National Field Work Center,

Conducting

G.C.E. (Advanced Level) Examination - 2023 , Term - 5

Information & Communication Technology [ICT]

தகவல், தொடர்பாடல் தொழினுட்பவியல் I Information & Communication Technology I	20	E	I	இரண்டு மணித்தியாலம் Two hours

Instructions:

- *Answer all the questions.*
- *Write down 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 (1),(2),(3),(4),(5) which is correct or most appropriate and mark a cross (X) in accordance with the instructions given on the back of the answer sheet.*
- *Use of calculators is not allowed.*

Part - I

1. Consider the following statements.

A - All operating systems are open source software

B - all perating systems are all system software

C - all pplication software are open source software

Which of the above is / are correct?

(1) A only (2) B only (3) A,B only (4) A,C only (5) B,C only

2. Which of the following is a good example of real-time processing?

(1) Sytem that repares payroll system

(2) System that prepares electricity utility bill

(3) Flight control system

(4) Telecommunication payment system

(5) System that prepares water utility bill

3. Which of the following does not influence the reduction of the digital divide gap?

(1) Development of communication infrastructure at village levels

(2) To develop awareness among the public about information communication technology

(3) Providing used computers to low income earners for learning purposes

(4) Providing opportunities for all students in schools to learn information communication technology

(5) Granting of loans to the general public by banks

[See page no. 2

4. Which of the following is the function of a basic input-output system (BIOS) in a computer?

(1) It provides physical interfaces to various devices

(2) It provides programs for communication of the central processing unit with other devices

(3) It provides memory space for loading applications from the hard disk

(4) It provides power to run the computer

(5) It provides the memory space required by the computer

5. Consider the following statements about dynamic random access memory (DRAM).

A - It is used as a technology of register

B - It has a lower speed than static random access memory (SRAM)

C - Its density is higher than static random access memory technology

Which of the above is / are correct?

(1) A only (2) B only (3) C only (4) B,C only (5) A,B,C all

6. What is the simplified result of the Boolean expression $A\bar{B}\bar{C} + \bar{A}\bar{B}C + BC + B\bar{C}$?

(1) $A\bar{C} + \bar{A}C + B$

(2) $\bar{B}(A\bar{C} + \bar{A}C) + B$

(3) $\bar{C}(A\bar{B} + B) + C(\bar{A}\bar{B} + B)$

(4) $A\bar{C} + B$

(5) $BC + A\bar{C} + \bar{A}C$

7. Consider the following Karnaugh map.

AB \ C	0	1
00	1	0
01	0	1
11	1	1
10	0	0

Which of the following Boolean expression is given by Karnaugh map?

(1) $A\bar{C} + \bar{A}\bar{B}$

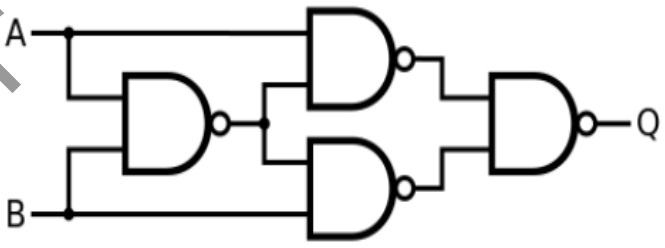
(2) $AB + BC + \bar{A}\bar{B}\bar{C}$

(3) $AB + \bar{A}BC$

(4) $BC + AB + A\bar{C}$

(5) $B\bar{C} + \bar{A}C$

8. Consider the following logic circuit.



Which of the following Boolean expression is equivalent to the output Q of the logic circuit given above?

(1) $\bar{A}B + A\bar{B}$

(2) $AB + \bar{A}\bar{B}$

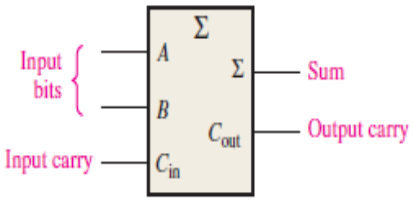
(3) $AB + \bar{A}$

(4) $A + \bar{B}$

(5) $A + B$

[See page no. 3

9. Consider the logic symbol with the following usual notations of full adder used in electronic circuits.



Which of the following(s) is /are correct about full adder?

A - $C_{out} = \bar{A}\bar{B} + (A \oplus B)C_{in}$

B - $\sum = (A \oplus B) \oplus C_{in}$

C – If inputs A = 1, B = 0, and Cin = 1 are, $\sum = 1$, and $C_{out} = 0$

(1) A only (2) B only (3) C only (4) B,C only (5) A,B,C all

10. Consider the following paragraph about the virtual memory function of an operating system.

"When ……①……. is executed, it may require more memory than what is ……②…… . Virtual memory steps in by temporarily transferring portions of the program's data and code between RAM and a dedicated portion of the ……③…… . This process, known as ……④…… ensures that the active parts of a program are kept in RAM, while less frequently used parts are stored on harddisk".

The order for filling the spaces ①,②,③, and ④ are respectively.

(1) ① - Page file, ② - Physical memory, ③ - Program, ④ - Paging
(2) ① - Paging, ② - Physical memory, ③ - Page file, ④ - Program
(3) ① - Program, ② - Physical memory, ③ - Page file, ④ - Paging
(4) ① - Physical memory, ② - Program, ③ - Page file, ④ - Paging
(5) ① - Program, ② - Paging, ③ - Page file, ④ - Physical memory

11. Which of the following is not included commonly in process control block (PCB)?

(1) Process number
(2) Capacity of hard disk
(3) Process scheduling state
(4) Program counter
(5) Process state

12. The operating system uses various ways to make space allocations for files.

Among them "……..creates a table of indices (pointer) at the time of file creation".

Which of the following is suitable for filling the blank?

(1) Linked allocation
(2) Memory allocation
(3) Contiguous allocation
(4) Indexed allocation
(5) Harddisk allocation

[See page no. 4

13. Consider the following statements.

A - Data can be retransmitted if packets do not reach their destination
B - Connection is not required to initiate and complete data transfer
C - Complete error checking ensures that data reaches its destination
D - Slower but has complete data delivery
E - Lower overhead

Which of the above is /are correct about UDP (user datagram protocol)?

