

8) Properties of different systems are given below. Among them in which system waterfall method can be used.

1. Small, Static, Unclear requirements
2. Large, Static, Clear requirements
3. Small, Static, Clear requirements
4. Large, Dynamic, Unclear requirements
5. Large, Dynamic, Clear requirements

9) Consider the following system Development models

- A. Network model
- B. Waterfall model
- C. Spiral model
- D. Hierarchical model

Which of the above is **not** a System Development Model

1. A, B Only
2. B, C Only
3. C, D Only
4. A, D Only
5. All the above

10) Consider the following statements

- A. Online Medical Care System is an example for Expert System.
- B. Expert System can be obtained by centralizing the brain of person (Expert).
- C. Daily transactions can be considered as an example for Expert System.
- D. Finger Print System is an example for office automated system.

Which of the above is / are correct?

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

11) Which of the following statement is correct about the off – the – shelf software which can be bought in the market?

1. Production cost of the software will be shared among the buyers
2. Difficult to buy the products in the markets
3. Prices will always be high
4. These softwares are developed for the requirements of buyers
5. These softwares are able to satisfy all the needs of the customers

12) What is the suitable database model for many to many relationship?

1. Waterfall model
2. Hierarchical Model
3. Network model
4. Rapid Applications Development model
5. None of the above

13) Consider the following table.

Class (ClassID, ClassName, Stream, Year)

Which is the correct SQL statement to display all the record of the above class?

1. Show table Class;
2. Select Class from table;
3. Select * from Class;
4. Select * where Class;
5. Select Class.ClassID, ClassName from Class;

14) What is the octal equivalent for the binary 1011010111.010100₂?

1. 1327.24₈
2. 1525.21₈
3. 4461.21₈
4. 4327.21₈
5. 277.24₈

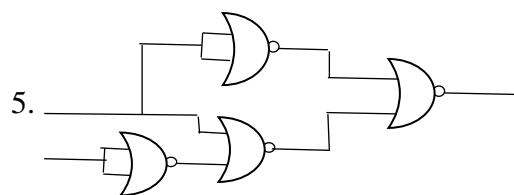
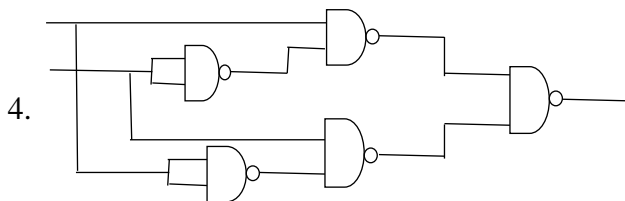
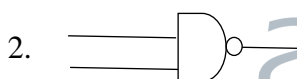
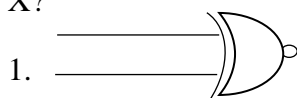
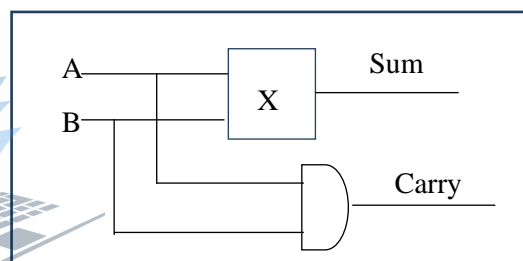
15) 462₈+1AB₁₆=

1. 1135₈
2. 1335₈
3. 1315₈
4. 3165₈
5. 3115₈

16) What is the equivalent for $f(x, y) = \overline{xy(x + y)(\bar{x} + \bar{y})}$ boolean expression?

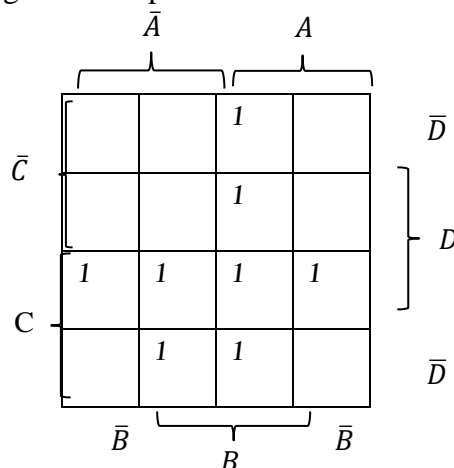
1. 1
2. x
3. y
4. xy
5. 0

17) For the shown incomplete half adder circuit, what is the suitable logic gate or circuit for X?



