



ANANDA COLLEGE - COLOMBO 10

20 E I

**Final Term Test - 2020 September
G.C.E. (Advanced Level) Examination - 2020 October**

**Information & Communication Technologies I
Grade 13**

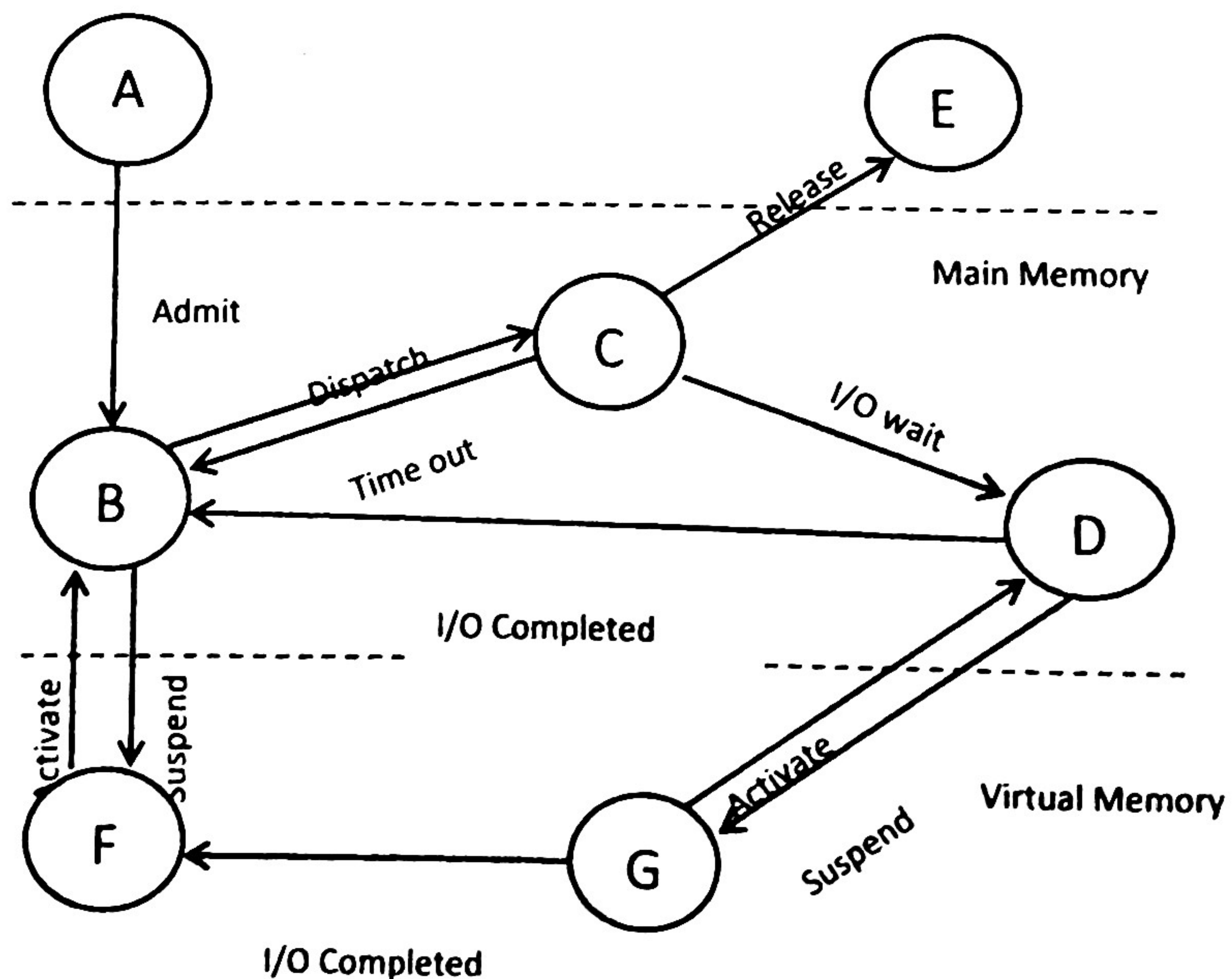
Time : 2 Hours

Name : _____

- Answer *all* questions
- In each of the questions 1 to 50, pick one of the alternatives from (1), (2), (3), (4) and (5) which is correct or most appropriate.

