



Grade

12

### Third Term Test - 2023 Information and Communication Technology -I

Name of the School: .....

Name of the Student / Index No: .....

Time: 02 Hours

#### Instructions:

- Write your Index Number in the space provided in the 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)
- Use of calculators is not allowed.

1. Which of the following is considered as an example of qualitative data?
  - 1) Niki scored 70 in ICT subject.
  - 2) The price of the book "Advanced Level ICT" is Rs.1570/-.
  - 3) Chamuditha is a good student.
  - 4) The price of a computer is Rs.180000/-.
  - 5) Piumi's weight is 40 kg.
2. A fact which is not include in the Golden Rule of Information,
  - 1) Depends on the relevance
  - 2) The value of information is minimal when the time approximate to zero.
  - 3) The value of information is minimal when the time equal to infinity.
  - 4) value of information gradually decreases with the passage of time.
  - 5) The value of information is greatest when the time approximate to zero
3. Which of the following is not a characteristic of an information?
 

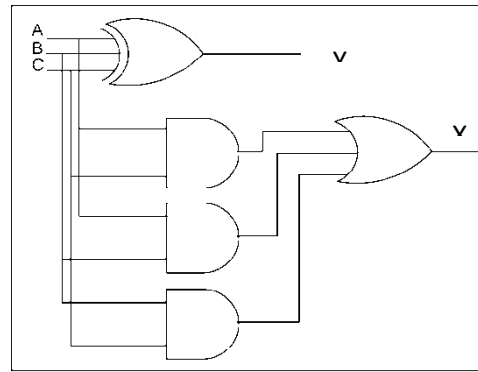
|                                           |                             |
|-------------------------------------------|-----------------------------|
| 1) Amazing                                | 2) Timeliness               |
| 3) Provides a means of intercommunication | 4) Depends on the relevance |
| 5) Must be storable                       |                             |
4. Which of the following expression can be considered an information when compared with a data?
 

|                                        |                                       |
|----------------------------------------|---------------------------------------|
| 1) The cost of a pen is Rs.15.         | 2) The average mark for ICT is 70.    |
| 3) There are 40 students in the class. | 4) The number of seats in a bus is 54 |
| 5) Achinta is a handsome young man.    |                                       |
5. The scientist who introduced WWW to the world was,
 

|                      |                       |
|----------------------|-----------------------|
| 1) Tim-Burnes-Lee    | 2) Raymond Thomlinson |
| 3) Douglas Engelbard | 4) Larry Robert       |
| 5) Vinton Scharf     |                       |

6. The incorrect statement regarding Analytical Engine is,
  - 1) It is an invention of Charles Babbage
  - 2) It was a programmable machine
  - 3) A computer belonging to the first generation of computers.
  - 4) The basic model of the computer was there.
  - 5) It was programmed by Ada Lovelace
  
7. A person who pioneered the creation of the world famous computer company IBM was,
  - 1) Charles Babbage
  - 2) Leibnitz
  - 3) John Mauchly
  - 4) Blaise Pascal
  - 5) Herman Hollerith
  
8. World's first digital computer is called,
  - 1) MARK – 1
  - 2) EDVAC
  - 3) ABC
  - 4) ENIAC
  - 5) UNIVAC
  
9. The generation of computers which used assembly language for operational purposes is,
  - 1) First generation
  - 2) Second generation
  - 3) Third generation
  - 4) Fourth Generation
  - 5) Fifth Generation
  
10. Keyboard was introduced to enter data in,
  - 1) First generation
  - 2) Second generation
  - 3) Third generation
  - 4) Fourth Generation
  - 5) Fifth Generation
  
11. Consider the following numbers  
**A -  $130_{10}$**       **B -  $260_8$**       **C -  $CD_{16}$**       **D -  $1101101_2$**   
 The statement which shows the ascending order of the above numbers is,
  - 1)  $A < B < C < D$
  - 2)  $D < C < B < A$
  - 3)  $D < A < B < C$
  - 4)  $D < B < A < C$
  - 5)  $A < D < B < C$
  