18) Choose the simplified Boolean expression for the given k-map?

1. $BC + AB\bar{C} + \bar{B}CD$
2. $AB + CD + BC\bar{D}$
3. $AB + CD + \bar{A}BC$
4. $AB + CD + AC$
5. $AB + CD + BC$



19) Consider the following statements

- A. Protecting data in hard disk is called as backup.
- B. Through disk defragmentation, fragmented files in hard disks can be made contiguous.
- C. Hard disk is magnetic storage device.

Which of the above statements is/are correct?

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

20) Consider the virtual memory space 1010111011010100. If the number of pages is 256, what will be the displacement?

- 1. 11010100
- 2. 10101110
- 3. 011010100
- 4. 1010111
- 5. 10000000

21) A computer in a network is structured with the IP address 192.248.16.91 and subnet mask 255.255.255.128. Which of the below IP address can't be assigned for a computer in the same network?

- 1. 192.248.16.161
- 2. 192.248.16.78
- 3. 192.248.16.110
- 4. 192.248.16.75
- 5. 192.248.16.120

22) Select the suitable statement/ statements about MAC address?

- A. MAC address is a constant one.
- B. A network device can only has MAC address
- C. In a digital computer, data packets are sent based on MAC address.

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

23) What is the server used to protect the infrastructure of a network?

- 1. DHCP Server
- 2. Proxy Server
- 3. DNS Server
- 4. Application Server
- 5. Web Server

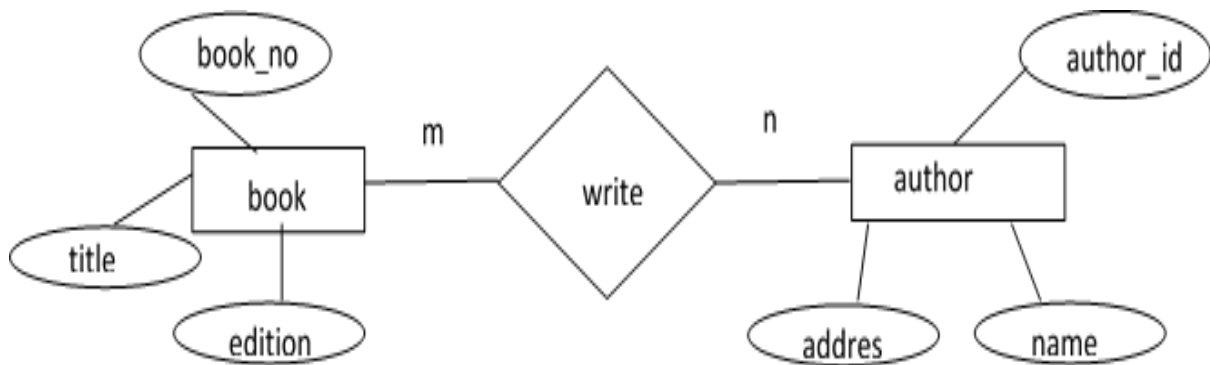
24) A LAN has 256 network devices. Which is the suitable subnet mask address for this computer network?

- 1. 255.255.255.0
- 2. 255.255.254.0
- 3. 255.255.255.128
- 4. 255.255.255.192
- 5. 255.255.255.224

25) In a public key encrypting and digital signature, given that the person x's private key is **priv(x)** and public key is **pub(x)**. Which of the following statements are incorrect?

- 1. Any different persons can use x's pub(x).
- 2. For better security, priv(x) and pub(x) should be different.
- 3. In public key encrypting, sender's private key and public key are used.
- 4. x knows both the priv(x) and pub(x).
- 5. Data communication security is increased by public encryption.

- Consider the ER diagram below to answer the questions 26, 27



26) What is the primary key of the above table 'book'?

1. author_id
2. author_id, book_no
3. book_no
4. title
5. edition

27) Which is the suitable relation for the relationships in the above ER diagram?