- Which of the descending order of memory hierarchy as far as price is concerned according to the following ?
 (1) Hard disk, RAM, Cache, Registers
 (2) RAM, Hard disk, memory card, External storage
 (3) Registers, Cache, RAM, Secondary storage
 (4) Memory card, Magnetic tape, Cache memory, External storage
 (5) None of these
- Which of the following characteristic of DRAM is an advantage over that of SRAM ?
 (1) Speed (2) Capacity (3) Power consumption (4) No. of transistors (5) Low price
- _____ is a process in which data is temporarily held to be used and executed by a device, program or the system
 Which of the following term is suitable to fill the blank above,
 (1) Spooling (2) Multi-programming (3) Latency (4) Multi-processing (5) Spooling
- Downloading someone else belonging and present them as your very own is known as,
 (1) Copyright (2) Phishing (3) Piracy (4) Privacy (5) Plagiarism
- What is the correct line of code that can be used to display an e-mail address through a HTML form on a web page ?
 (1) <form Action = "e-mail.php" method="POST">
 (2) <? php echo \$_POST ["email"] ; ?>
 (3) < ? php echo \$_email [POST] ; ? >
 (4) < ? php FORM Display = "email" ; ? >
 (5) <? php Print email: "Form" ; ? >

6. Which of the following statement or statements is/are true about Internet Of Things (IOT)
- (A) IOT environment can be monitored remotely
 - (B) IOT environment can be built by using hardware, sensors, connectivity and required software
 - (C) Embedded computer is used to give computing ability to things
- (1) A only (2) B only (3) C only (4) A and B only (5) A,B,C all
7. The corresponding External CSS to apply for a webpage is known as,
- (1) `Link {url = "mystyle.css"}`
 - (2) `<Link rel = "stylesheet" type = "text/css" href = 'mystyle.css'>`
 - (3) ``
 - (4) `Link {rel = 'stylesheet' type = 'text/css' href = 'mystyle.css'}`
 - (5) `<Form Action = "mystyle.css" method = "GET">`
8. Which of the following term best describes the time required for a particular process to complete from submission time to completion ?
- (1) Throughput time (2) Waiting time (3) Turnaround time (4) Response time
 - (5) Completion time
9. Mechanism in which a process in main memory moving in to virtual memory is identified as,
- (1) Context switching (2) Demand paging (3) Scheduling (4) Swapping (5) Interrupting
- Consider the following process transition diagram to answer 10 - 12



10. Which of the following represent the correct order of letters A - F of seven state process transition diagram above.

- (1) A - New, B - Ready, C - Running, D - Blocked, E - Exit, F - Ready/Suspend, G - Blocked
- (2) A - New, B - Ready, C - Blocked, D - Running, E - Exit, F - Suspend blocked, G - Ready/Suspend.
- (3) A - New, B - Ready, C - Running, D - Blocked, E - Exit, F - Ready/Suspend, G - Blocked/Suspend.
- (4) A - Create, B - Running, C - Ready, D - Ready/Suspend, E - Exit, F - Blocked, G - Blocked/Suspend.
- (5) A - Create, B - Ready, C - Blocked, D - Running, E - Exit, F - Ready/Suspend, G - Blocked/Suspend.

11. Which is the most correct reason for transition of process C to D in the above diagram

- (1) Because RAM has no enough space
- (2) Because a high priority job is in presence
- (3) When a process terminates
- (4) Because of secondary memory is not sufficient
- (5) None of the above

12. Which statement describes the correct reason for transition of process G to F ?

- (1) To give priority to another process
- (2) Because RAM has no enough space
- (3) Because of an effect from an input or output device
- (4) Because of answer (1) and (2) both
- (5) None of the above

13. Consider a system where a heat sensor detect an intrusion & alerts the security company what kind of requirement the system is providing

- (1) Functional Requirement
- (2) Non- functional Requirement
- (3) Known Requirement
- (4) Nice to have functional requirement
- (5) Nice to have non-functional requirement

14. _____ Enables the software engineer to derive sets of inputs conditions that will fully exercise all functional requirements for a program

- (1) White - Box testing
- (2) Black - Box testing
- (3) User acceptance testing
- (4) Unit testing
- (5) Integrated testing

15. Which of the following system development model is not suitable for accommodating any change in first phases of the system ?