(1) A,B only
(2) B,E only
(3) B,D,E only
(4) A,D,E only
(5) A,B,C,E only

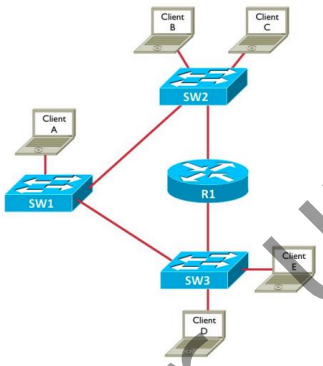
14. Consider the following statements about ADSL (Asymmetric digital subscriber line).

A - This enables faster data transmission over existing copper wire telephone lines at high bandwidth
B - ADSL provides simultaneous analog (voice) information and data over a single telephone line
C - It usually provides Internet connection data at high upload speed and low download speed
D - This is faster compared to a traditional dial-up connection and a cost-effective method of accessing the Internet

Which of the above are true about ADSL?

(1) A,B,C only
(2) B,C,E only
(3) A,B,D only
(4) A,D,E only
(5) A,B,C,D only

15. In the following topology, how many collision domains are represented?



Where,

SW1, SW2, SW3 - Switches

R1 - Router

(1) 3 (2) 4 (3) 5 (4) 9 (5) 7

16. Consider the following statements about proxy server.

A - It is considered as an intermediary server between client and the Internet
B - It can be used for the Internet connection sharing
C - It fasten the service by process of retrieving content from the cache which was saved when previous request was made by the client
D - It allows to hide, conceal and make network user anonymous by hiding user's IP address.

Which of the above is / are correct statements?

(1) A,B,C only (2) A,C,D only (3) A,B,D only (4) C,D,E only (5) A,B,C,D all

[See page no. 5

17. Consider the following paragraph.

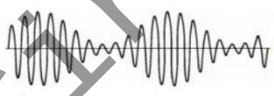
The ① is routing packets by discovering the best path across a physical network. The ② is composed of two parts such as Logical Link Control (LLC), which identifies network protocols, performs error checking and synchronizes frames, and Media Access Control (MAC) which uses MAC addresses to connect devices and define permissions to transmit and receive data. The ③ is responsible for reassembling the segments on the receiving end. The ④ defines how two devices should encode, encrypt, and compress data so it is received correctly on the other end.

(1) ① - Datalink layer ② - Network layer ③ - Transport layer ④ - Presentation layer
(2) ① - Network layer ② - Datalink layer ③ - Transport layer ④ - Presentation layer
(3) ① - Network layer ② - Transport layer ③ - Datalink layer ④ - Presentation layer
(4) ① - Presentation layer ② - Datalink layer ③ - Transport layer ④ - Network layer
(5) ① - Transport layer ② - Datalink layer ③ - Network layer ④ - Presentation layer

18. What is the IP address range to assign to a subnet consisting of 172.16.1.10/19 IP address block?
(1) 172.16.0.1 – 172.16.31.254
(2) 172.16.0.1 – 172.16.63.254
(3) 172.16.0.0 – 172.16.31.255
(4) 172.16.0.1 – 172.16.31.255
(5) 172.16.0.0 – 172.16.63.254

19. Consider the following statements regarding networking devices.
A - A device that forwards data packets along networks, connected to at lease two networks and uses protocols to find the best routes
B - A device that filters and forwards packets between LAN segments, operating at layer 2 in OSI model
C - A device that provides a common connection point for devices on a network, contains multiple ports and copies packets arriving at one port to all other ports
The above statements in correct order refer to:
(1) Router, Switch, Hub
(2) Switch, Router, Hub
(3) Router, Hub, Bridge
(4) Router, Gateway, Hub
(5) Hub, Switch, Router

20. Consider the following figures representing types of modulations.

X - 
Y - 
Z - 

Which of the following is correct?
(1) X → FM, Y → AM, Z → PM
(2) X → FM, Y → PM, Z → FM
(3) X → AM, Y → PM, Z → FM
(4) X → AM, Y → FM, Z → PM
(5) X → PM, Y → AM, Z → FM

[See page no. 6

21. A cable consists of a copper wire in the middle surrounded by isolation material which in turn is surrounded by a braided outer conductor. All these are encased in a protective plastic covering running along the cable. What is the type of this cable?

(1) Fiber optic cable
(2) Coaxial cable
(3) UTP cable
(4) STP cable
(5) A cable used for domestic wiring

22. Consider the following definitions about three types of impairments related to transmission of signal in a medium.

A - **Attenuation** → loss of signal power as it propagates over a distance in the media
B - **Delay distortion** → is the relative delay of individual signal components caused by the media on the propagated signal
C - **Noise** → unwanted energy from sources other than the transmitter

Which of the above is / are true?

(1) A only (2) A,B only (3) C only (4) A,C only (5) A,B,C all

Consider the following scenarion to answer questions **(23)** and **(24)**.

The owner of ABC pharmacy wants to upgrade his business by using a software system for his daily business operations. He wants to have a computerized system which can be used to store all the information regarding the drugs, search and record them at the point of sale. Further, he needs his customers to upload their prescription to his system before coming to the pharmacy, in order to minimize the delay. However, he likes to give this facility only regular customers.

23. What types of software is most suitable for the above system?

(1) System software and Business software
(2) Generic software and System software
(3) Scientific software and Customized software
(4) Application software and Web-based software
(5) Embedded software and Web-based software

24. Which of the following would be the functional requirements of the above system?

A - Regular customers shall be able to login to the system.
B - The system should be fast enough to work without delaying the business process.
C - The user interface of the system should be easy for customers to operate without any confusion.
D - The system should alert the user about expired drugs based on drug details.

