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Royal College – Colombo 07

Second Term Test - July 2024
Grade 13

Information & Communication Technology I	20	E	I	Two hours

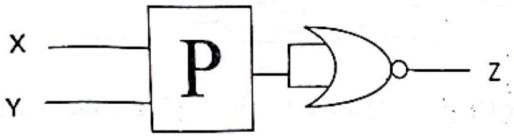
Instructions:

- *Answer all the questions.*
- *Write your Index Number in the space provided in your answer sheet*
- *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*

1. What is the correct decimal equivalent of the 10001.0001_2 number?

(1) 16.125 (2) 17.625 (3) 10001.125 (4) 17.0625 (5)110.625

2. Consider the figure of the logic circuit in which P indicates a two-input logic gate. Which of the following should be P so that when x=0 and y=1 the output Z would be 1?



I- a NOR gate
II- an XOR gate
III-a NAND gate

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

3. $AC_{16} + 100110111_2 = (\ldots\ldots\ldots\ldots)$ The answer suitable for the blank is?

(1) 743_8 (2) 111100010_2 (3) $1E2_{16}$ (4)481_{10} (5)101100001_2

4. Find the decimal number of 8 bits 2's complement binary representation of 11010001?

(1) -213 (2) 49 (3) -47 (4) -49 (5) 213

5. Which of the following is/are not equivalent to hexadecimal $C2A_{16}$

A= 110000101010_2
B=6050_8
C =3114_{10}

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

6. Select the correct sum of products (SOP) for the product of sum expression given below.

$S=(\bar{X}+Y).(\bar{Y}+Z).(X+\bar{Z})$

(1) $(X.\bar{Y})+(Y.\bar{Z})+(\bar{X}.Z)$
(2) $(\bar{X}.\bar{Y})+(Y.Z)+(X.\bar{Z})$
(3) $(X.Y)+(Y.Z)+(X.Z)$
(4) $(X+Y).(Y+Z).(X.Z)$
(5) $(\bar{X}.Y.Z)+(X.Y.\bar{Z})+(X.Z)$

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7. What is the suitable Boolean expression for the Karnaugh map given below.

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

(1) $AC+\bar{A}\bar{D}+AD$

(2) $AB+BC+AD$

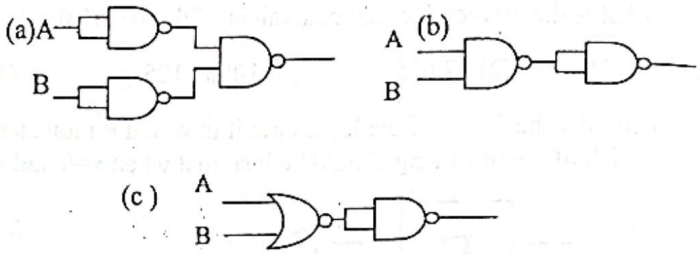
(3) $A\bar{B}+AD+\bar{A}\bar{D}$

(4) $AC+AD+A\bar{D}$

(5) $AC+\bar{A}\bar{D}+A\bar{D}$

8. What is/are the logic circuits relevant to the given truth table below?

A	B	F
0	0	0
0	1	1
1	0	1
1	1	1

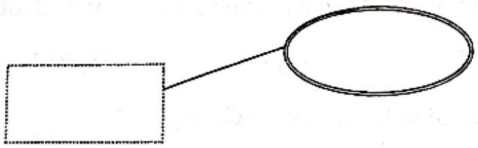


(1) a Only (2) and b Only (3) a and c Only (4) b and c Only (5) a,b and c all

9. Which of the following does not belong to a utility software.

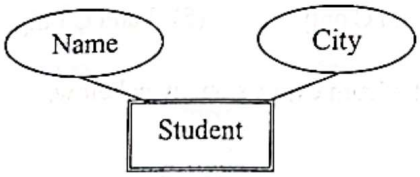
(1) Archivers (2) Cryptographic (3) Debuggers
(4) Antivirus Software (5) Language Translators

10. Which attribute can be shown by the symbol given below used in an ER diagram.



(1) Phone Number (2) Name (3) Date of Birth (4) Designation (5) Age

11. The following weak entity shown can be converted into a strong entity by



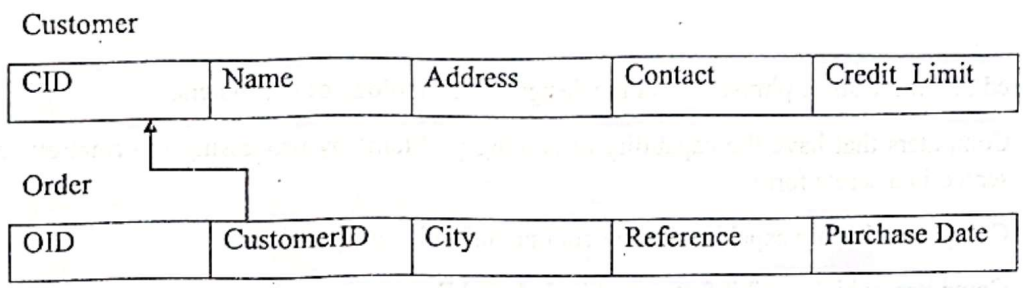
(1) Using Generalization
(2) Adding appropriate attribute
(3) Using aggregation
(4) Normalization
(5) Renaming

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12. In HTML groups related elements in a form which helps in creating more organized and user-friendly forms like including a box around relevant data set?

(1) Method (2) Action (3) Frameset (4) Comment (5) Field Set

13. Which of the following gives a correct matching between ER diagram components.



(1) Table ->Customer	Primary Key-> CID	Multivalued Attribute->Contact
(2) Table ->Order	Primary Key-> City	Multivalued Attribute->OID
(3) Table ->Customer	Foreign Key-> Reference	Multivalued Attribute->Name
(4) Table ->Order	Primary Key-> OID	Multivalued Attribute->CustomerID
(5) Table ->Customer	Primary Key-> CID	Multivalued Attribute-> CustomerID

14. What would be the output of the following python code?

```
X=12
While X>0
        X=X-4
        print (x,end='/')
```

(1) 8/4/0 (2) 8 4 0 (3) 0/4/8 (4)12/8/4 (5)12/8/4/0

15. Consider the following python list.

x= [1,2,3,4]

What would be the output of the following python code.

```
x.clear()
print(x)
```

(1) [_] (2) [ ] (3) [0] (4) {} (5) (0)

16. What would be the output of the following python code?

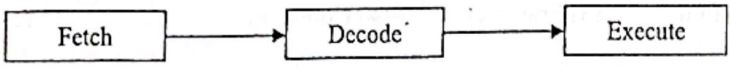
```
a=['True','False',"6.5]
y=['Sup',70]
a.extend(y)
print(a)
```

(1) ['Sup',70]['Sup',70] (2) ['True','False',6.5] (3) [True,False,'Sup']

(4) ['True','False',6.5]['Sup',70] (5)['True','Falsc',6.5','Sup',70]

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17. What is the hardware involved in the repeating cycle given below in a computer?