12. The decimal equivalent to binary  $1010.101_2$  is,
  - 1) 10.5
  - 2) 10.625
  - 3) 10.25
  - 4) 10.125
  - 5) 10.75
  
13. The eight bits' two's complement representation of number 20 is,
  - 1) 11101100
  - 2) 11101011
  - 3) 10100
  - 4) 01011
  - 5) 00010100
  
14. Consider the two binary numbers A = 11011010. The result of the operation A XOR B is correctly represented in,
  - 1) 10101000
  - 2) 10001111
  - 3) 10001010
  - 4) 01110000
  - 5) 01111010
  
15. If the ASCII code for R is represented as 01010010 then what will be the ASCII representation for P?
  - 1) 01010000
  - 2) 01010001
  - 3) 01001111
  - 4) 01010100
  - 5) 01010101
  
16. The answer which can be obtained after simplifying the Boolean Expression  $A(A + \bar{B}C) + A(\bar{B} + C)$  is,
  - 1)  $A + C$
  - 2)  $A$
  - 3)  $A + \bar{B}$
  - 4)  $\bar{B} + C$
  - 5)  $\bar{B}C$

17. Consider the circuit given in the figure below



- A)  $X = 1$  when only A and B are given 1.  
 B) When A, B and C are given 1, both X and Y are 1.  
 C)  $X = 1$  when only A is given 1.

Which of the above statements/s is/are correct?

- 1) A Only   2) B Only   3) C Only   4) A and B Only   5) A and C Only

18. The correct statement/s regarding the Boolean Expression  $AB + B\bar{C}$  is/are,

- A) A circuit can be constructed using only 02 AND gates, 01 OR gate and a NOT gate.  
B) Can be constructed with only 04 NAND gates.  
C) The circuit can be constructed using 03 NAND gates and one NOT gate
- 1) A Only                                      2) A and C Only                                      3) A and B Only  
4) B and C Only                                      5) All A, B and C

19. The answer which can be obtained after simplifying the given Karnaugh map is,

|   |   | AB |    |    |    |
|---|---|----|----|----|----|
|   |   | 00 | 01 | 11 | 10 |
| C | 0 | 1  | 0  | 0  | 1  |
|   | 1 | 1  | 1  | 1  | 1  |

- $$\begin{array}{lll} 1) A\bar{B} + \bar{A}\bar{B} + B & 2) A\bar{B} + \bar{A}\bar{B} + C & 3) \bar{B} + C \\ 4) A + C & 5) \bar{B} + \bar{C} & \end{array}$$

20. The minimum number of NAND gates required to construct an AND gate is,

- 1) 1                      2) 2                      3) 3                      4) 4                      5) 5

21. Which of the following is not a result of hard disk fragmentation?

- 1) Increases the time taken to access data
- 2) Data related to the same file is scattered all over the hard disk
- 3) Increases the number of head movements used to read and write data on the hard disk
- 4) Reduces the life time of the hard disk.
- 5) Increases the data reading speed

22. The process of creating a single large empty space on the hard disk by consolidating all the empty spaces where data cannot be stored on the hard disk is called ..... The most suitable term for the blank is,
- 1) Compaction
  - 2) Defragmentation
  - 3) Fragmentation
  - 4) Swapping
  - 5) Context Switching
23. What is meant by an idle time?
- 1) The time from the start of a process to its completion
  - 2) The time a process waits in the ready status queue.
  - 3) The time during which no any process exists at run time.
  - 4) The time a process has been blocked.
  - 5) The time a process is running.
24. The virtual memory of the computer is located in,
- 1) The Mother Board
  - 2) The RAM
  - 3) The Cache Memory
  - 4) The CPU
  - 5) The Hard Disk
25. In a computer with a virtual memory address space of 24 bits, if 07 bits are used for page address, the total number of pages that can be defined is,
- 1) 24 pages
  - 2) 128 pages
  - 3) 07 pages
  - 4)  $2^{24}$  pages
  - 5) 17 pages
26. The size of one Block of a disk is 2KB. A portion of the File Allocation Table (FAT) of that disk will look like this at a certain point. That section also shows the blocks in the Total.py file.
- Note: -**
1. The last block of a file is denoted by -1.
  2. The directory information associated with a file indicates the block number of the first block of the file.