(1) A,B only (2) B,C only (3) A,D only (4) B,D only (5) A,B,C,D all

[See page no. 7

25. Consider the following table consisting of software process models in column P and explaining them in column Q.

	Column P		Column Q
(i)	Waterfall model	**(a)**	It is more focused for a system with requirements that have the risk of changing.
(ii)	Prototyping model	**(b)**	It is suitable for a project with new business engaged with stable requirements.
(iii)	Spiral model	**(c)**	The initial version of software is first developed, tested, and refined as per user feedback repeatedly till a final acceptable software is achieved.
(iv)	Agile model	**(d)**	It is characterized by a set of clearly defined milestones and deliverables.
(v)	RAD model	**(e)**	It refers to a software development approach based on iterative development and this method break tasks into smaller iterations with time slices.

Which of the following is correct pair?
(1) (i) → (a), (ii) → (c), (iii) → (d), (iv) → (e), (v) → (b)
(2) (i) → (c), (ii) → (b), (iii) → (a), (iv) → (e), (v) → (d)
(3) (i) → (d), (ii) → (c), (iii) → (a), (iv) → (b), (v) → (e)
(4) (i) → (d), (ii) → (c), (iii) → (a), (iv) → (e), (v) → (b)
(5) (i) → (a), (ii) → (b), (iii) → (c), (iv) → (d), (v) → (e)

26. Consider the following statements regarding the Waterfall model in software development.
A - User involvement is minimum during the software development time
B - Having well documentation than the other software process models
C - It is an old model that is not popular now
Which of the above statements is/are true?
(1) A only (2) C only (3) A,C only (4) B,C only (5) A,B,C all

27. A testing that isolates each part of the system and shows that the individual components are correct is called testing.
(1) white-box testing
(2) black-box testing
(3) unit testing
(4) system testing
(5) acceptance testing

28. Which of the following is/are correct about custom software?
A -They are developed to satisfy the needs of particular customers
B - In comparison to COTS packages, users can use most of its features
C - They are less costly in comparison to COTS packages
(1) A only (2) B only (3) C only (4) A,B only (5) A,B,C all

[See page no. 8

29. Consider the given table below.

	Information Systems		Description
(i)	Executive Support Systems	**(a)**	A system which uses knowledge to solve complicated problems in a logical manner.
(ii)	Decision Support System	**(b)**	An Information System that compiles data and analysis models, or provides the administrative staff with analysis tools, makes the semi-structures and structured decisions of an organization.
(iii)	Expert System	**(c)**	information system that addresses unstructured decision making through advanced graphics and communications for the strategic level users of an organization.

Which of the below given is correct in regards to the table?

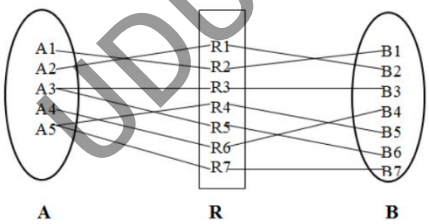
(1) (i) → (a), (ii) → (b), (iii) → (c)
(2) (i) → (b), (ii) → (a), (iii) → (c)
(3) (i) → (b), (ii) → (c), (iii) → (a)
(4) (i) → (a), (ii) → (c), (iii) → (b)
(5) (i) → (c), (ii) → (b), (iii) → (a)

30. Which of the following statement(s) is / are correct about DFD drawn using SSADM?

A - External entities are often referred to as data sources and sinks
B - All information represented within the system is sourced initially from a process
C - Data flow from a data store can only go to a data store
D - Each external entity must relate to at least one data flow

(1) A,C only (2) A,B,D only (3) A,D only (4) B,C,D only (5) A,B,C,D all

31. The following figure represents the relationship between two entities A and B. What are the cardinality and degree of relationship R respectively ?



(1) 1:N, unary (2) M:N, unary (3) Binary, 1:N
(4) 1:N, binary (5) Binary, N:1

32. What are the advantages of database systems over file based approach?

A - Reducing data isolation
B - Increasing data duplications
C - Enhancing database security mechanisms
D - Minimizing data redundancy

Which of the following are advantages of database systems over file-based approach?

(1) A,B only (2) C,D only (3) A,B,C only
(4) A,C,D only (5) A,B,C,D all

[See page no. 9

33. Followings are the three main steps in designing a new database.

I - Creating a logical design that can be expressed in a data model implemented in a DBMS
II - Requirements specifications and analysis
III - Creating the physical design during which further specifications are provided for storing and accessing database

Which of the following answer depict the correct order in designing a new database?

(1) II, I, III (2) II, III, I (3) I, II, III (4) I, III, II (5) III, II, I

34. Which of the following are true regarding anomalies that result from data redundancy?

(1) Only creation and update anomalies are resulted from data redundancy
(2) Only insertion, update and creation anomalies are resulted from data redundancy
(3) Only insertion, update and delete anomalies are resulted from data redundancy
(4) Only deletion anomalies are resulted from data redundancy
(5) Only insertion and update anomalies are resulted from data redundancy

35. User MALIK would like to insert a row into the **Employee** table, which has three columns: **EMPID**, **LASTNAME** and **SALARY**. The user would like to enter data for **EMPID** 59694, **LASTNAME** HARRIS, but no salary.

Which of the following SQL statement(s) is / are correct?

A - INSERT INTO Employee VALUES (59694, 'HARRIS');
B - INSERT INTO Employee (EMPID,LASTNAME,SALARY) VALUES (59694, 'HARRIS');
C - INSERT INTO Employee VALUES (59694, 'HARRIS', NULL);
D - INSERT INTO Employee (EMPID, LASTNAME, SALARY) VALUES (59694, 'HARRIS', NULL);

(1) A,B only (2) C,D only (3) A,B,C only (4) A,C,D only (5) A,B,C,D all

36. Consider the following incomplete sentence.

A …….. attribute is an attribute that can be further subdivided to yield additional attributes.

What is the best way of completing it?