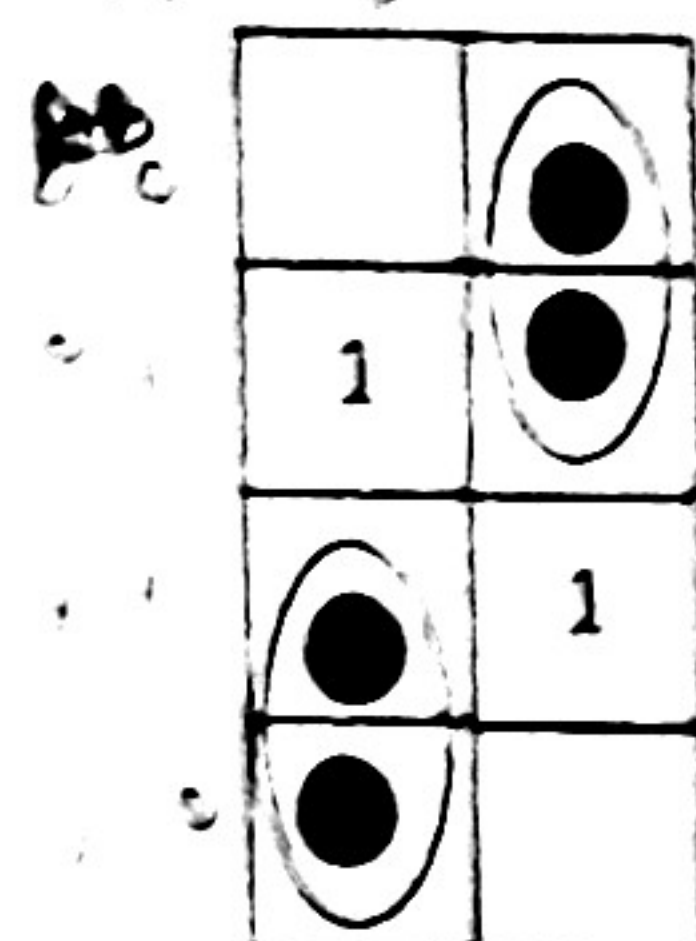
- (1) Prototype Model
- (2) Waterfall Model
- (3) Agile Model
- (4) Rapid Application Development Model
- (5) Spiral Model

16. Which of the following are correct regarding the rules of a DFD
- A) Each process should have at least one input and one output
 - B) Data stores must go through a process
 - C) All process in a DFD should go to another process or data store
 - D) Data store should access another Data store
 - E) An Entity can handle data store
- (1) ADE (2) ABD (3) BCD (4) ACD (5) ABC
17. Which of the following information system type is used to decide how to carry out specific tasks by strategic management and establishing criteria for completion ?
- (1) Transaction Processing system
 - (2) Decision support system
 - (3) Management Information system
 - (4) Smart system
 - (5) None of the above
18. Which of the following services use TCP ?
- 1. DHCP
 - 2. SMTP
 - 3. HTTP
 - 4. TFTP
 - 5. FTP
- (1) 1 and 2 (2) 2, 3 and 5 (3) 1, 2 and 4 (4) 1, 3, 4 and 5 (5) 1, 3 and 4
19. You need to subnet a network that has 5 subnets, each with at least 16 hosts. Indicate which of the following subnet mask is correct.
- (1) 255.255.255.192
 - (2) 255.255.255.224
 - (3) 255.255.255.240
 - (4) 255.255.255.248
 - (5) 255.255.255.128
20. Which layer is responsible for processing to process delivery?
- (1) Network layer
 - (2) Transport layer
 - (3) Session layer
 - (4) Data link layer
 - (5) Physical layer
21. What is the size of mac address ?
- (1) 16 bits
 - (2) 32 bits
 - (3) 48 bits
 - (4) 64 bits
 - (5) 128 bits
22. What is the use of ping command?
- (1) To test whether a device on the network is reached
 - (2) To test a hard disk faults
 - (3) To test bugs in an application
 - (4) To detect network errors
 - (5) None of the above
23. A digital signature needs a _____
- (1) Private key system
 - (2) Shared key system
 - (3) Public key system
 - (4) Private and Public both
 - (5) Manual key system
24. Which of the following correctly represents the binary equivalent of the Hexadecimal number 193_{16} is,
- (1) 1010.101₂
 - (2) 10010.11₂
 - (3) 1101.11₂
 - (4) 11001.0101₂
 - (5) 10011.0011₂
25. Which of the following represents the bitwise XOR operation of the two binary numbers of 01011011 and 10110110.
- (1) 10101101
 - (2) 01011011
 - (3) 11011101
 - (4) 11101110
 - (5) 1001