(1) RAM (2) Processor (3) System Clock (4)MMU (5) ROM

18. Listed below are some phrases about the designing technology of computers.

A- Computers that have the capability of solving problems by processing information represented in discrete form.

B- Computers that are capable of using continuously changing entities.

C- Computers which exhibit features of both A and B

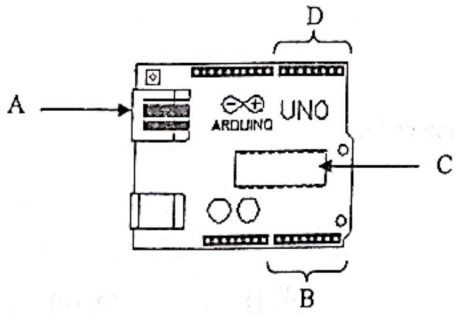
Which of the following matches correctly with the above statements?

(1) A- Street Lamp with Sensor B- ECG Machine C-Desktop PC
(2) A- ECG Machine B- Street Lamp with Sensors C- Desktop PC
(3) A-Desktop PC B- ECG Machine C- Street Lamp with Sensors
(4) A-Desktop PC B- Street Lamp with Sensors C- ECG Machine
(5) A-ECG Machine B- Desktop PC C- Street Lamp with Sensors

19. What is the device used to provide internet facility to an **Arduino Circuit**?

(1) Ethernet Shield (2) Motor Shield (3) Relay Shield
(4) Bluetooth Shield (5) Proto Shield

20. Identify the parts marked as A, B, C and D of the **Arduino Uno Board** given below.



(1) A- Micro Controller, B- Digital Input/Output, C- USB Port, D- Analog Input
(2) A- Micro Controller, B- USB Port, C- Analog Input, D- Digital Input/Output
(3) A- Analog Input, B- Digital Input/Output, C- USB Port, D- Micro Controller
(4) A- USB Port, B- Analog Input, C- Micro Controller, D- Digital Input/Output
(5) A- Analog Input, B- USB Port, C- Digital Input/Output, D- Micro Controller

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Past Papers Wiki

21. Match the given sensor or module labelled from A to D to the corresponding descriptions labelled from 1 to 4.

Sensor/Module	Description
A: LDR	1- Serve as a device that acts as an interface to allow signals to transfer between different systems.
B: Motion Sensor Module	2- Detects objects using waves.
C: Ultrasonic Module	3- Resistance decreases with an increase in intensity of light.
D: Relay Module	4- Detects movements around the device.

(1) A ⟶ 1 B ⟶ 3 C ⟶ 1 D ⟶ 4

(2) A ⟶ 3 B ⟶ 4 C ⟶ 1 D ⟶ 2

(3) A ⟶ 3 B ⟶ 4 C ⟶ 2 D ⟶ 1

(4) A ⟶ 4 B ⟶ 3 C ⟶ 2 D ⟶ 1

(5) A ⟶ 1 B ⟶ 2 C ⟶ 3 D ⟶ 4

22. What is the main device needed to get an output after creating an electronic circuit?

(1) Diodes
(2) LDR
(3) Arduino Board
(4) Bread Board
(5) LED

23. Which of the following is not information commonly found in the Process Control Block (PCB) Operating System?

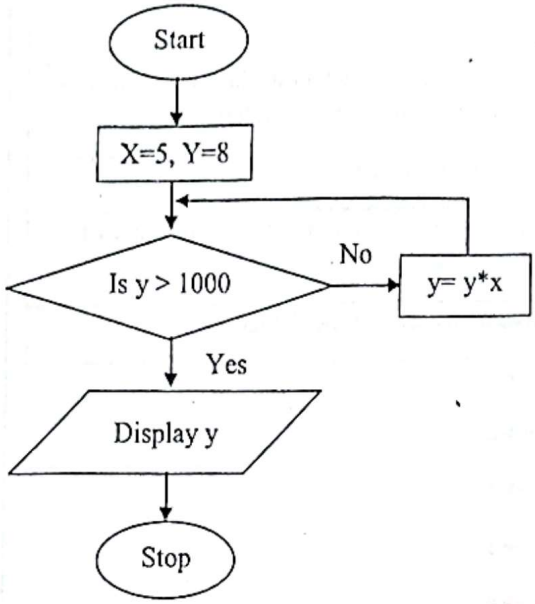
(1) Process number
(2) Capacity of hard disk
(3) Process Scheduling state
(4) Program counter
(5) Process State

24. If a style sheet created is saved by the name "KitKat", What is the relevant HTML code line to include this style sheet on a web page?

(1) <a rel="stylesheet" type="text/css" href="KitKat.css">
(2) <rel="stylesheet" type="text/css" href="KitKat.css">
(3) <link rel="style sheet" type="text/css" href="KitKat.css">
(4) <rel="style sheet" href="KitKat.css">
(5) <link rel="stylesheet" type="text/css" href="KitKat.css">

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25. What is the output given by the following flowchart below?



(1) 8
(2) 40
(3) 200
(4) 1000
(5) 5000

26. Select the correct python code for the flowchart given in question No.25?

(1)
```
x,y= 5,8
While not(y>1000):
        y=y*x
print(y)
```

(2)
```
x,y= 5,8
While (y<1000):
        y=y*5
print(y)
```

(3)
```
x= 5
y=8
While (y>1000):
y=y*x
print(y)
```

(4)
```
y,x= 5,8
While (x<1000):
        y=y*x
print(y)
```

(5)
```
x,y= 5,8
While (y>x):
        y=y*x
print(y)
```

27. A .....*A*.....uniquely identifies a network-based application on a computer. These are identified with positive .....*B*..... unsigned integers, ranging from 0 to 65535 for each.....*C*....., and address combination.