(1) Composite (2) Simple (3) Single-Valued (4) Multi-Valued (5) Derived

37. Relationship cardinality is best described as the

(1) Number of items in a relationship
(2) Number of relationships in which an entity can appear
(3) Number of items in an entity
(4) Number of entity sets which may be related to a given entity
(5) Number of rows in a table

38. Consider the following Python program.

```
x = "awesome"
def myfunc():
    global x
    x = "fantastic"
    print ("Python is " + x)
myfunc()
print ("Python is " + x)
```

What is the output of the above program when it is executed?

[See page no. 10

(1)
Python is awesome
Python is awesome

(2)
Python is awesome
Python is fantastic

(3)
Python is fantastic
Python is awesome

(4)
Python is fantastic
Python is fantastic

(5) Will show error message

39. Consider the following Python program.

```
S = 'The way to get started is to quit talking and begin doing'
ch = "e"
c = 0
w = 0
for i in range(len(S)):
    if c % 2 == 0 and S[i] == ch:
        w += 1
        c = 1
    elif S[i] == " ":
        c = 0
print(w)
```

What is the output of the above program when it is executed?

(1) 4 (2) 12 (3) e (4) 6 (5) get

40. Consider the following Python statements.

A - *a, b = (2, [3, 4])* B - *s = set()*

C - *c = 2, 3, 4* D - *a = b, c = (1, [2, 3])*

Which of the above is/are valid python statements?

(1) A only (2) B only (3) A,C only (4) A,B,C only (5) A,B,C,D all

41. In the following python program, what is the output when the user inputs 11?

```
res = 'A'
n =int(input())
if n > 5:
    res = 'P'
    if n > 8:
        res = 'Q'
    else:
        res = 'R'
    if n > 10:
        res = 'S'
else:
    res='Z'
print(res)
```

(1) A (2) P (3) Q (4) Z (5) S

[See page no. 11

42. What is the output after the python statement *print (5 | 2 ^ 3 << 2)* is executed?

(1) 2 (2) 15 (3) 3 (4) 1 (5) 4

43. Consider the following statements in regards to computer programming

A - Python is an object-oriented programming language.

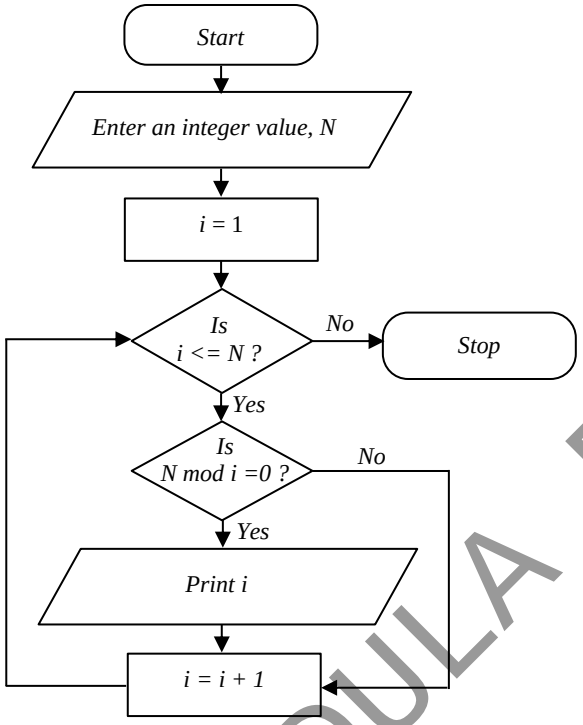
B - First and second generation programming languages are collectively called as " High-level programming languages."

C - Compiler translates one instruction at a time from source code to machine code

Which of the above is/are correct?

(1) A only (2) B only (3) C only (4) A,B only (5) A,B,C all

Answer questions **(44)** and **(45)** using the flowchart given below.



44. Which of the following statements is / are correct in relation to the above flowchart?

A - When a negative value is given to N, an output will be shown

B - When N is given a positive integer value, it stops

C - When N is given the value 6, the output is 1 2 3 6

(1) A only (2) B only (3) C only (4) A,B only (5) A,B,C all

45. Which of the following is/are equivalent to the python program in **(44)?**

I

```
i = 1
n = int(input())
while i <= n:
    if n % i == 0:
        print(i)
    i = i + 1
```

II

```
i = 1
n = int(input())
while True:
    if n % i == 0:
        print(i)
    i = i + 1
    if i > N: break
```

III

```
n = int(input())
for i in range (N):
    if n % i == 0:
print(i)
```

(1) I only (2) II only (3) III only (4) I,II only (5) I,II,III all

[See page no. 12

46. If 5 is given as the input in the following program, what will be the output?

```
a = int(input())
n1, n2 = 0, 1
count = 0
while count < a:
   print(n1,end=' ')
   n = n1 + n2
   n1 = n2
   n2 = n
   count += 1
```

(1) 1 2 3 4 5
(2) 0 1 2 3 4
(3) 0 1 1 2 3
(4) 5
(5) 0 1 2 3

47. Which of the following is the HTML code for the output given in the following list?

1. Amal
2. Nimal
3. Sunil

(1) *<dl> <li;1>Amal <li;2> Nimal <li;3> Sunil </dl>*
(2) *<tr> <td> Amal </td> <td> Nimal </td> <td> Sunil </td> </tr>*
(3) * Amal   Nimal   Sunil *
(4) * Amal   Nimal   Sunil *
(5) *<nl> Amal   Nimal   Sunil </nl>*

48. The correct HTML code to insert an image is.
(1) *<image src="image.gif" alt="tree"/>*
(2) *<img alt="tree">image.gif</img>*
(3) *<image href="image.gif" alt="tree" />*
(4) **
(5) **

49. Consider the following HTML code with some blanks to insert a sound file.

```
< (A)   width="320" height="40"  (B) >
    < (C) src="a.mp3"  (D) ="audio/mp3" />
</audio>
```

The appropriate terms to fill the blanks **(A),(B),(C)** and **(D)** are respectively.