1. book(book_no,title,edition,author_id)
2. book_author(book_no, author_id, title)
3. author(author_id,name,address)
4. book(book_no)
5. none of the above

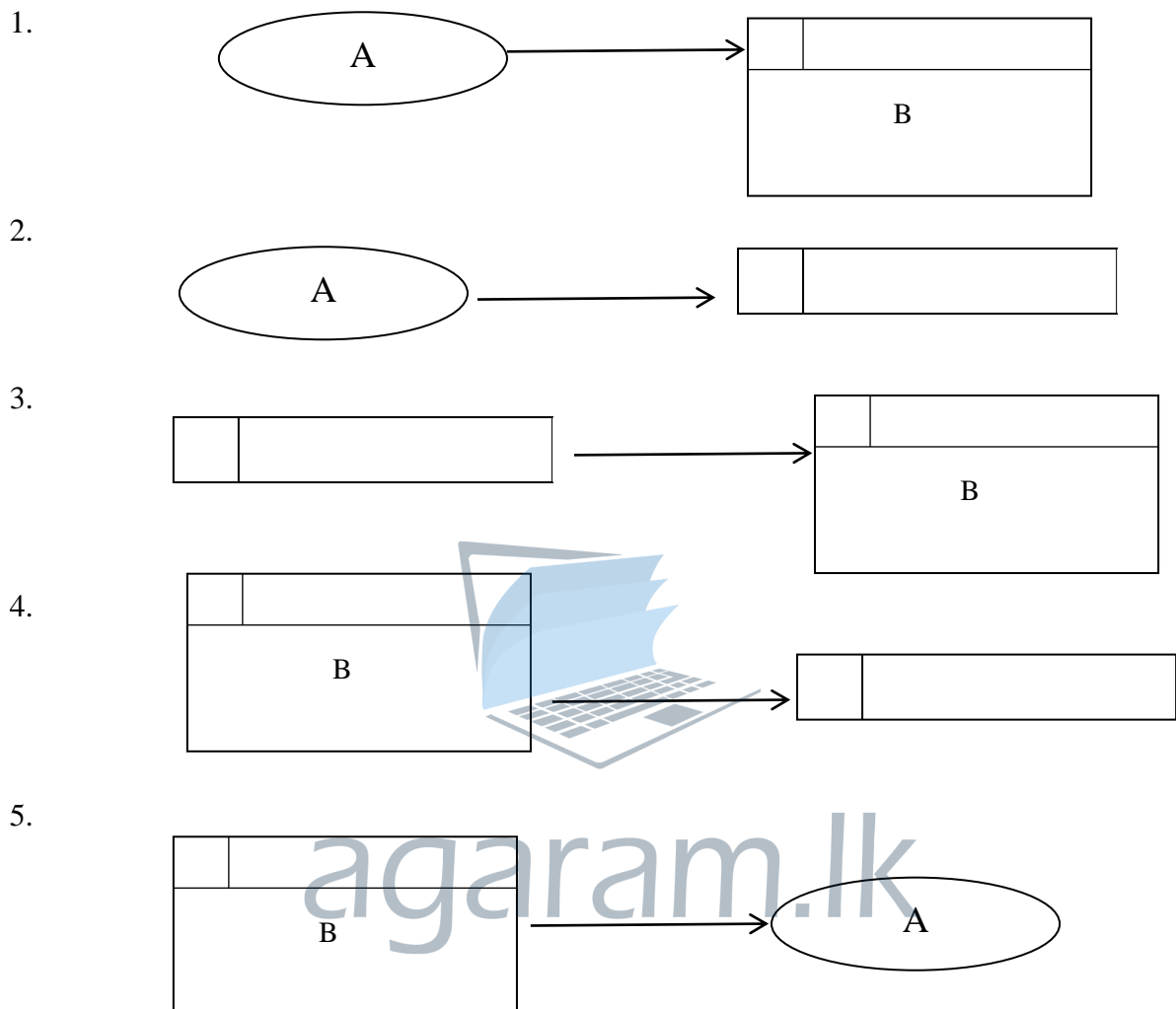
28) Student

SID	Name
S01	Raksan
S02	Janush
S03	Ramya

What is the degree and cardinality of the above table 'Student'?

1. 4,4
2. 3,2
3. 2,3
4. 8,4
5. 2,2

29) Which of the following database diagram is invalid?



30) Which is the true about algorithms in the following statements?