26. Which of the following represents the result of the binary arithmetic operation of $10101101 - 01011011$?
 (1) 00010110 (2) 1000 (3) 00001011 (4) 1000010 (5) None of these

27. What is the binary equivalent of the decimal 13.375?
 (1) 00001101.101 (2) 10110.011 (3) 111.011 (4) 00000101.11 (5) None of these

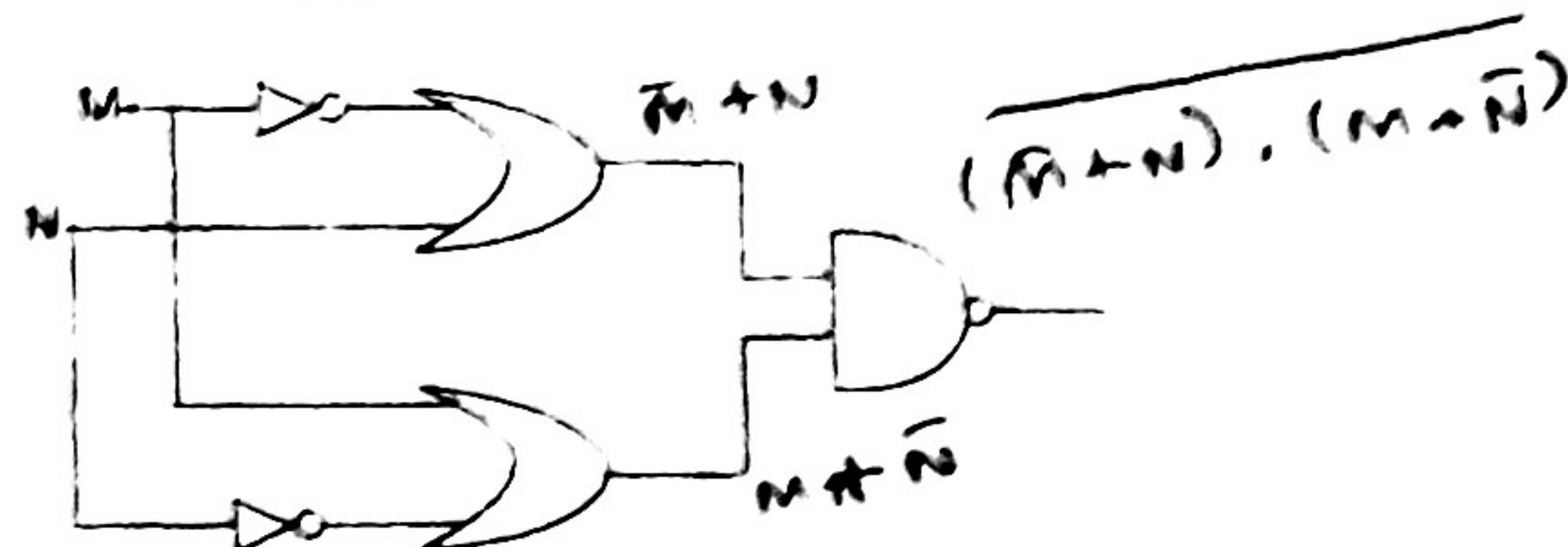
• Consider the following K-Map



28. Which of the following is the correct logic expression that corresponds to the two marked segments on the K-Map?

- (1) $\bar{C} + A\bar{B}$ (2) $C + \bar{A}B$ (3) $A\bar{B} + C$ (4) $\bar{A}\bar{B}C + ABC$ (5) None of these

• Consider the following logic circuit



29. If $M + N$ is equivalent to $\bar{M}N + \bar{N}M$, to which of the following the above given diagram belongs to
 (1) $\bar{M} \oplus \bar{N}$ (2) $\bar{M} \oplus N$ (3) $\bar{M} - \bar{N}$ (4) $\bar{M}N$ (5) None of these

30. A computer uses 18-bit virtual memory address and also byte addressable. Which of the following represents the correct value of its total virtual memory.