(1) A -IP Address, B-8 bits, C- User Datagram Protocol
(2) A -IP Address, B-16 bits, C-Transmission Control Protocol
(3) A -MAC Address, B-16 bits, C- transport protocol
(4) A -port number, B-16 bits, C- transport protocol
(5) A-port number, B-32 bits, C- Transmission Control Protocol

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28. In modern ICT, cloud computing is used vastly. Select the most suitable cloud computing service model used in A, B, and C.

A	Mobiles, App Server, Codes, Database
B	Servers, Large amounts of data centers, Storage
C	Hosting, Security, Operating System, Web Services

(1) A- IaaS B- PaaS C- SaaS
(2) A- PaaS B- SaaS C- IaaS
(3) A- IaaS B- SaaS C- PaaS
(4) A- SaaS B- IaaS C- PaaS
(5) A- SaaS B- PaaS C- IaaS

29. What are the replacement terms for the labels A, B, C, and D following Python code that has been written to find the minimum number from a given set of integers?

```
def findMin(NewList):
    minimum =100
    for i in NewList:
        if i < A
            minimum= B
    print('minimum value is', C )
Listone=[24,16,23,43,13,7,66,50]
findMin(D)
```

(1) A-minimum B- i C- minimum D-Listone
(2) A-minimum B- Listone C- findMin D-minimum
(3) A- 10 B- findMin C- I D-Data
(4) A- Listone B- findMin C- minimum D-i
(5) A- i B- findMin C- minimum D-Listone

30. The memory management technique in which the system stores and retrieves data from secondary storage for use in main memory is called

(1) Fragmentation (2) Paging (3) Mapping
(4) Swapping (5) None of the mentioned

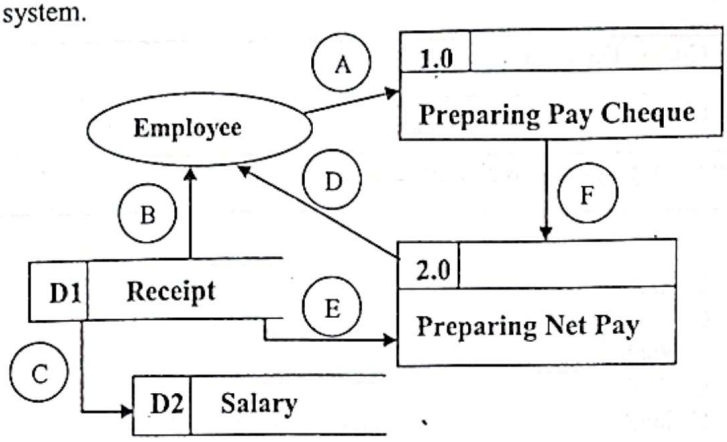
31. What would be the output of the following python code?

```
a= 3&5+8/7-4^7
b=(3&5)+(8/7)-(4^7)
print(a,b)
```

(1) 5,5 (2) 13,13 (3) 5,13 (4)13,5 (5) 13,12

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32. The following shows a data flow diagram (DFD) prepared by a software development team for a system.



Write the letter/s of the data follow which has a fundamental error.

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

33. ..... is a buffer that holds the inputs and outputs of other devices and it's a special area in memory or hard disk which is accessible to I/O devices. Which is the most suitable word for the blank?

(1) Simultaneous Peripheral Operations On Line (SPOOL) (2) Register
(3) Virtual memory (4) L1 cache memory
(5) Random Access Memory

34. Consider the style in the table.

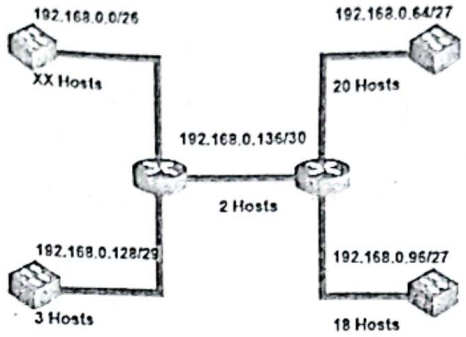
Selector	Description
Class with a class name "abc"	Size of font is 20px Text Should be centered
Header 2	Text colour is blue

It is expected to use the above styles in several web pages on a website. Suitable cascading style sheet to define the styles given in the table are?

(1) #ABC{font-size:20px;Text align :center}
h2{color:blue}
(2) #abc{font:size:20px;Text align :center}
h2{color:blue}
(3) .abc{font-size:20px;Text-align :center;}
h2{color:blue;}
(4) .ABC{font.size:20px;text-align :center}
h2{color:blue;}
(5) abc{font-size:20px;Text align :center}
h2{color:blue;}

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35. The setup of a network diagram is given below. Up to how many hosts can be placed in the subnet



which currently reads as 'XX' hosts?

(1) 128 (2) 64 (3) 62 (4) 32 (5) 30

36. The Operating System maintains a page table for each process. Moreover, to identify the entry of a virtual page the virtual page number is used as the index. Which of the following is not inserted in the Page table entries?

(1) Frame Number
(2) Valid and invalid bit
(3) Page fault
(4) Referenced bit
(5) Modified bit

37. Which of the following is the right way of declaring a variable in PHP?

(1) $3w3school (2) $_hello (3) $this (4)$5_Hello (5) $365

38. Consider the python code given below,

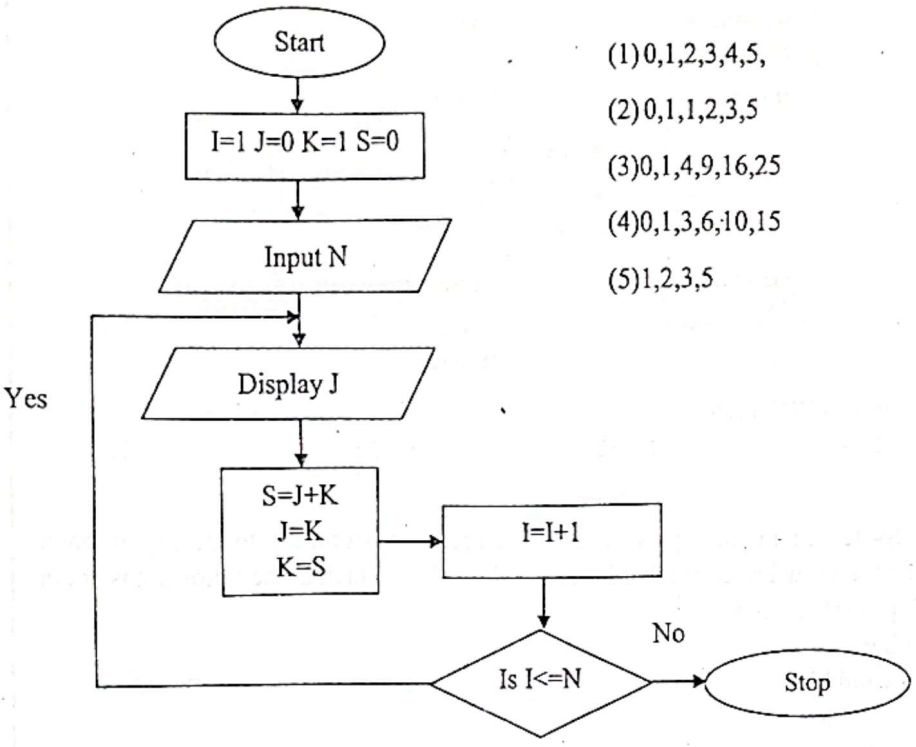
```
def abc():
        a=int(input('Enter a Number?'))
        fact=a
        while (a>1)
            a=a-1
            fact=fact*a
        print(fact)
```