1. Possibilities for a system
2. Set of steps used for problem solving
3. Testing and correcting the error in the coding for problems.
4. Series of process used for problem solving
5. Methods used to research a certain problem



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Information & Communication Technology - II

Part A- Structured Essay

Answer all four questions on this paper itself.

1.

a) Write **True / False** in the given statements

(1) L1 Cache memory is embedded in the microprocessor and approximately high in speed.

(2) Data in SRAM are continuously refreshed.

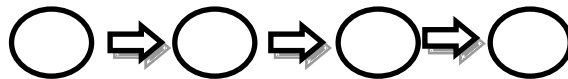
(3) Parallel computing means many programs and process performed at one time.

(4) The Tablet is larger than notebook computers and smaller than small mobile phones.

(5) Connectors and ports in computers facilitate data transmission.

b) Order the **four steps** of the fetch execute cycle correctly. (2 steps below are not correct)

1. Providing interface
2. Decoding the instruction
3. Providing security
4. Executing the instruction
5. Increasing the process count
6. Fetch the next instruction



c)

i. Write how 19_{10} , -72_{10} can be denoted in 2s compliment using 8 bits.

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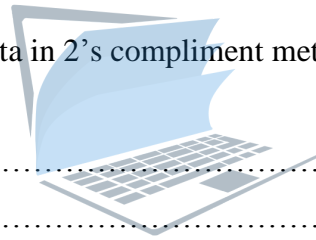
ii. Using the above method(in (i)) find $19_{10}-72_{10}$

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iii. Can $5_{10}-150_{10}$ be calculated using 8 bits 2's compliment? Reason out?

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iv. Give two **benefits** of using data in 2's compliment method for processors inside the computer.



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2.

a)

i. What is the reason for using page table maintained by operating System?

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ii. Present level of seven state process transition model is given. Fill the next possible state and the condition for transition in the table below.

Present level	next possible state	condition for transition
New state		
ready state		

iii. Choose from the list given below and fill the suitable terms form 1-5 regarding Operating System

List: {Packet, Response time, Waiting time, Swapping, Paging, frame }

1. Virtual memory divided into same size blocks is called pages. Number of pages is equal to the number of.....
2. To bring a process into main memory, shifting a process from main memory to secondary memory isin an Operating System.
3. The time between an instruction is given and beginning the process is.....

b)

i. In the data communication media, give the guided media has high bandwidth and less attenuation

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ii. In The signal encrypting NRZ- I (Non Return to Zero – Inverted), 1 shows transition in physical state, and 0 shows non-transition in physical transition. Draw the NRZ-I encrypting diagram for the digital signal 0011010011?

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3.

a)

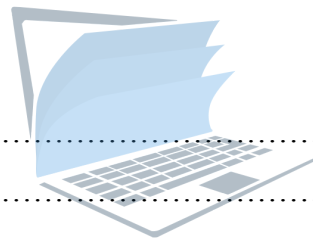
i. Explain the functional requirements and non-functional requirements used in System Development Life Cycle?

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ii. Given below are the functional requirements and non-functional requirements of the e – learning portal which have the subjects for higher education

1. System can be used 24 hours on all days throughout the year.
2. System can work in any web browsers.
3. Students are allowed to see the subjects in the lists.
4. Data should be protected during a breakdown of the system.
5. System must be easily usable.
6. Students should be allowed to present short notes about the courses and to view others' short notes.
7. Students' reliability should be reassured with the user name and passwords.
8. Passwords for the system must include more than 8 characters.

Write the alphabets of the requirements that belong to the category of non-functional requirements?



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b) Consider the relation below.

car (carno,carname,type,colour1,colour2)

i. The relation **car** given above is in which normalization form?

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ii. Change above given relation to 3rd normalization.

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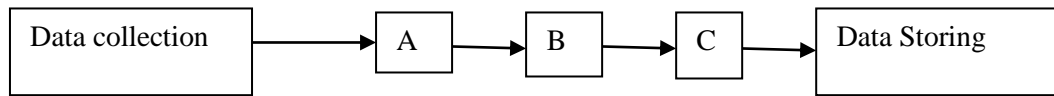
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4.

a) i. Write the appropriate names for **A**, **B**, **C** according to Data processing.