|     |     |
|-----|-----|
| 110 | 114 |
| 111 |     |
| 112 | -1  |
| 113 | 112 |
| 114 | 113 |

FAT

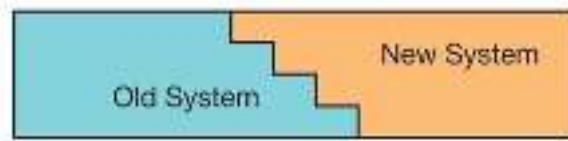
Which of the following shows the disk space and directory information for the Total.py file respectively?

- 1) 8KB,110
  - 2) 6KB,110
  - 3) 10KB,114
  - 4) 8KB,114
  - 5) 10KB,110
27. The function of Long Term scheduler is,
- 1) Transitioning a process in ready state to running state.
  - 2) Transitioning a process in the ready state to the ready/suspend state.
  - 3) Transitioning a new process to the ready state.
  - 4) Transitioning a process in the blocked state to the ready state.
  - 5) Transitioning a process in the running state to the Exit state.

28. The Protocol Data Unit (PDU) at transport layer in OSI model is called,  
 1) Segment                      2) Packet                      3) Frame  
 4) Bit                              5) Data
29. According to the OSI model, the device Hub in a computer network functions in,  
 1) Application Layer      2) Presentation Layer      3) Transport Layer  
 4) Network Layer      5) Physical Layer
30. If the IP addresses of 02 devices in a computer network are 192.168.1.30 and 192.168.1.80, then the subnet mask of this network will be,  
 1) 255.255.255.240      2) 255.255.255.224      3) 255.255.255.192  
 4) 255.255.255.128      5) 255.255.255.248
31. You have received the range of IP addresses 192.168.1.128/25. You need to divide it into 02 subnets. The two computers belonging to only one network are,  
 1) 192.168.1.10 and 192.168.1.20      2) 192.168.1.40 and 192.168.1.60  
 3) 192.168.1.140 and 192.168.1.170      4) 192.168.1.150 and 192.168.1.250  
 5) 192.168.1.130 and 192.168.1.250
32. The correct number of bits in a MAC address is,  
 1) 32 Bit      2) 48 Bit      3) 128 Bit      4) 16 Bit      5) 6 Bit
33. The protocol belonging to the transport layer in which orderly data flow takes place in data communication between two devices is,  
 1) IP      2) UDP      3) TCP      4) HTTP      5) FTP
34. Which of the following is not a properties of a signal?  
 1) Amplitude      2) Frequency      3) Phase      4) Distortion      5) Wave Length
35. Consider the following statements about cryptographic communication.  
 A - In symmetric cryptography, only the public key is used for encryption and decryption.  
 B - In asymmetric cryptography, a private key is used for data encryption and a public key is used for decryption.  
 C - Asymmetric cryptography uses public key for encryption and private key for decryption.  
 Which of the above statements is correct?  
 1) A and B only      2) A and C only      3) B and C only  
 4) A only      5) C only
36. The type of malicious computer program that masquerades as a benign program and leaks important information inside the computer is,  
 1) Trojan Horse      2) Worms      3) Virus  
 4) HOAX      5) Spam