The output of the above function is given by.

(1) a x (a-1) x (a-2) x .....3 x 2 x 1
(2) a x a^2 x a^3 x .....
(3) a x a
(4) 1 x 2 x 3 x 4 x.....
(5) (a-1) x (a-2) x .....3 x 2 x 1

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39. What series of numbers you would get from the flowchart given below when inputting N as 6?



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

(2) 0,1,1,2,3,5

(3) 0,1,4,9,16,25

(4) 0,1,3,6,10,15

(5) 1,2,3,5

40. ..... is a system program that operates or controls a particular device attached to a computer and also provides software interface to hardware devices. The most suitable word for the blank is,

(1) Basic Input Output System (BIOS)
(2) Complementary Metal Oxide Semiconductor (CMOS)
(3) Device Driver
(4) Utility software
(5) Language translator software

41. Which of the following statement/s is/are false regarding **Dynamic Host Configuration Protocol?**

A- It is a routable protocol.
B- DHCP makes it easier for network administrators to add or move devices within a network.
C- A DHCP server manages a record of all the IP addresses it allocates to network nodes.

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

42. Which of the following statements true regarding IP addresses are correct?

A- Public addresses are often static addresses.
B- A router can assign public IP addresses to devices connected within its network.
C- IPv6 uses a 128-bit address instead of 32-bit address.

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

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43. Match each network protocol labeled from A to D to the corresponding layer of the TCP/IP Model.

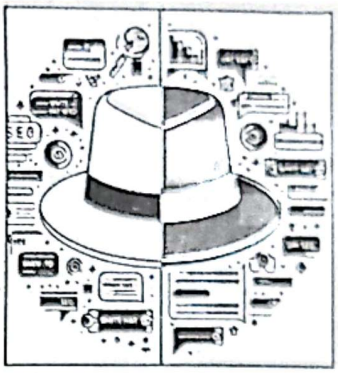
Name of the Protocol
A. TCP
B. DNS
C. PPP
D. ICMP

Name of the Layer
1. Application Layer
2. Transport Layer
3. Network Layer
4. Network Access Layer

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

44. Which of the following techniques is true regarding Black Hat Search Engine Optimization (SEO)?

(1) Hidden Page
(2) Good Content
(3) Proper Title
(4) Ease of Navigation
(5) Quality Inbound Links



45. Which of the following is not a property of the MAC address assigned to devices in a network?

(1) MAC address operates in the data link layer.
(2) MAC Address is considered permanent.
(3) MAC Address is a physical address.
(4) MAC address is hardware oriented
(5) MAC address identifies the device globally.

46. Which of the following is not an advantage of converting a database into a **Normalization Form**?

(1) Supports efficient query response.
(2) Need to know what the user needs to normalize.
(3) Minimize the physical storage space.
(4) Prevents data anomalies.
(5) Reduce the risk of data entry errors.

47. Which of the following is not a benefit of an expert system?

(1) Time (2) Speed (3) Availability (4) Cost Reduction (5) Reduction of error rate

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48. Consider the following PHP code.

```
$conn=new msqli($servername,$username,$password)
```

What's the task of this code?

(1) Data retrieving
(2) To change the data in a database
(3) To build the connection with the server computer
(4) To create a database
(5) To remove the connection with a database.

49. What would be the output of the following PHP code?

```
<!Doctype html>
<html>
<body>
<?php
for ($count=1;$count<4;++$count){
echo "$count times 8 is =".  $count*8;
echo"<br>";
}
?>
</body>
</html>
```

(1)

```
1 times 8 is 8
2 times 8 is 16
3 times 8 is 24
4 times 8 is 32
```

(2)

```
1 * 8
2 * 8
3 * 8
4 * 8
```

(3)

```
1 times 8 is = 8
2 times 8 is = 16
3 times 8 is = 24
4 times 8 is = 32
```

(4)

```
1 * 8 is = 8
2 * 8 is = 16
3 * 8 is = 24
4 * 8 is = 32
```

(5)

```
1 times 8 is = 1 * 8
2 times 8 is = 2 * 8
3 times 8 is = 3 * 8
4 times 8 is = 4 * 8
```

50. Artificial Intelligence (AI) is about

(1) Programming on a machine with your intelligence.
(2) Playing a game on a computer.
(3) Putting your intelligence in a machine
(4) Making a machine intelligent.
(5) Learning AI agents.

****

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Royal College – Colombo

Third Term Test - July 2024
Grade 13

Information & Communication Technology - II | 20 E II | Three hours

Use the additional reading time of 10 minutes to go through the question paper, select the questions you will answer, and decide which of them you prioritize.

Additional Reading Time - 10 minutes

Index No: _____

mportant:

* This question paper consists of 10 pages.
* This question paper comprises of two parts, **Part A** and **Part B**. The time allotted for both parts is three hours.
* Use of calculators is not allowed.

PART A – Structured Essay

(pages 2-7)

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

PART B – Essay:

pages 8-14)

* This part consists of 6 questions, of which, four are to be answered. Use the papers supplied for this purpose

  At the end of the time allotted for this paper, tie the two parts together so that Part A is on top of Part B before handing them over to the supervisor.

  You are permitted to remove only Part B of the question paper from the Examination Hall

For Examiners' Use Only

For the Second Paper		
Part	**Question No.**	**Marks**
A	1	
	2	
	3	
	4	
B	5	
	6	
	7	
	8	
	9	
	10	
Total		

Final Marks

In Numbers	
In words	

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Part A- Structured Essay

- **Answer all the questions on this paper itself.**

1.

i) The following style sheets are expected to be used on a web page.