[See page no. 13

(1) embed / controls / source / type
(2) audio / controls / source / type
(3) audio / type / source / controls
(4) audio / source / controls / type
(5) embed / controls / source / type

50. The Following is an HTML code with some blanks to display a bookmark.

```
<body>
    <ol>
            <li> <a  (A) = "#section1" (B) ="top" > Part A </a> </li>
    </ol>
    <h1> <a  (C) = "section1"> Part A </a> </h1> <p> <a  (D) ="#top"> Top </a> </p>
</body>
```

The appropriate terms to fill the blanks **(A),(B),(C)** and **(D)** are respectively.

(1) name, name, name, href
(2) href, name, href, href
(3) name, name, href, href
(4) href, name, name, href
(5) name, href, name, href

***

[End.

National Field Work Center, Conducting
G.C.E. (Advanced Level) Examination – 2023, Term - 5

Information & Communication Technology [ICT]

தகவல், தொடர்பாடல் தொழினுட்பவியல் II Information & Communication Technology II	20	E	II

மூன்று மணித்தியாலம் Three hours	மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள் Additional Reading Time - 10 minutes

Use the additional reading time to read the question paper and select and organize questions to prioritize when writing the answer.

Index No. : .....

- This paper comprises of two parts **A and B.** The time allotted for the **two parts** is **three hours only**. Additional Reading time – 10 minutes.
- Use of calculators is **not** allowed**.**

❑ **Part A – Structured Essay**

- Answer **all** the questions on the question paper itself.
- Write your answers in the space provided for each question.
- Please note that the space provided is sufficient for the answer and extensive answers are not expected.

❑ **Part B – Essay**

- This part consists of **six** questions. Answer **four** questions only. Use the papers supplied for this purpose.
- At the end of the time allotted for this paper, tie the **two papers together** so that **Part A** is **on top** of **Part B** and hand them over to the Supervisor.
- You are permitted to remove **only Part B** of the question paper from the Examination Hall.

For Examiner's Use Only

Part	Question No.	Marks
A	1	
	2	
	3	
	4	
B	5	
	6	
	7	
	8	
	9	
	10	
Total		
Percentage		

Final Marks

In numbers	
In words	

Code Numbers

Marking Examiner 1	
Marking Examiner 2	
Checked by	
Supervised by	

[See page no. 2

Part A – Structured Essay

*Answer **all four** questions on this **paper itself**.*

Do not write in this column

1.

(a)

(i) The HTML code to get the following result on a web browser is given below. Fill in the blanks with suitable words.

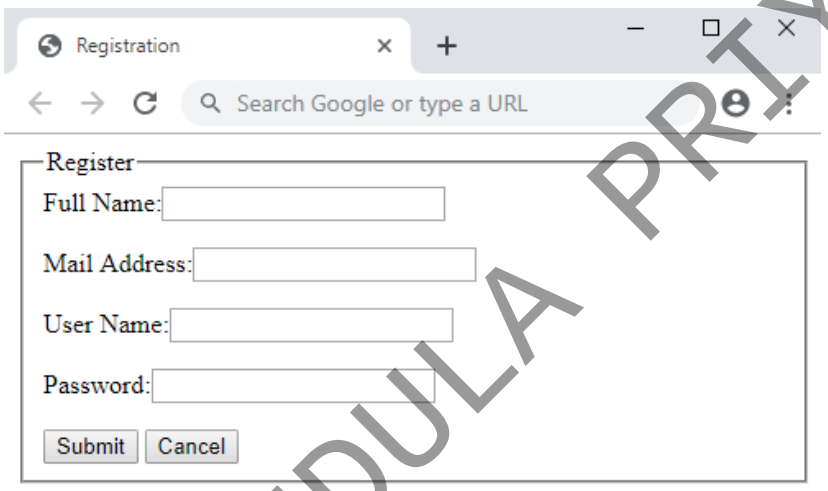
Violin
- a string instrument

Clarinet
- a wind instrument

```
<…….>
    <…….> Violin </……>
    <…….> - a string instrument </……>
    <…….> Clarinet </……>
    <…….> - a wind instrument </……>
</…….>
```

[3 marks]

(ii) Consider the following webpage.



The HTML code for the above webpage is given below. Fill in the blanks with suitable words.

```
<html>
<head>
        <title> Registration </title>
</head>
<body>
<form action="register.php" method="post">
        <fieldset>
        <legend> Register </legend>
                Full Name: <input type="……" name="name"/>
                <p> Mail Address: <input type="……." name="email"/> </p>
                User Name: <input type="……." name="uname"/>
```


[See page no. 3

Do not write in this column

```
        <p> Password: <input type="……." name="pwd"/> </p>
        <input type="……." name="Submit" value="Submit"/>
        <input type="……." name="Cancel" value="Cancel"/>
    </fieldset>
</form>
</body>
```

[3 marks]

(b) Write down the output for the following HTML code in the box given below.

```
<table border="1">
 <tr><th> Heading 1 </th><th colspan="2"> Heading 2 </th></tr>
 <tr><td> 1 </td><td> 2 </td><td> 3 </td></tr>
 <tr><td rowspan="2"> 8 </td><td> 4 </td><td> 5 </td></tr>
 <tr><td> 6 </td><td> 7 </td></tr>
</table>
```

[2 marks]

(c) State each of the following H code elements as true if true and false if false.

(i) * Visit *

(……)

(ii) *<iframe src="demo.html" height="200" width="300" title="ex"> </iframe>*

(……)

(iii) *<input type="email" id="email" name="email">*

(……)

(iv) *<input type="image" src="img.gif" alt="Submit" width="48" height="48">*

(……)

[2 marks]

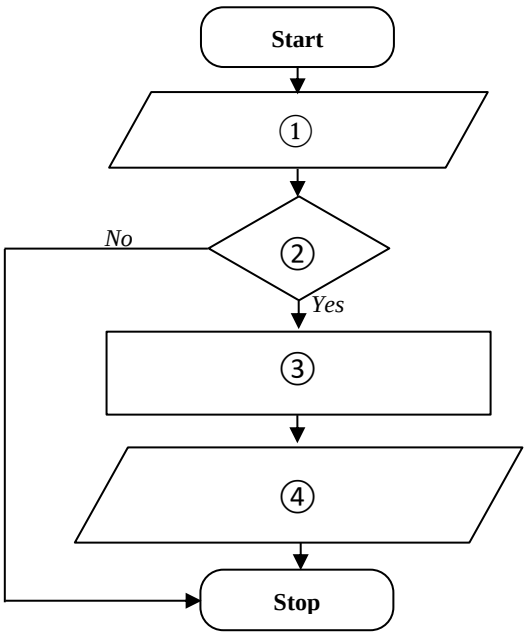
[See page no. 4

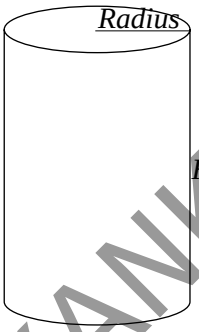
Do not write in this column

2.