- (1) 2^8 bits (2) 2^8 B (3) 256 KB (4) 8 MB (5) None of these

31. In which of the SDLC phase DFD's are drawn?

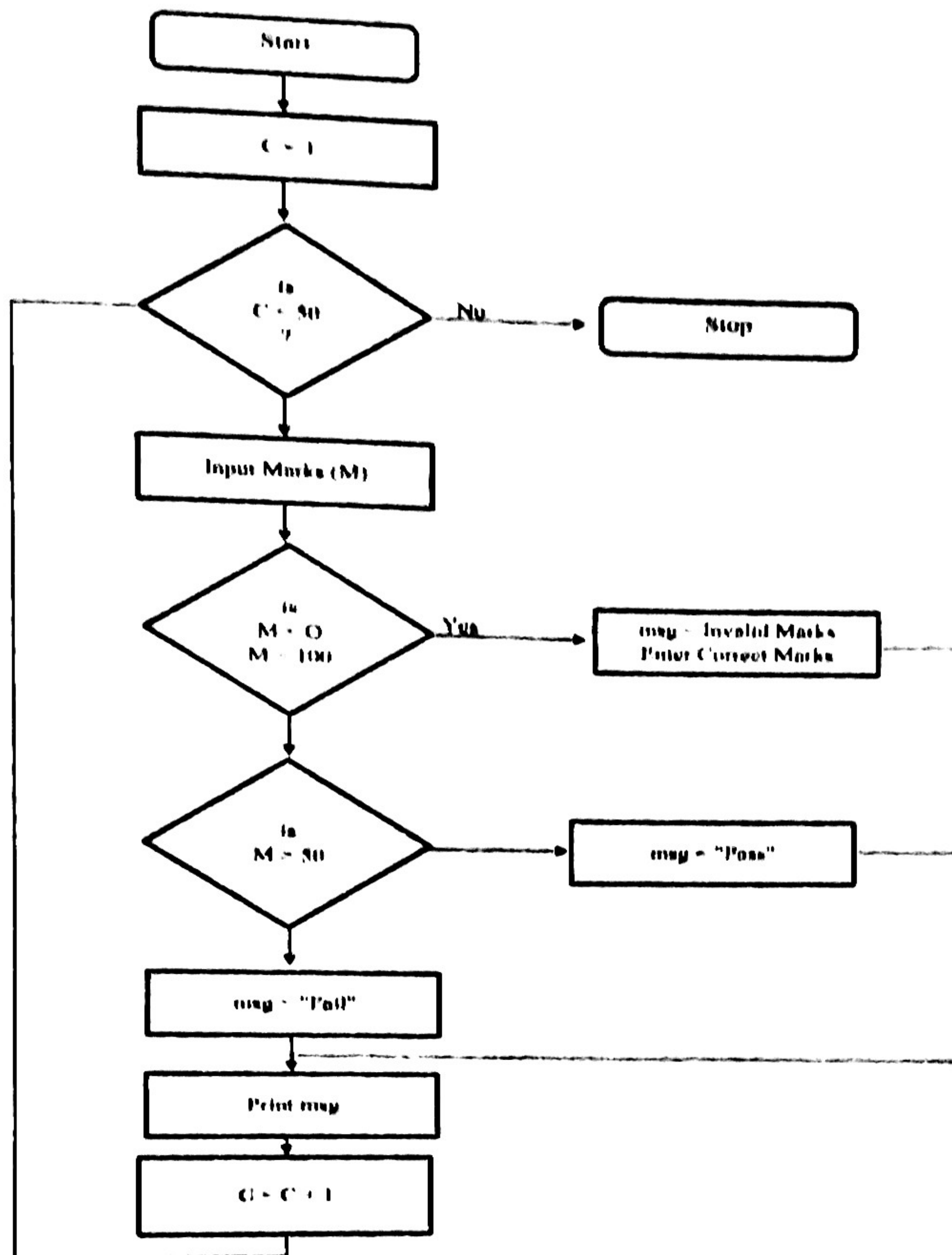
- (1) Requirements Analysis (2) System Design (3) System Testing
 (4) System Implementation (5) System Maintenance