37. The state / states in which a process in a blocked state may occur in the process management carried out by an operating system is/are,  
 A – Running State    B – Ready State    C – Blocked / Suspend State    D – Exit State  
 1) B only    2) C only    3) B and C only    4) A only    5) A and B only
38. Multiplexing is called,  
 1) Encoding the data sent in data communication.  
 2) Sending signals over long distances is done by attaching them to a wave that can travel over long distances.  
 3) Decryption of data sent in data communication.  
 4) Communication is by combining several signal streams into one signal.  
 5) The process of converting data into packets in data communication.
39. A device which use to determine the most suitable path for a data packet to travel is,  
 1) Repeater    2) Bridge    3) Router    4) Hub    5) Layer 2 Switch
40. A system that can be considered as natural and closed is,  
 1) ATM system    2) Banking system    3) Sinharaja Forest  
 4) School System    5) The lymphatic system of the human body
41. Earthquake incidents were reported in various cities in Sri Lanka recently. A system in which such seismic information is recorded may be called as a,  
 1) Transaction processing system    2) Decision Support System  
 3) Management support system    4) Geographic information system  
 5) Smart System
42. The system development model, which is given in the form of sequential process level output iteration is,  
 1) Waterfall Model    2) Agile Model    3) Spiral Model  
 4) Prototyping    5) Rapid Application Development Model
43. Consider the following phases of system development life cycle.  
 A – System Testing    B – System Maintenance    C – Identification of Requirements  
 D – System Deployment    E – Feasibility Study    F – System Design  
 G – System Development  
 The correct sequence of the phases of system development life cycle is,  
 1) C,E,F,G,A,D,B    2) A,B,C,D,E,F,G    3) C,F,E,G,B,A,D  
 4) E,C,F,G,A,D,B    5) E,C,F,G,B,A,D
44. Which of the following is not a type of Feasibility Study?  
 1) Economical Feasibility  
 2) Organizational Feasibility  
 3) Technical Feasibility  
 4) Operational Feasibility  
 5) Planning Feasibility

45. Consider the following diagram related to system deployment



The deployment method shown in the above diagram is,

- |                        |                      |                      |
|------------------------|----------------------|----------------------|
| 1) Parallel Deployment | 2) Direct Deployment | 3) Phased Deployment |
| 4) Pilot Deployment    | 5) None of the above |                      |

46. The component of a data flow diagram represented by the following figure is,



- |            |               |              |
|------------|---------------|--------------|
| 1) Process | 2) Entity     | 3) Data Flow |
| 4) System  | 5) Data Store |              |

47. In system testing, the testing of the system code is,

- |                      |                        |                       |
|----------------------|------------------------|-----------------------|
| 1) Black Box Testing | 2) White Box Testing   | 3) Acceptance Testing |
| 4) System Testing    | 5) Integration Testing |                       |

48. Which of the following is not a method of identification of requirements when developing a new system?

- |                   |                             |               |
|-------------------|-----------------------------|---------------|
| 1) Questionnaires | 2) Interviews               | 3) Researches |
| 4) Internet       | 5) Document Sample Checking |               |

49. Which of the following statements is correct regarding System Testing?

- A - Bugs in codes are detected during unit testing.  
 B - In White-Box Testing the outputs are tested by giving different inputs.  
 C - Acceptance Testing is done after system testing.
- |                 |                 |           |
|-----------------|-----------------|-----------|
| 1) A Only       | 2) B Only       | 3) C Only |
| 4) A and C Only | 5) A and B Only |           |

50. Which of the following indicate Functional Requirements only?

- A - Presence of a pattern lock (Pattern Lock) on a mobile phone.  
 B - Existing 36 hours battery life of the mobile phone.  
 C - Availability of phone number storage facility in mobile phone.
- |                 |                 |           |
|-----------------|-----------------|-----------|
| 1) A Only       | 2) B Only       | 3) C Only |
| 4) A and C Only | 5) A and B Only |           |

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Grade

12

**Third Term Test - 2023**  
**Information and Communication Technology -II**

Name of the School: .....

Name of the Student / Index No: .....

Time: 03 Hours

**Part - A**

- *Answer all 4 questions.*
- *Write answers for the questions on this paper itself*

1) Assume that the integers in a certain digital device are represented in eight-bit two's complement form. However, the results of calculations are printed in decimal form.

a) Show how  $30_{10}$  is represented in the above device.

.....

.....

b) Show how  $-45_{10}$  is represented in the above device.

.....

.....

.....

.....

c) Explain how to calculate  $30_{10} + (-45_{10})$  by the methods you mentioned in the above (a) and (b) parts.