(a) Enter the radius and height of a cylinder and consider the following incomplete flowchart to display volume of a cylinder and its radius and height are entered by user. The flowchart should be stopped when radius and heigth are zero or negative values.

Volume of Cylinder = 3.14 x Radius x Radius x Height





Fill in the blanks of flowchart in a suitable way in the following spaces.

① …… ② ……

③ …… ④ ……

[2 marks]

(b) Write down the output of the following Python program.

```
n = 1976
r = 0
while n != 0:
    d = n % 10
    r = r * 10 + d
    num //= 10
print(r)
```

……

[2 marks]

Do not write in this column

(c) Consider the following Python program that returns the number of digits in an integer (the line numbers for code lines are given at left side).

```
1  num = 3452
2  count = 0
3  while num != 0:
4        num //= 10
5        count + 1
6       print(count)
```

(i) State the errors in this program.

……

……

……

[2 marks]

(d) Segments of a python program to retrieve data entries from a database are given below. They are not given in the correct execution order. Write the labels of the program lines in execution oreder in the blanks given below. (write only the labels).

No.	Lines of the program
①	*ex = conn.cursor()*
②	*res = ex.fetchall()* *for i in res:* *print(i)*
③	*ex.execute("SELECT * FROM employee")*
④	*import mysql.connector* *conn = mysql.connector.connect(host="localhost", user="root", password="admin", database="myDB")*

(i) …….. **(ii)** ……..

(iii) …….. **(iv)** ……..

[2 marks]

(e) Write down two characteristics of high level computer programming languages in comparison with low level compute programming languages.

……

……

[2 marks]

[See page no. 6

Do not write in this column

3.

(a) Write down the appropriate terms in column B from the list given below matching for column A.

Lists: [Computer virus, data encryption, Trojan horse, Digital signature, Secret key encryption, Phishing, Public key encryption, Denial of service, Ransomware]

	Column A		Column B
(i)	The sender is encrypted data using public key and the receiver can use his private key to recover the information	**(A)**	
(ii)	The same key is used to encrypt and decrypt the data	**(B)**	
(iii)	It is the process of transforming information using an algorithm to make it unreadable to unauthorized people	**(C)**	
(iv)	This is a computer program that appears to perform a desirable function / useful for the user prior to run or install, but steals information or harms the system	**(D)**	
(v)	The sender encrypt the information by using his private key. The receiver verifies the identity of the sender by decrypting the information by using the public key	**(E)**	
(vi)	It is an effort for attack that sends client requests to a range of server port addresses on a host, with the goal of finding an active port	**(F)**	

[3 marks]

[See page no. 7

Do not write in this column

(b) Computer A sends data 110001. If the even parity bit method is used in order to detect errors,

(i) What is the parity bit? Give reason.

……

……

[1 marks]

(ii) State one limitation of parity bit method in detecting errors.

……

……

[1 marks]

(c) Consider the following *Customers* and *Orders* data tables.

Customers

CustID	CustName	City
1	Joe Bloggs	London
2	Jane Smith	Berlin
3	Peggy Blue	New York

Orders

OrderID	CustID	OrderDate
999	2	12/12/2021
998	50	12/12/2021
997	51	13/12/2021

(i) Write down the output of the following SQL statement.

Select Customers.CustID,City,OrderID from Customers left join Orders on Customers.CustID=Orders.CustID;

(ii) Re-write the output again when the SQL given above is changed to as following.

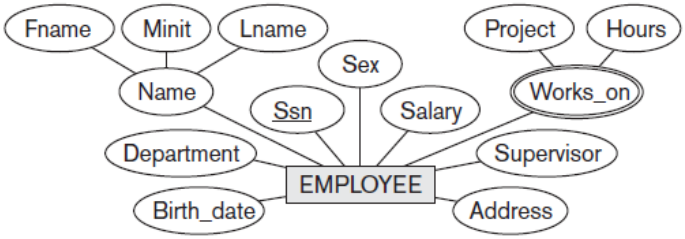
Select Customer.CustID,City,OrderID from Orders left join Customers on Customers.CustID=Orders.CustID;

[1.5+1.5 = 3 marks]

[See page no. 8

Do not write in this column

(c) Consider the following EMPLOYEE entity and its attributes.



Write down the types of attributes in the following spaces.

(i) Name ……..

(ii) Ssn ……..

(iii) Works_on ……..

[2 marks]

4.

(a) Here is given a scenario for a Data Flow Diagram (DFD) for a simple library management system.

A new library member comes to the library and provides their information to the librarian. The librarian enters this information into the library system, creating a member record. A library member selects a book they want to borrow. The librarian enters the member's ID and the book's information into the system. The system checks if the book is available, and if it is, it records that the book has been checked out to the member. A library member returns a book they borrowed. The librarian enters the member's ID and the book's information into the system. The system updates the book's availability and calculates any late fees if the book is overdue. A library member asks the librarian to find a specific book. The librarian enters the book's title or author into the system, which searches the book database and provides a list of matching books.

(i) Write down the external entities of the system.

……

……

[1 marks]

(ii) Write down the processes of the system.

……

……

……

……

[2 marks]

[See page no. 9

Do not write in this column

(iii) Write down the data stores of the system.

……
……
……
……

[2 marks]

(iv) Write down the data flows of the system.