• Consider the following database table to answer the questions 32-36

Part_Warehouse

Part ID	Warehouse ID	Quantity	Warehouse Address
P001	A	200	Maradana
P002	B	150	Borella
P003	C	100	Fort
P004	D	175	Pettah
P005	B	185	Borella

- Consider the following flow chart to answer the questions 40-41



40. Which of the following statements is / are correct about the algorithm expressed by the flowchart?

- A – It takes exactly 50 input
- B – It doesn't output an integer.
- C – If it inputs invalid marks it will terminate the program

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

41. Which of the following Python program has/have the same functionality as the algorithm in the flowchart above.

(1)

```
c = 1
while c <= 50:
    m = int(input("Marks"))
    if m < 0 or m > 100:
        msg = "Invalid Marks"
    elif m >= 50:
        msg = "Pass"
    else:
        msg = "Fail"
    print(msg)
    c = c + 1
```

(2)

```
c = 1
while c <= 50:
    m = int(input("Marks"))
    if m < 0 or m > 100:
        msg = "Invalid Marks"
    elif m >= 50:
        msg = "Pass"
    else:
        msg = "Fail"
    print(msg)
    c = c + 1
```

(3)

```
c=1
while c<=50:
    m=int(input('marks'))
    if m<0 or m>100:
        msg='Invalid Marks'
    elif m>50:
        msg='Pass'
    else:
        msg='Fail'
    print(msg)
    c=c+1
```

(4).

```
c=1
while c<=50:
    m=int(input('marks'))
    if m<0 or m>100:
        msg='Invalid Marks'
    elif m>50:
        msg='Pass'
    else:
        msg='Fail'
    print(msg)
    c=c+1
```

(5).None of these

42. What will be the output of the following python code segment?

```
for i in range(10, 20, 2):
    if i % 3 == 0:
        continue
    else:
        print(i)
```

(1) 10
12
14
16

(2) 12
18

(3) 10
14
16

(4) No output

(5) None of these

43. Which of the following statement is correct?

- (1) Interpreter runs faster than compiler.
- (2) Debugging is more difficult in compiler than interpreter.
- (3) Compiler uses less memory compared with interpreter
- (4) Easy to modify the code in compiler than interpreter.
- (5) Compiler is less likely to crash the computer than the interpreter.

44. What is the value of the following python expression?

$2*(25\%7)**2//8$

- (1) 2.0
- (2) 4.0
- (3) 2
- (4) 4
- (5) 3.5

45. What will be the output if the following Python code is executed with 'racecar' as the input?

```
>>>s=input()
>>>s[::-1]==s[::-1]
```

- (1) True
- (2) False
- (3) 1
- (4) 0
- (5) -1

46. What will be the output if the following Python code?

```
y=10
for i in range(1,6):
    y=y+5
print(y)
```

- (1) 10
- (2) 45
- (3) 35
- (4) 30
- (5) 25

47. What will be the output if the following Python code segment?

```
L=[2,3,7,6,8,10]
t=0;i=0;
while i<len(L):
    if L[i]%2==1:
        t=t+L[i]
    i=i+1
print(t)
```

- (1) 2
- (2) 5
- (3) 8
- (4) 9
- (5) 10

48. What will be the result when the following Python code is executed?

```
def C2F(c):  
    F=9*c/5+32  
    return F  
print(C2F(35))
```

- (1) 25.0 (2) 37.0 (3) 45 (4) 95.0 (5) 100.0

49. The Process Control Box(PCB) is used to,

A-Identify the process number

B-Identify the state of the process

C-To track the movement of the process inside CPU.

Which of the following is correct regarding above?

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

50. Which of the following e-business type is suitable for online transactions with 'www.elance.com'?

- (1) B2C (2) B2B (3) C2C (4) G2C (5) C2B

32. What is the name of the functional dependency violated by the above table?
(1) Partial Functional (2) Full Functional (3) Derived (4) Transitive (5) None of these

33. Which of the normalization form violated by the above table?
(1) 1 NF (2) 2 NF (3) 3 NF (4) BC NF (5) None of these

34. In which of the normal form violated by the above table below
(1) 1 NF (2) 2 NF (3) 3 NF (4) BCNF (5) 5 NF

35. Consider the following statements regarding the above table?

A – It has a composite primary key

B – "Quantity" attribute is fully dependent on the composite primary key

C – WarehouseID is a part of the primary key

Which of the above statement is/are correct?