Selector	Style Description
An id named "paraOne".	Font size 12 px, Text should be left-Aligned, text color green
paragraph	Text color red, font size 12px
header 2	The text colour is blue, Text should be centered-Aligned

To meet this requirement, write an appropriate internal style sheet (CSS) for the style definition in the table above.

.....

.....

.....

.....

ii) Underline the parts containing errors in the following HTML code (please ignore the line numbering).

```
1  <html><head>
2   <link rel="stylesheet" type="css" href="Externalstyles.css">
3  <style>
4      h1 { color: rgb(00,00,280); font-size: 300%; }
5      p  { color: #000F0H; font-family: courier; }
6  </style></head>
7  <body>
8      <h1 style:"color=blue;">This is a heading</h1>
9      <p>This is a paragraph.</p>
10 </body></html>
```

(iii). Write the correct code lines to relevant correct HTML code, with line numbers.

.....

.....

.....

.....

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(iv). Fill in the following PHP code snippet blanks.

Below is the code required to retrieve the student's name (StName) and number (Stno) from the student table through a database.
The username and password are given below. ('admin','ict@123') The database name is RoyalDB..

```
<?php
$conn= new mysqli("localhost", ".....", ".....", ".....");
if ($conn->connect_error)
{ die("Connection failed: " . .....->connect_error); }
else
{ echo " Connected Successfully ";}
$sql = "SELECT Stno, ..... FROM Student";
$result = $conn->query(.....);
if (.....->num_rows > 0)
{
while($row = $result->fetch_assoc())
{ echo "Student No:". $row[".....]." = Name: ".$row[ "StName"]."<br>"; }
else
{ echo "No results"; }
.....->close();
```

2.
. Digital signatures use mathematics, the uniqueness of certain numbers, and the integrity of ıcryption to provide an authentication mechanism for data. Select suitable terms from the ven list and fill in the blanks.

List – (Public key, Private key, Privacy, sender's, digital signature, Integrity, authentication, receiver's, encrypt, decrypt, message digest, hashing)

digital signature is a security mechanism that is used in cyber security. The basic stages of ɔplying a digital signature include:

1. Generating ..... by ..... the message.

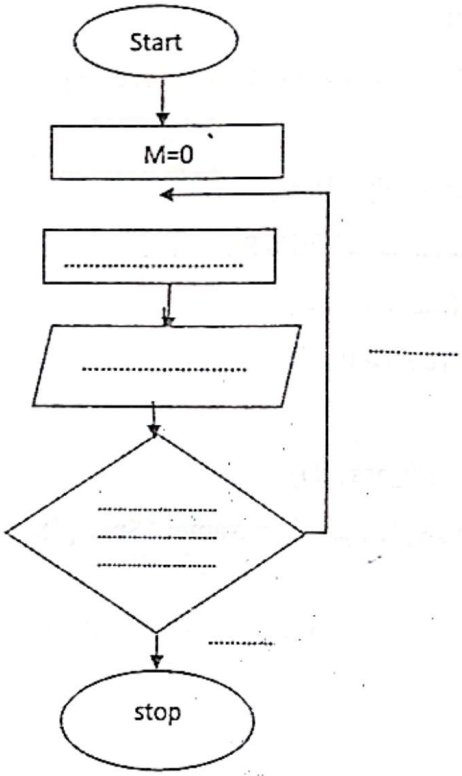
2. Creating the ....., by encrypting the message digest and the message by using ..... Of the send.

3. The recipient decrypts the message using..... public key, while at the same time hashing the decrypted message. This is compared against the hash sent by the sender as part of the signature.

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4. If the hashes match, then the "signature" matches and proves that the data was signed by the holder of the private key associated with the public key used for verification. It also indicates that the data has not been altered since it was signed, ensuring both
.....and .....

b.i. The given flow chart is to be drawn for an algorithm to print all the multiples of 2 from 2 to 100. Complete the flowchart by writing the required content for the five-component left blank



ii) What is the output of the following Python code as the 1st and 2nd inputs are "Sri Lanka" and " a" respectively?

```
count = 0
my_string = input("Enter the Text")
my_char= input("Enter the letter")
for i in my_string:
    if i==my_char:
        count+=1
print (count)
```

.....

iii) if " if i==my_char:" is removed from the above program, what should be the output?

.....

.....

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03.

(a) A Fuel QR code system is introduced as a solution for the problem regarding the issuing of fuel by fuel stations.

Fill in the blanks in the following statements by selecting the most suitable items from the given list.

(Directly, Parallel, Maintenance, Prototype, RAD, Spiral, Black box, White box, System testing, acceptance testing, Maintenance, Developing)

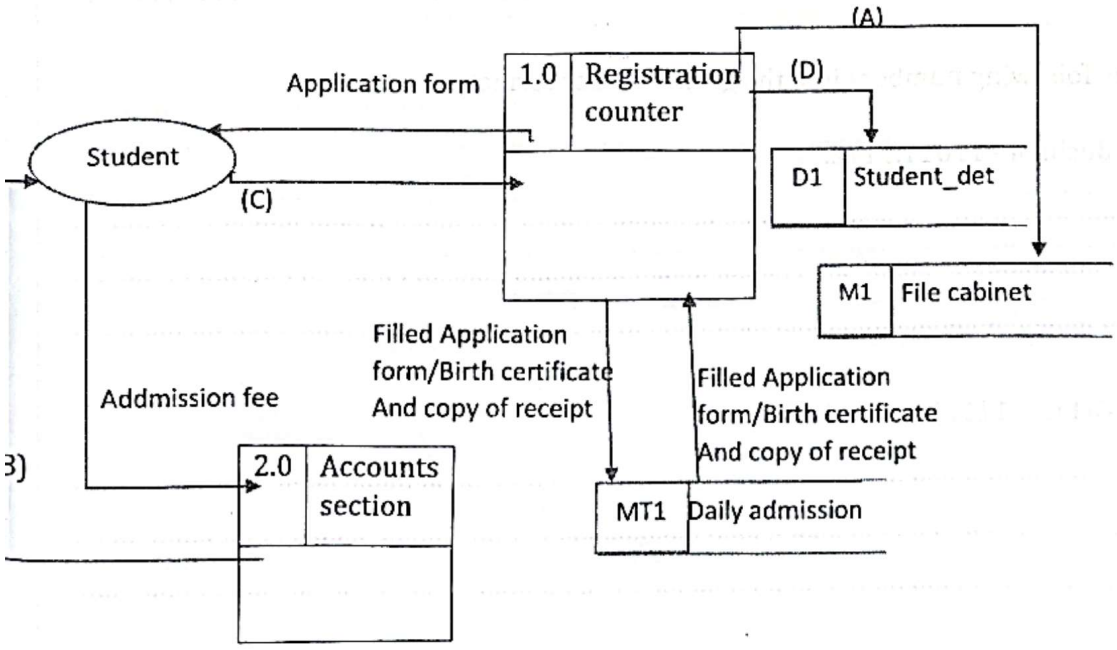
(i) As the need for an immediate solution system developers decided to use the ..... model to develop functional modules parallel as prototypes and the final product is made by integrating them.