.....

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.....

d) Write down the steps required to convert the result obtained from part C to decimal.

.....

.....

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2)

- a) Consider the following statements about full adder. In the given space, state whether the statement is true/false.
- i. A full adder requires 01 XOR gate, 03 AND gates and 01 OR gate. (.....)
  - ii. This can only be created with NAND gates. (.....)
  - iii. It has memory storage capability. (.....)
  - iv. It has the ability to add 03 bits simultaneously. (.....)
  - v. This is used to create register memory. (.....)

- b) A byte-addressable memory uses a memory capacity of 4MB for its virtual memory. It has a page size of 4KB.

- i. Show the number of pages in virtual memory with calculations.

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- ii. Show the length of a memory address in bits with all calculations.

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- iii. Show with all the calculations how many bits are required to represent the page number.

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.....

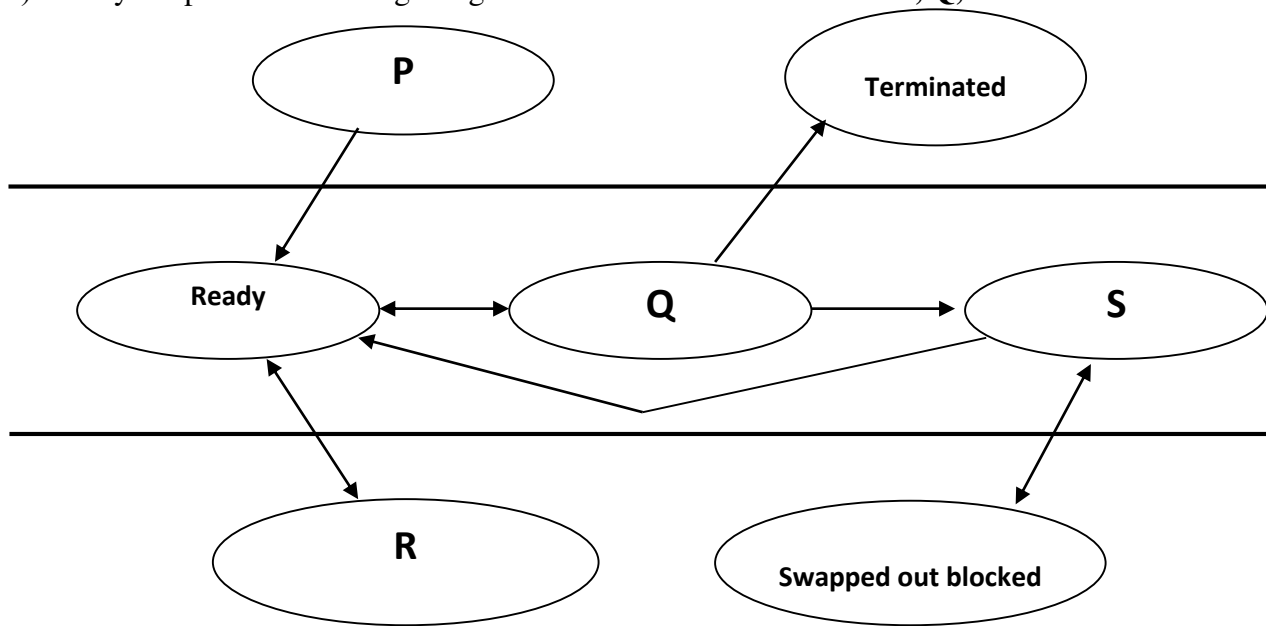
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.....

3)

a) Study the process state diagram given below and name the labels **P**, **Q**, **R** and **S**.



P - .....

Q - .....

R - .....

S - .....

b) Write any two differences that can be seen among NTFS and FAT32 file systems.

.....

.....

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c) Briefly explain 'Fragmentation'.

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4)

a) Write the suitable terms for the blanks.

- i. Sayuri and Imasha exchange data securely through a computer network with the help of data encryption.

In encoding the message send by Sayuri, .....is used, and once the message reaches Imasha, to ....., Imasha's ..... key is used.