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

36. The cardinalty and the degree represented by above table is given as,

(1) 4, 5 (2) 3, 4 (3) 5, 5 (4) 5, 4 (5) None of these

37. Which one of the following SQL statement is correct to update the address of "Borella" to "Narahenpita"?

(1) ALTER table Part_Warehouse change 'Borella' to 'Narahenpita'

(2) SELECT * FROM Part_Warehouse WHERE WarehouseAddress = "Narahenpita"

(3) UPDATE Part_Warehouse SET WarehouseAddress = "Narahenpita"
WHERE WarehouseID = "Borella"

(4) UPDATE WarehouseAddress SET WarehouseAddress = "Narahenpita"

(5) None of Above

38. Which of the following SQL clause is used as DML?

(1) DELETE (2) CREATE (3) ALTER (4) MODIFY (5) USE

39. SQL _____ is used to delete all data but keeping the structure.

(1) DELETE (2) ALTER (3) DROP (4) CLEAR (5) TRUNCATE

Part B

❖ Answer any 04 questions only.

Q1. There are 3 sensors A, B, C and two LEDs, L1 and L2 connected to a digital circuit. The behavior of L1 and L2 will be represented by the following truth table.

A	B	C	L1	L2
0	0	0	....	0
0	0	1	....	1
0	1	0	....	1
0	1	1	....	0
1	0	0	....	1
1	0	1	....	0
1	1	0	....	0
1	1	1	....	1

The respective conditions for L1 and L2 to be turned on are,

L1 - If at least two sensors are active then it outputs 1

L2 - If the result of the binary combination of A and B combining with C will output 1.
(Considering two inputs at a time if and only if one input is 1 then the output is 1)

Consider the turn on and turn off states of both L1 & L2 are represented by the Boolean values 1 & 0 respectively

The active and inactive states of each sensor is represented by 1 & 0 respectively.

- Complete the output of L1 of the truth table above
- Obtain sum of products (SOP) expression to show the output of L1?
- Simplify the above expression either by using Boolean algebra rules & axioms or by using K-Maps obtained in part (ii) above.
- Construct re logic circuit for the simplified expression obtained in part (iii) above by using basic logic gates.
- Identify the output of L2 and construct the logic circuit using only XOR gates to show the output of L2 above.
- Name the complete logic circuit represented by A, B, C, L1, L2 if both the outputs shown separately on the same diagram?

Q2. Consider the following scenario.

The AMW Company has four units. They are production, Maintenance, Sales and IT. The following table shows the number of computers available in each unit.

Unit	No of computers
Production	32
Maintenance	28
Sales	20
IT	40

A company has been assigned IP address block 192.248.17.1 It is required to subnet IP address block to satisfy the requirements of each unit and allocate IP address to them.

- a)
 - 1) Find the subnet mask.
 - 2) Write the relevant network address for each unit
 - 3) Write the allocated range of IP addresses for each unit.
- b) The IT unit administrator is responsible for setting up the company network by linking the four units and connecting those units to the internet through IT unit. The network has been completed by installing 4 switches, a router and a firewall.

The company decided to connect to the internet through a proxy server. There is a DNS server also in the IT unit.

- i) Draw the logical network diagram for the above.
 - ii) State clearly the name of each unit & devices properly.
- c) Briefly describe the following terms.
 - a. Digital Signature.
 - b. Symmetric key encryption.
 - c. Crackers and hackers.

Q3. eBay shopBot has created an opportunity for eBay. It can reach a new group of shoppers on one of the largest social messaging platforms- Facebook, Messenger; which has over 1 billion monthly active users. Chat bots are possibly the most accessible form of AI. They respond to customers instantly. As they use machine learning to learn more about each customer specifically they're able to provide satisfactory, personalized answers that nudge a customer closer towards a conversion. Chatbots collect data, track behavior, and they help to provide a seamless shopping experience.

Use the above paragraph to answer the following questions.