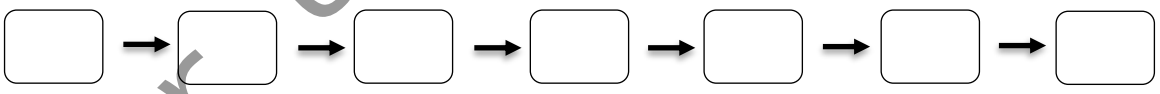
……
……
……
……

[2 marks]

(b) The steps (phases) of the waterfall model are given below not in order.

i. Maintenance
ii. Feasibility study
iii. Testing
iv. System design
v. Implementation (coding)
vi. Requirements analysis
vii. Deployment

Write down the numbers in order from left to right in the following boxes.



[3 marks]

**

[See page no. 10]

National Field Work Center,

Conducting

G.C.E. (Advanced Level) Examination - 2023 , Term -5

Information & Communication Technology [ICT]

தகவல், தொடர்பாடல் தொழினுட்பவியல் II
Information & Communication Technology II

20 | E | II

Part B

❋ Answer any **four** questions only

(5)

(a) Consider the following Karnaugh map.

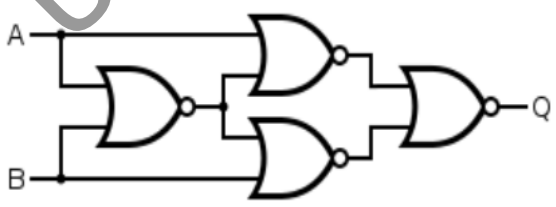
C \ AB	00	01	11	10
0	0	1	0	0
1	1	1	0	1

(i) Obtain a simplified Boolean expression in the form of sum of products (SOP) using the Karnaugh map. Show the loops clearly in the Karnaugh map.

(ii) Construct a logic circuit corresponding to the simplified Boolean expression using only NAND gates.

(iii) Construct a truth table corresponding to the simplified Boolean expression.

(b) Consider the following logic circuit.



(i) Derive the output Q of the logic circuit given above.

(ii) Construct truth table for the simplified Boolean expression.

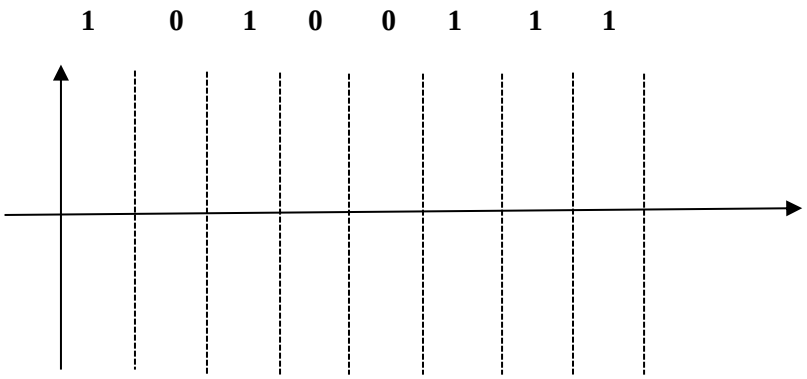
(iii) Which is the single logic gate equivalent to the output Q?

[2+2+4+3+2+2=15 marks]

[See page no. 11

(6)

(a) Draw the Manchester signal encoding for the data transmission of 10100111 in the following diagram (copy the digram in your answer sheet).



[3 marks]

(b)

(i) Write two advantages of subnetting a computer network.

(ii) Write two functions of the data link layer of OSO network reference model.

(iii) Give two advantages of star topology in comparison with mesh topology.

[2+2+2=6 marks]

(c) Consider the following scenario.

A food production company has four LANs for each departments such as accounting information system , marketing, sales, production. The table given below shows the number of computers and network printers in each department.

Departments	**Number of computers in each department**	**Number of network printers in each department**
Accounting information system	*33*	*1*
Marketing	*37*	*1*
Sales	*32*	*2*
Production	*40*	*1*

An IP block 192.147.1.0 / 24 has been assigned to a network administrator. The network administrator must assign IP addresses to all the nodes in each department. Four subnets will be set up for this purpose and this network will be connected to a public IP address for the Internet access of employees. Each department is located in a different building in a premises. A firewall is installed for the security of the network and four switches, necessary network cables, proxy server and DHCP server are provided to the network administrator for this purpose. The accounting information system department is directly connected to the Internet.

[See page no. 12

Use the following table as a guide to assign IP addresses.

Departments	Network address	Broadcast address	Subnet mask	Usable IP address range
Accounting information system				
Marketing				
Sales				
Production				

[6 marks]

(7)

(a) Consider the following scenario about books publishers system.

Each publisher has a unique publisher ID, a name, and contact information. Publishers can publish multiple books. Each book has a unique ISBN (International Standard Book Number), a title, and a publication year. Books can belong to different genres. Books can be written by one or more authors. Books are published by a publisher. Each author has a unique author ID, a name, and contact information. Authors can write multiple books. Book copies represent individual physical books. Each book copy may have a unique copy ID within the scope of a particular book. Book copies are associated with a specific book. Book Copies are indicating that they depend on the books entity for its existence. It has its own unique identifier CopyID and can have additional attributes specific to individual book copies.

Draw ER diagram for this book publishers system. If any assumptions are used, indicate them clearly.

[5 marks]

(b) Write down two advantages of database normalization.

[2 marks]

(c) Consider the following data tables **Subjects** and **Results**.

Subjects

SubjectID	SubjectName
ENG	English
PHY	Physics
ECO	Economics
ACC	Accountancy

Results

StudentNo	NIC	FirstName	SubjectID	Grade
S1234	986888457V	Nilam	ENG	B
S1447	992562321V	Praveena	PHY	C
S1234	986888457V	Nilam	ACC	A
S1323	900251452V	Thilan	ENG	S
S1323	900251452V	Thilan	ACC	B

[See page no. 13

(i) Justify with suitable reason in which normal form **Subjects** table given above is.
(ii) Justify with suitable reason in which normal form **Results** table given above is.
(iii) Convert the above **Results** table to the next normal form. Write the tables in schema form.
(iv) Write down the output of the following SQL statement.