(ii) After developing the system it has been released to end users to do ..... and..... testing methodology is used there.

(iii) According to the very urgent situation, it deploys ..... And stopped issuing fuel priority-based.

(iv) After a specific time period it was needed to change the limit of issuing fuel. This activity should be in the ..... phase of the SDLC.

(b) The following is a labeled data flow diagram to represent the admission of AL students in a school.



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(i) Write the most suitable terms for A, B, C, and D by selecting from the given list

{Application form, Student File, Filled Application form/Birth certificate and copy of receipt, Payment details, Student information, Receipt, Receipt/ Copy of Receipt, Copy of receipt}

A- ..... B - .....

C - ..... D - .....

(ii) Explain why the why the data stores of the above DFD are labeled as D1, T1, MT1

D1-

.....

M1 -

.....

MT1 -

.....

c. (i) What are non - functional requirements of a system?

.....

.....

(ii) Name three types of feasibilities which are identified in feasibility studies

.....

.....

.....

04. Convert the following numbers into the given number format.

a.

i) Binary to decimal - 11011.111$_2$.

.....

.....

.....

ii) Binary to Octal - 11100011.1011$_2$

.....

.....

.....

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i) Hexadecimal to Octal - $DE9_{16}$

.....

.....

.....

v)Simplify 9-12 by using the 8-bit two's complement method.

.....

.....

.....

.....

) Explain the concept **multi-core process.**

.....

.....

.....

) What are the steps of the fetch execute cycle?

.....

.....

.....

)Write one difference between mobile communication and mobile computing.

.....

.....

.....

.....

iv)What is the use of memory registers in the CPU?

.....

.....

.....

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Part B

*Answer any **four** questions only*

Prove that (A+B) (A+C) = A+BC (Distributive Law) using truth tables.

Consider the logic circuit shown in the following figure in which A, B, and C are the inputs and Z is the output.

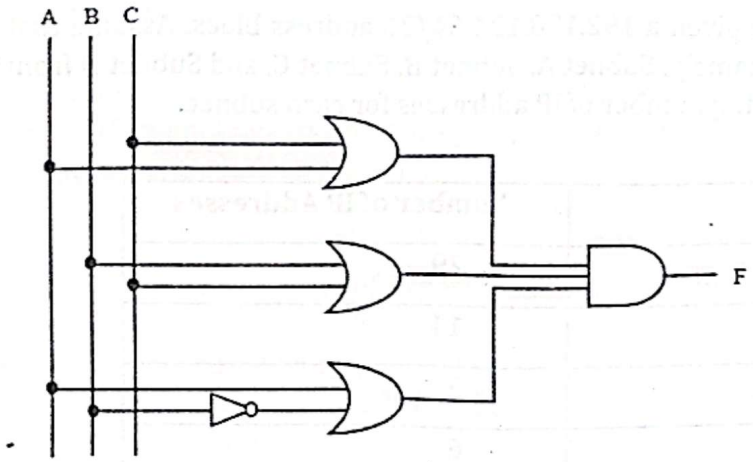


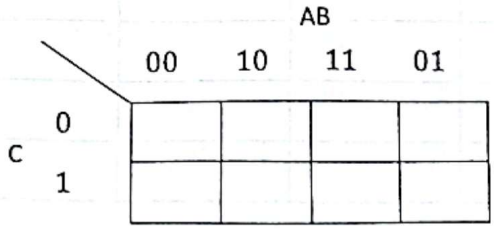
Figure 1

Write the Boolean expression for the output F of the above logic circuit.

Write the standard product-of-sum expression for the output of F using Boolean algebraic laws.

Draw the complete truth table for the above circuit with the help of the above-derived product-of-sums expression.

Complete the Karnaugh map relevant to the above circuit according to the following format.



Using a Karnaugh map, Write the most simplified sum-of-products expression for output F. Show the loops clearly on the Karnaugh Map.

Draw a logic circuit for the above-given logic circuit (*Figure 1*) only using minimum NOR gates.

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5.

a. An IP (internet protocol) address is a numerical identifier. The computer network to which it is assigned uses it to communicate with the outside world. Write about two differences between a public IP address and a private IP Address.

b. Write the names of networks classified based on their connections and explain them.

c. Data encapsulation and de-encapsulation are fundamental concepts in computer networking and communication protocols. These processes are essential for transferring data across networks efficiently and securely. Briefly explain data encapsulation.

d. Suppose that you are given a 192.178.124.64/26 address block. Assume that you want to create four subnets namely, Subnet A, Subnet B, Subnet C, and Subnet D from this address block with the following number of IP addresses for each subnet.

Subnet	Number of IP Addresses
Subnet A	29
Subnet B	14
Subnet C	5
Subnet D	6

i. Write the first address and the last address in the given address block.

ii. Write the subnet mask of the given address block in dotted decimal notation.

iii. Once the subnetting is done fill the following table.

Subnet	Network Address	Subnet mask	The first usable IP address	The last Usable IP address	Broadcast Address
Subnet A					
Subnet B					
Subnet C					
Subnet D					

e. A person wants to access a website without showing his real IP address to the remote end. For this purpose, he is planning to use a virtual private network rather than using a proxy server. Do you agree with his choice? Give reasons.

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a. A genius fashion designer decided to develop an expert system with his knowledge and experiences. Sketch a diagram to show the above expert system with labels. (The nonexpert user may provide their body features such as height, skin tone, complexion, hair type..... etc., and receive many suggestions)

i. Give one advantage and disadvantage of the expert system by considering human experts.

ii. Depict a diagram to connect this expert system to a multi-agent system according to the scenario given below.