- a) State the e-business transaction type between eBay and online shoppers.
- b) State one-functional and non-functional requirements of Chatbot above?
- c) State briefly the benefits gained by eBay through the use of AI.
- d) Do you think that eBay would be able to grant its services efficiently to satisfy customers without Chatbot? Give reasons.

Q4. Applicant have to sit for an aptitude test to be selected for master of computing courses at the UCSC of university of Colombo. those who score high marks will be qualified to follow the above course. minus marks have been introduced to discourage any guessing.

For each correct answer awarded 2 points while for each incorrect answer awarded (-1) marks. Applicants have to score greater than or equal to 50 marks in order to qualify. program should be terminated when the applicant name is equal to "exit".

each applicant name is input one after the other followed by,

- a - total number of attempted questions
- c - total number of correct answers

The program should display the name of each applicant and either "pass" or "fail to be recorded in a text file named "eligible.txt"

- (i) Construct a flow chart to show the output of the above algorithm.
- (ii) Develop a python program to implement the algorithm explained by the flowchart.

05.

i. Consider the following invoice to create a set of normalized relations.

Invoice		
BEST CARE PET HOSPITAL		
Invoice #	: 486	Date : Jan 13/2019
Customer Number	: 10086	
Customer Name	:	
	Mr. Thomas Richard	
Customer Address:		
	688/1, New city, Chicago	
Pet	Procedure	Amount
Rover	Rabies Vaccination	830.00
Morris	Rabies Vaccination	924.00
	Total	1754.00
	Tax (8%)	140.32
	Amount	1894.32

- I. invoice (invoice-no, invoice - date, customer-no, Customer-name, customer-address)
- II. invoice-pet (invoice-no, pet-id, pet-name, procedure, amount)

(a) In which normal form do the above relations given in I, II, III above exist? Justify your answer.

(b) Convert the above relations to the next Normal form from the current Normal form which you have stated in 5(a) - (present the contents relevant to the labels (A) to (D) indicated in the following table as your answer)

Relation No	Next Normal Form	Relation/s in Next Normal Form
I	(A)	(B)
II	(B)	(D)
III	(C)	(F)

- ❖ Computer science Department frequent filers have been complaining to quad city Airport officials about the poor organization at the airport as a result, the officials decided that all information related to the airport should be organized using a DBMS, and you have been hired to design the database. Your first task is to organize the information about all the airplanes stationed and maintained at the airport. The relevant information is as follows.

- Every airplane has a registration number and each airplane is of a specific model.
- The airport accommodates a number of airplane models, and each model is identified by a model number. (eg: DC-10) and has a capacity and a weight.
- A number of technicians work at the airport. You need to store the name, SSN, address, Phone number, and salary of each technician.
- Each technician is an expert on one or more plane model (s) and his or her expertise may overlap with that of other technicians. This information about technicians must also be recorded.
- Traffic controllers must have an annual medical examination. For each traffic controller, you must store the date of the most recent exam.
- All airport employees (including technicians) belong to a union. You must store the union membership number of each employee. you can assure that each employee is uniquely identified by a social security number.
- The airport has a number of tests that are used periodically to ensure that airplanes are still airworthy. Each test has a federal Aviation Administration (FAA) test number, a name, and a maximum possible score.
- The FAA requires the airport to keep track of each time a given airplane is tested by a given technician using a given test. For each testing event, the number of hours the technician spent doing the test, and the score the airplane received on the test.

- ii. Draw an ER diagram for the airport database. be sure to indicate the various attributes, key attributes of each entity, relationship set and cardinality.

Q6. Reservation of hotel in the group of Acqua Hotels can be booked online.

Customer should get logged on to the webpage of Acqua hotels which will display hotels available in the group. Calendar of dates will be on display when a hotel is selected by the customer. There after customer's date of arrival and date of departure will be stored in the record of dates.

At that stage, customers, name and citizenship should be confirmed indicating the number of arriving and no of rooms required, which will get stored in the record of customer information.

Payments, of hotels charges must be paid for confirmation of the customer's credit/visa card details and confidential details are provided at this stage will be safety stored in the finance data stores.

When the customer activated process all information regarding reservation of rooms will be recorded and the Acqua group of hotels will issue an acknowledgement with thanks to the customer.

1. Draw DFD level 1 for reservation of hotels online system.
2. Indicate 2 requirements each for functional requirements and non functional requirements.