- ii. An IP address is made up of ..... different octets and each octet is represented by ..... bits. Also, octets are separated by ..... But a MAC address is represented by ..... groups of ..... bits each. Out of which, by the first ..... octets the ..... unique number is represented and by the last..... octets ..... unique number is represented. Therefore, representing a MAC address requires a total of ..... bits.

b) Fill in the names of the respective layers in the boxes shown for the OSI model and the TCP/IP model.

|    |
|----|
| 7. |
| 6. |
| 5. |
| 4. |
| 3. |
| 2. |
| 1. |

OSI

|    |
|----|
| 4. |
| 3. |
| 2. |
| 1. |

TCP/IP



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### Third Term Test - 2023

#### Information and Communication Technology -II

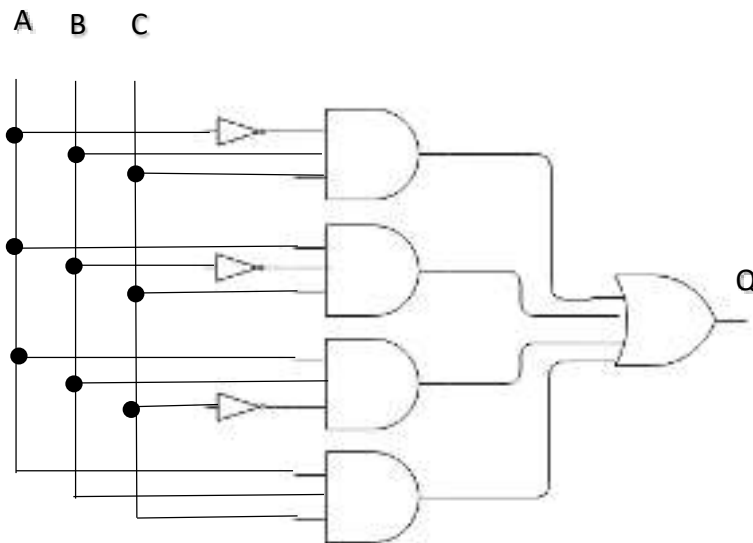
Name of the School: .....

Name of the Student / Index No: .....

#### Part - B

➤ Answer any 04 questions only.

- 5) Consider the logic circuit given in the figure below where the inputs are A,B,C and the output is Q.



- Construct the complete truth table for the above circuit.
- Accordingly complete the Karnaugh map shown below.

|   |   | AB |    |    |    |
|---|---|----|----|----|----|
|   |   | 00 | 01 | 11 | 10 |
| C | 0 |    |    |    |    |
|   | 1 |    |    |    |    |

- Derive the simplest expression of sum of products (SOP) for output Q using Karnaugh map. Clearly show the loops you used on your Karnaugh map.
- Using the rules of Boolean algebra, show that the SOP statement you got from the truth table is the same as the answer you got from solving the Karnaugh map. Clearly mention the Boolean algebra rules you used for simplifications.
- Draw a logic circuit for the simplified Boolean Expression using only NAND gates.

- 6) Meegalewa National School has 4 units namely as the main Office (Office), Ordinary Level Information and Communication Technology Unit (OL ICT), Advanced Level Information and Communication Technology Unit (AL ICT) and Engineering Technology Unit (ET). The table below shows how the computers are divided among each unit

| Unit   | No. of Computers |
|--------|------------------|
| Office | 30               |
| OL ICT | 60               |
| AL ICT | 50               |
| ET     | 40               |

**Meegalewa National School expects the following.**

- A separate Local Area Network for each unit to share software and resources related to each unit.
- Providing Internet facilities to every unit through the Advanced Level Information and Communication Technology Unit (AL ICT).
- Providing an efficient Internet connection through a Domain Name System (DNS) and a Proxy server computer.
- Protecting the entire network with a firewall.

- a) Which type of network topology is best suited to fulfill all the above requirements?
- b) For this, the network administrator has received the IP address range 192.168.20.0/24. Subnets should be set up to the respective units using this group of IP addresses.