The output according to the user request of the expert system is sent to the search agent. The search agent triggers domain agents that are connected with many relevant businesses (garment products, jewelry, shoes .....etc) search agent outputs results through a chat bot agent to the user.

iii. Name one challenge of connecting of Expert system with a multi-agent system.

b. i. Using an example for each category explain the four types of business, Business to Business(B2B), Business to Consumer(B2C), and Consumer to Consumer(C2C) Business to Employee (B2E) in e-commerce.

ii. Explain the difference between e-business and e-commerce.

iii. Explain the following business organizations with examples of each of them.

a) Pure click
b) Brick and Click
c) Pure click

iv. Over the years you developed a friendship with Chonil, the owner-operator of an upscale hardware shop. As a result of recent government regulations to manage the current situation, chronic has decided to close the retail side of his business and move it online. He needs your help as a friendly neighborhood digital marketing consultant.

(a) What type of e-commerce business applies to the above description?

(b) What is the business revenue model used for e-commerce stores?

(c) Write three functions performed in the above e-marketing process.

(d) Mention three methods that can be used by planned e-business to make online Payments?

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8.

a. A hospital maintains an electronic database to maintain the information of them. Consider the following relations regarding the DBMS of the hospital.

Patient(P_ID,NIC,Patien_Name,Address, Contact_No,D_O_B, Age, Clinc_ID,Cinic_Name,Doctor_ID, Doctor_Name,Clinc_schedule, Room_No)

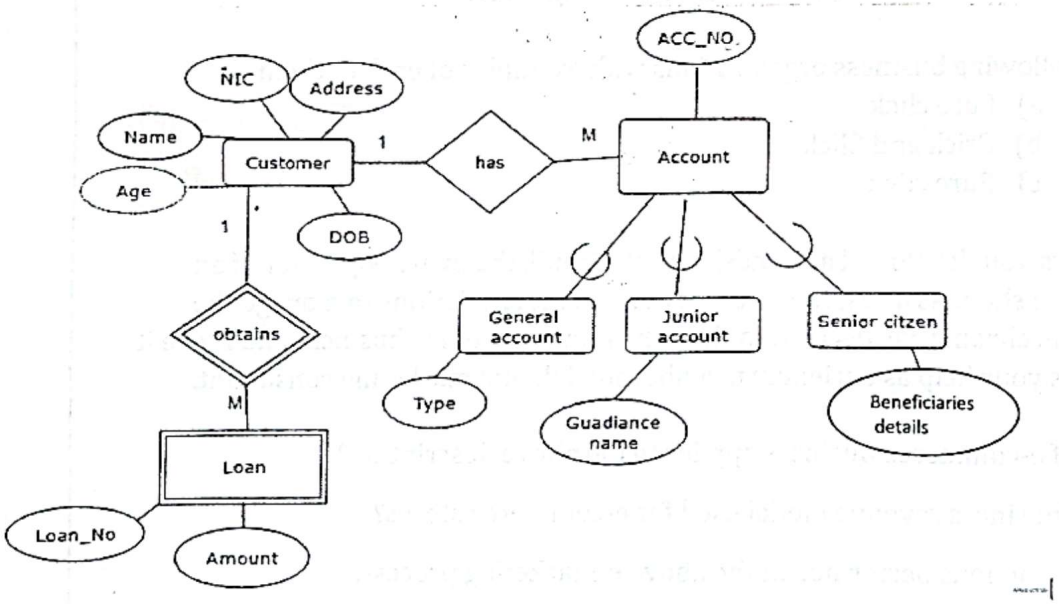
- A patient ID is unique for the patient
- Clinic ID is unique for the clinic
- Doctor_ID is unique for the doctor
- A patient consists of more than one contact no
- A patient may attend one or more clinics
- A Doctor responsible for only one clinic and a clinic has three doctors.

i. In which normal form does the above relation? justify your answer.

ii. Normalize the above relation up to the final normal form. Intermediate levels also should be mentioned with relevant functional dependencies

iii. Consider the address as a composite attribute (Houes No, Address Line1, Address Line2) and draw an Entity relationship diagram to depict the above relations. By identifying the relationships, key attributes, other attributes, and the cardinality. Write the SQL statement to get the count of patients in the diabetic clinic. (Where Cilinc_ID="0101").

b. Part of an EER diagram which is depicted for a banking database is given below.

