEnter the message to encrypt: ")
for i in range(0, len(message)):
    resultE = resultE + chr(ord(message[i]) + 1)
print(resultE)

```

1. OLLEH 2. hello 3. IFMMP 4. PMMFI 5. 5

(44) What will be the output when the following Python code is executed?

```

n = 3
while n <= 5:
    if n < 5:
        n = n + 1
    elif n == 4:
        pass
    else:
        break
    n = n + 1

print(n)

```

1. 3 2. 4 3. 5 4. 6 5. error

(45) Read the following sentence about Web Development:

“Websites can be static or dynamic and they usually have a front end and a backend.A.....
can be used to program front end and the backend of a dynamic website will be programmed by
usingB..... ”

Which of the following can be replaced with the labels A and B in the blanks above respectively?

1. HTTP and HTML
2. HTML and HTTP
3. HTTP and PHP
4. HTML and PHP
5. PHP and HTML

(46) Which of the following is the correct example for a CSS id selector?

1. .myid {text-align:center; color:blue;}
2. #textformat {text-align:center; color:blue;}
3. textid {text-align:center; color:blue;}
4. @import .id{ text-align:center; color:blue;;}
5. Id = {text-align:center; color:blue;}

(47) Consider the following HTML code:

```
<!DOCTYPE html>
<html>
<head>
<style>
body {background-color:#0000ff; }
p { color:#ffffff ;}
</style>
</head>
<body>
<h2> Bandaranayake College </h2>
<p style="color:yellow;"> Bandaranayake College is one of the leading government schools in Sri Lanka</p>
<p> It is a boys' school </p>
</body>
</html>
```

Which of the following statements is/are correct with regard to the above code segment?

- A. The content in the last <p> element in the above code segment will be in white color
 - B. Whole text on the page will be rendered in yellow color.
 - C. Page has used both internal and external CSS.
 - D. The background of the web page is in blue color.
1. A, and D only
 2. B and C only
 3. A, B and C only
 4. B, C and D only
 5. All A, B, C and D only.

(48) Which of the following statements is correct with regard to IoT applications?

1. IoT applications can only be implemented using the Internet platform.
2. IoT cannot be homogeneous(similar) in nature
3. Power consumption of IoT applications is usually higher.
4. IoT infrastructure is more expensive.
5. IoT applications cannot be implemented through Internet.

(49) Consider the following statements with regard to Arduino program codes:

- A. Codes inside 'void setup()' will run only once.
- B. Codes inside 'void loop()' will run only once.
- C. Void functions do not return any information to the function from which it was called.

Which of the above statements is/are correct?

- 1. A only 2. A and B only 3. B and C only
- 4. A and C only 5. All A, B and C

(50) Consider the following statements with regard to PHP database connections:

- A. mysqli extension can be used to connect only a MySQL database.
- B. mysqli can be used to connect databases both in procedural and object oriented ways.
- C. '\$con = mysqli_connect(\$servername, \$username, \$password, \$databasename)' code can be used to connect to a database in procedural way.

Which of the above statements is/are correct?

- 1. A only 1. A and B only 3. B and C only
- 4. A and C only 5. All A, B and C