Copy the incomplete table given below in your answer sheet and write the IP addresses according to its format. (Assume that the sub-netting is done so that more computers can be added to the respective units in the future.)

| Unit   | Network Address | Broadcast Address | Subnet mask | Range of usable IP addresses |
|--------|-----------------|-------------------|-------------|------------------------------|
| Office | 192.168.20.0    |                   |             |                              |
| OL ICT |                 | 192.168.20.127    |             |                              |
| AL ICT | 192.168.20.128  |                   |             |                              |
| ET     |                 |                   |             |                              |

- c) Draw a logical setup (network diagram) of the school computer network that can be implemented by the network administrator to meet the needs of the school, clearly showing the connection topology and mechanisms.

- 7) Your class teacher installed 8GB of memory in his computer with the aim of getting the maximum memory capacity of his computer. In his computer's main memory is byte addressable and the size of a memory address is 32 bits.
- Explain to your class teacher with calculations whether this 8GB memory can be used by him.
  - The size of a frame in the main memory of this computer is 4 KB. Calculate the total amount of frames in this physical memory.
  - c) Assume that, the class teacher used a computer application with 4 MB virtual memory. It's one-page size was identified as 256 KB.
    - Find the number of pages to be processed here.
    - Calculate the number of bits required to represent the page number of those pages.
  - Write two situations in which the class teacher can use a computer for his class activities.
  - Write two functional requirements and two non-functional requirements of this computer.
- 8) A private eye examination center has the following activities.  
 The tip ordered by a doctor to perform the eye test is handed over by the patient to the receiving counter of the eye test center. The receiving counter issues an invoice to the patient and sends a copy to the cashier. After checking the invoice by the patient and verifying it, the payment is handed over to the cashier along with the payment. The cashier issues a receipt to the patient and sends a copy to the laboratory. The patient submits the receipt to the laboratory. After the laboratory confirms the patient and performs the eye test, the patient is given the receipt updated as "Done". The laboratory hands over the report to the receiving counter and the counter is marked as "Issued" and the report is issued to the patient along with the updated receipt.
- Draw a context diagram for the above scenario.
  - Draw a Level 1 Data Flow Diagram (DFD -1) for the above scenario.
- 9) Draw a Context Diagram to show an overview of the system described below. Clearly show external entities and data flows in your diagram. State any possible assumptions you have made.

New students will be admitted through the proposed Student Admission Information System (SAIS) to be launched in A/Pusiyankulama Maha Vidyalaya in 2025. External students intending to join Pusiyankulama Maha Vidyalaya should submit their application to the school management. There the school administration checks the applications and forwards the approved applications to the non-academic staff. They enter the approved applications into SAIS (input Application). SAIS then provides the user name and password of each student to the school administration. The external students will be given that username and password by the school administration. Students who have obtained username and password are considered as internal students. Any student who has obtained the user name and password can register to the E Library (EL) of Pusiyankulama Maha Vidyalaya . Students who register in this way will be activate by EL in the E library of SAIS. After that, the internal students send the username and password to SAIS and get the E-Books from SAIS.

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විභාග ඉලක්ක

පහසුවෙන් පසරන්න

ඕනෑම පොතක් ඉක්මනින්  
නිවසටම ගෙන්වා ගන්න



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| A/L ප්‍රශ්න පත්‍ර | අනුමාන ප්‍රශ්න පත්‍ර | අතිරේක කියවීම් පොත්  
| School Book | ගුරු අත්පොත්



pesuru  
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Akura Pilot



සමනල  
දැනුම

T

සුභර

පෙර පාසලේ සිට උසස් පෙළ දක්වා සියලුම ප්‍රශ්න පත්‍ර,  
කෙටි සටහන්, වැඩ පොත්, අතිරේක කියවීම් පොත්, සඟරා  
සිංහල සහ ඉංග්‍රීසි මාධ්‍යයෙන් ගෙදරටම ගෙන්වා ගැනීමට

www.LOL.lk වෙබ් අඩවිය වෙත යන්න