Select Subjects.SubjectID, StudentNo, Grade From Subjects, Results Where Subjects.SubjectID = Results.SubjectID;

[2+2+2+2=8 marks]

(8)

(a)

(i) Give two reasons why user requirement analysis should be done during software development.
(ii) Explain briefly that what is functional requirement.

[2+2=4 marks]

(b) Block size of a hard disk is **4KB**. Below is a portion of the file allocation table (FAT) of that disk at a given time. Also, the area also provides the blocks of the file named *max.py*. In this, the last block of the file is given as **-1** and the directory entry of the file contains the block number of the first block of that file.

FAT

100	**102**
101	**100**
102	**-1**
103	**101**
104	**105**

(i) What is the directory entry of *max.py*?
(ii) What is the space allocated for *max.py*?
(iii) Write down a disadvantage of linked allocation that is used to allocate disk space to files.

[2+2+2=6 marks]

(c) State what the Process Control Block (PCB) in an operating system.

[2 marks]

(d) Write down the steps involved in context switching in an operating system.

[2 marks]

[See page no. 14

(9)

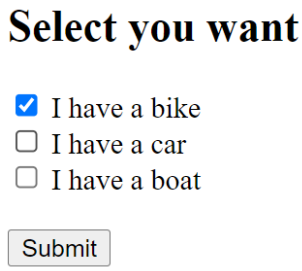
(a) Briefly explain the followings regarding HTML.

(i) Elements

(ii) Attributes

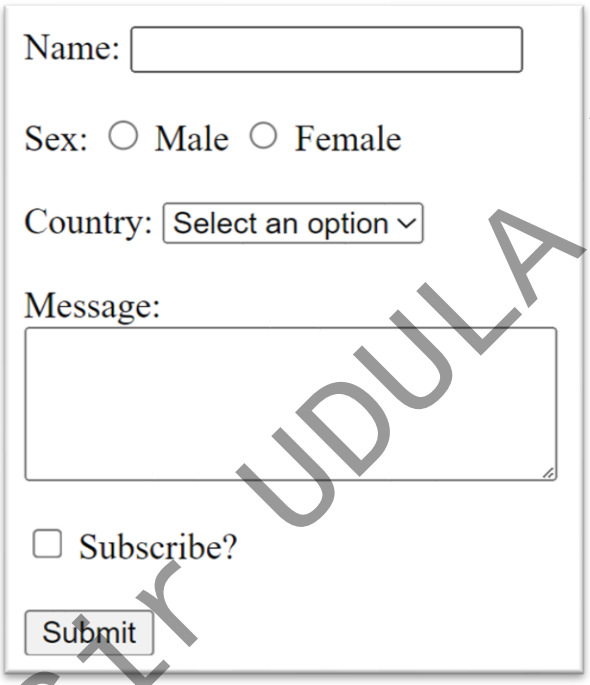
[3 marks]

(b) Write down a complete HTML code to display the following output.



[5 marks]

(c) Write down a complete HTML code to display the following output.



Note: Country should be Nepal, USA, or Australia.

[7 marks]

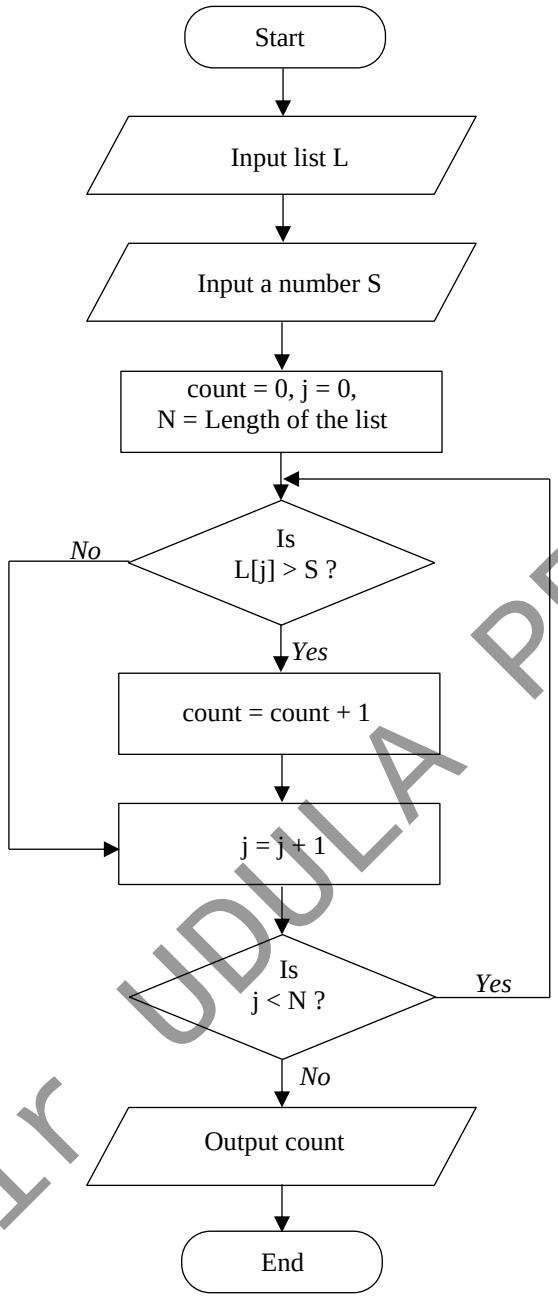
[See page no. 15

(10)

(a) A particular number (N) of positive and negative numbers are entered by the user, among them only those that the sum of positive numbers should be displayed as the output. Draw the flowchart for this purpose.

[6 marks]

(b) Consider the following flowchart.



(i) Write the output of the flowchart if the list L consists of the numbers 5, 4, 7, 4, 4, 3, 2, 1, 5, 6 and input S is 3.

(ii) Explain the purpose of the Flowchart.

(iii) Write down the python program for the logic given by the flowchart.

[2+2+5=9 marks]

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[See page no. 16