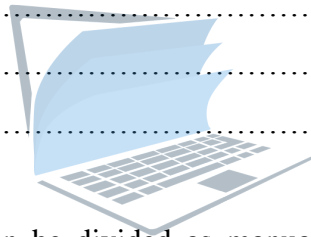
A :-

B :-

C :-

ii. One must input a user name in order to play online game. They have to input their Date of Birth in the following format yyyy/mm/dd. Year should be between 1995 and 2005. What are the data validation methods used here?

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iii. Data collecting method can be divided as manual, semi-automatic and automatic methods. Give two examples for manual data collecting methods?

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b)

i. If a ball is thrown with the acceleration u from the height h , hits the floor with the acceleration a and speed v , draw the flow chart to input the initial speed, and final speed acceleration to and find the height. equation for the height $h = \frac{v^2 - u^2}{2a}$

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ii. Write a pseudo code to input two numbers and display the maximum among them.

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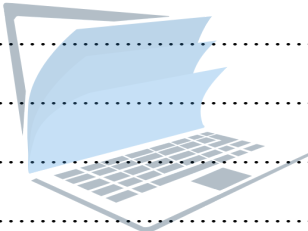
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Information & Communication Technology - II

Part - II B

* Answer any two questions only.

1. A computer – controlled machine produces plastic sheets. The thickness of each sheet must be within a certain tolerance. The sheets are kept below 50°C as they move over rollers at 10 meters per second.

Three parameters need to be monitored all the time

Parameter	Description	Binary value	Conditions
D	sheet thickness	1	thickness of sheet in tolerance
		0	thickness of sheet out of tolerance
S	roller speed	1	roller speed = 10 meters/second
		0	roller speed \neq 10 meters/second
T	temperature	1	temperature $< 50^{\circ}\text{C}$
		0	temperature $\geq 50^{\circ}\text{C}$

An alarm, X, will sound if:

Thickness is in tolerance AND (roller speed \neq 10 meters/second OR temperature $\geq 50^{\circ}\text{C}$)OR

Roller speed=10 meters/second AND temperature $\geq 50^{\circ}\text{C}$

- Write the Boolean expression to represent the above monitoring system?
- Draw a logic circuit in the above system?
- Draw the truth table in the above logic circuit?
- Draw the S-R flip flop's logic gates using the NAND gates only. And draw the truth table?

2.

a. Copy the following table and write the class, netid and host id of each IP address.

	IP address	Class	Netid	Host id
(1)	200.10.7.5			
(2)	110.100.10.10			
(3)	10.7.4.100			
(4)	156.7.7.4			

b. Give the layer of OSI model for all the following protocols and devices.

- | | |
|------------|-----------|
| 1. SMTP | 6. Router |
| 2. UDP | 7. IP |
| 3. ICMP | 8. Switch |
| 4. Hub | 9. TCP |
| 5. NetBIOS | 10. PPP |

c. when the command ping www.edupub.lk is given to the server connected to internet, from the computer A connected to internet, the RTT time is 710ms for the above circumstance give the network diagram including all the needed components.

d. Draw the **mesh** and **star** topologies.

3. The Blood bank Testing Unit. This is one unit within the College Street Red Cross Blood Donor Centre (Blood Bank). On the day following a blood donation, the Blood Bank unit tests all blood for blood type and potential viral agents. They send the results of these tests to the processing Office (another unit of the Centre). Blood units have a limited shelf life. The Blood Bank receives a list every day of those units which have exceeded their shelf life. These are discarded and the list sent back to the Processing Office with a signed indication of the disposal of the units.

The Blood Bank also distributes blood to various hospitals requesting blood. Requests usually come in for specific blood types. The Blood Bank receives a listing for each hospital and the specific units of blood to supply to the hospital from the Processing Office. The order is printed in triplicate. When the order is filled, the lab technician (inside the Blood Bank Testing Unit) signs the order and returns a copy to the Processing Office. A copy of it travels with the blood to the requesting hospital. The final copy is kept in the Blood Bank records but discarded after one year.

Draw the **context diagram** to above system?

4. Consider the following situation.

A company which sells the vehicle parts has many branches. It stores the branchNo, telephoneNo and address of those branches. Many employees work in a branch and one employee works only in one branch. EmployeeNo, name, address and telephoneNo are stored. Every employee can sell more than one part. At the same time one part can be sold by different employees. For each part unique partNumber, partName, colour, and number_of_parts sold by an employee are also stored.

Draw the ER diagram.