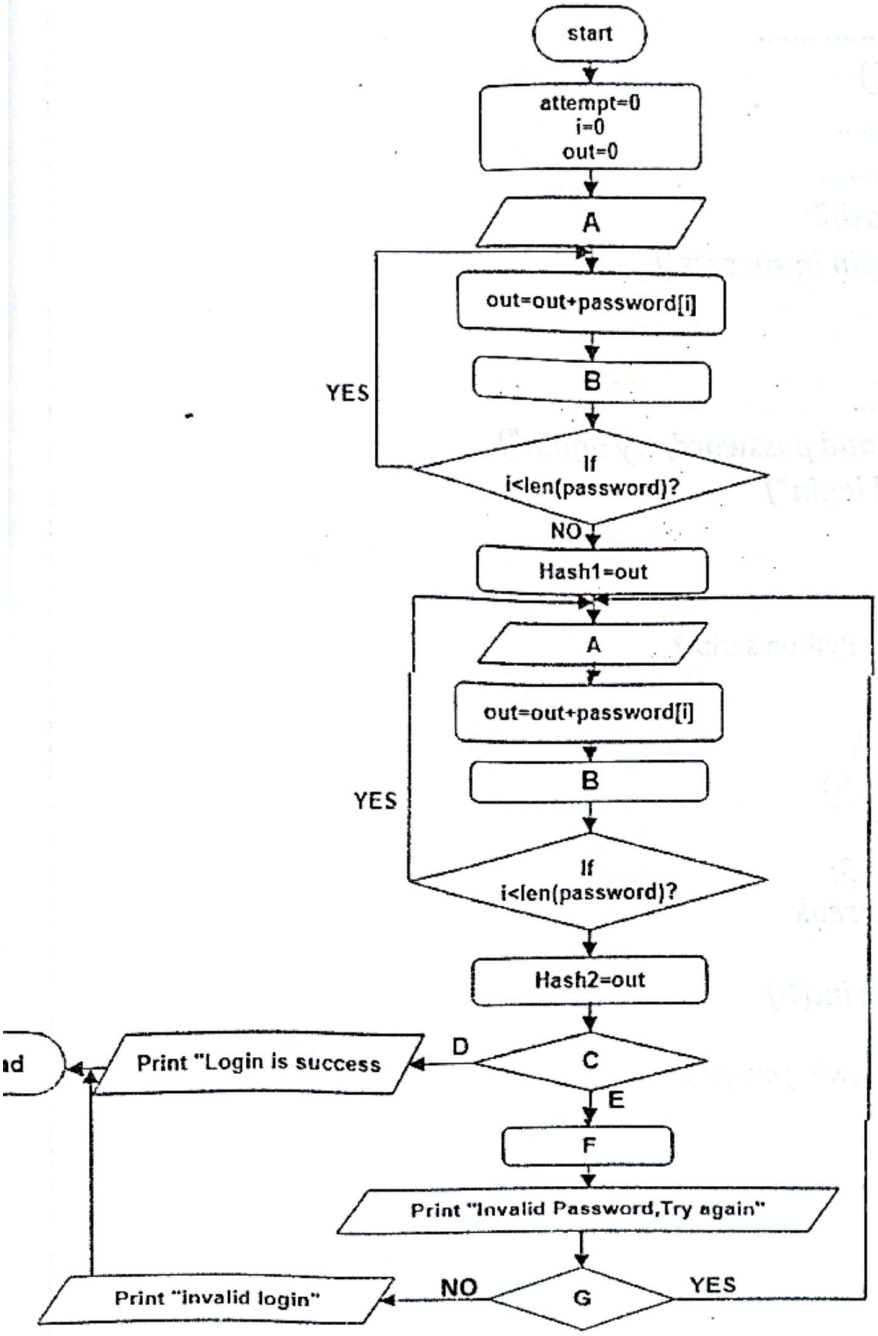


i) What are the special properties of a database which are able present only using Extended ER. Explain them by using above diagram.

ii) Derive relational schema for the above EER.

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mobile app stores the hash value of the password entered by the user for the first time. fter each instance when the user login to the system, the hash value of the entered assword is matched with the stored hash code. If the two values are matched user is allowed) access the app, otherwise display the message " the password is incorrect. The user has nly three attempts and the Password consists of only numbers.
he hashing algorithm used above gets the total of entering numbers.
assword = 34567 Hashing algorithm = 3+4+5+6+7 Hash value = 15
Write suitable terms in the blanks of the given flowchart.



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ii. The Python code which relevant to the above Python code is given below. Fill in the blanks with suitable terms.

```
c=0
def hash():
  out=0
pw=input("enter the pass word")
  .....A.....
    .....B.....
  .....C.....
hash1=(hash())
.....D.....
  .....E.....
  if hash1==hash2:
    print ("Login in success")
    break
  else:
    .....F.....
    print("invalid password, try again")
print(" Invalid login")
```

b. What is the output of the following Python script?

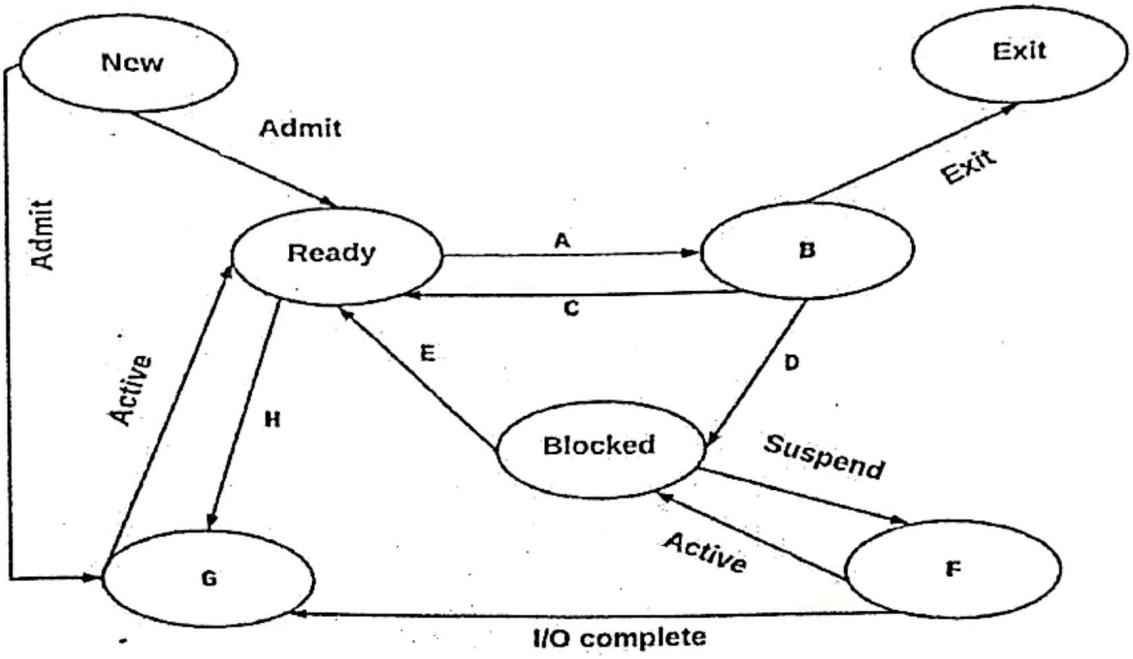
```
i=0
while i<5:
    print(i)
    i+=1
    if i==3:
        break
    else:
        print(0)
```

c. Write the python code to get the following output.

```
1
22
333
4444
55555
```


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The central theme of the modern operating system is process. The process is a program in execution.
The process can have many states. Those states are shown below in the diagram.



Choose the correct answer from the list to fit the blanks in the above seven-state transition diagram. Write the correct answers against the labels in your answer sheet.

[Short-term scheduler, scheduler dispatch, I/O or event wait, I/O or event completion, Swapped out and blocked, Swapped out and waiting, Terminated, Waiting, Interrupted, Active, Running, Suspend]

i. State 02 reasons for the arrow C in the above seven state transition diagram.
ii. State 02 reasons for the creation of the process.
iv. The operating system resolves every resource allocated, after the end of the process. List out reasons for process termination.
iv. Process in ready state is changed to state B by arrow A. Which scheduler is responsible for the above act?

b. Consider a computer that has virtual addresses of 16 bits from 0 to 64K. The physical memory size of this computer is 32KB. Assume that the size of a page is 4 KB.

i. What is the number of bits needed to store a page number?
ii. What is the number of bits needed to store a frame number?
iii. What is the number of bits of the offset of the virtual memory?

c. Write down the advantages and disadvantages of the contiguous space allocation technique used in an Operating System.

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