දකුණු පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව
தென் மாகாணக் கல்வித் திணைக்களம்
Southern Provincial Department of Education
අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) - 12 ශ්‍රේණිය - දෙවන වාර පරීක්ෂණය - 2020 මාර්තු
General Certificate of Education (Adv. Level) - Grade 12 - Second Term Test - March 2020

තොරතුරු හා සන්නිවේදන තාක්ෂණය
Information and Communication Technology   20   S   I   පැය 02 යි
Time: 02 hours

- **Answer all questions.**
- **In each of the question 1to 50 pick one of the alternatives (1) (2) (3) (4) (5) which is correct or most appropriate.**
- **Mark a cross (x) on the number corresponding to your choice in the answer sheet provided.**

1. Which of the following, can be considered as data with compared to 'information'?
   A) The economic growth rate of a country
   B) 40 marks obtained for Mathematics
   C) Visible things characteristic and sound
   D) Number of Students in Grade 12 A
   - (1) A and D only
   - (2) A, C and D only
   - (3) B, C and D only
   - (4) A, B and D only
   - (5) A, B, C and D

2. Which of the following answers contains only automatic data collection methods?
   - (1) Sensors , Mouse, Bar Code Reader
   - (2) Magnetic Ink Character Recognition(MICR), Keyboard,Optic Mark Reading(OMR)
   - (3) Magnetic Stripe Reader , Bar Code Reader, Optic Mark Reading(OMR)
   - (4) Touch Screen, Keyboard ,Mouse
   - (5) Magnetic Strip Code Reader, Bar Code Reader, Plotter

3. Who introduced the 'Stored Program Concept' which allows working with stored program in a computer without making any changes to the machine?
   - (1) Blaise Pascal
   - (2) Charles Babbage
   - (3) John Von Neumann
   - (4) Joseph Jacquard
   - (5) Ada Ogasta Lovelace

4. Which of the following statements is false regarding the data and information?
   - (1) Processed information is called as data
   - (2) Processed data is called as information
   - (3) Information can become data when passed time.
   - (4) Information is used in decision making.
   - (5) Data has very little meaning.

5. Which of the following memory devices has the lowest memory capacity?
   - (1) USB flash drive
   - (2) Dynamic Random Access Memory
   - (3) Cache memory
   - (4) Registers
   - (5) Read Only Memory

6. Which of the following false about hard drive with comparing to main memory?
   (1) A non-volatile memory
   (2) There is huge memory capacity
   (3) The price of a bit is low
   (4) It is fast
   (5) Secondary memory

7. _____is a high-speed semiconductor memory that can speed up function of central processing unit. What is the most appropriate answer to fill this blank?
   (1) Primary memory   (2) Secondary memory   (3) Registers
   (4) Cache memory   (5) Read Only Memory

8. Use of sensitive information, such as a username, password, credit card details, for malicious purposes is called as,
   (1) Plagiarism   (2) Phishing   (3) Encryption
   (4) Digital divide   (5) Intellectual Property
                                   Rights

   • **Question 9 and 10 are based on memory units given below**

9.
   A-Registers   D- Secondary Storage memory
   B- Random Access Memory (RAM)   E- Magnetic tap
   C- Cache Memory
   What are the memory types in the processor out of the above mentioned memory types?
   (1) A and B only   (2) A, B and C only   (3) A and C only.
   (4) D and E only.   (5) A,B,C and D only

10. Which answer shows ascending order of cost per bit and data access speed respectively?
    (1) A, C, B, D, E   (2) E, D, B, C, A   (3) E, D, B, A, C
    (4) E, B, D, C, A   (5)D, E, B, C, A

11. Big data means,
    (1) Data that cannot be processed
    (2) Incomplete and inaccurate data
    (3) Complex data which is unable to be processed by traditional data processing software
    (4) Complex data which is able to be processed by traditional data processing software
    (5) Data that cannot be understood and having less value.

12. Which of the following statement true given below?
    (1) Skype is popular video conferencing method.
    (2) Virtual Private Network provides a medium for telecommuting.
    (3) Offline exams can be considered as computer aided assessment.
    (4) Microsoft power point is Free and Open Source Software (FOSS) for computer based presentation
    (5) Computer based learning is teacher centered learning method.

13. Which is the equivalent decimal number to 101101.011_2?

    (1)55.125_{10} (2)54.175_{10} (3)45.375_{10}

    (4)54.375_{10} (5)45.125_{10}

14. What is the answer of $34B_{16} + 010110110_2 =$

    (1) 513_{10} (2) 1025_{10} (3) $B01_{16}$

    (4) $4A1_{16}$ (5) 1026_{10}

- **Consider the following three numbers**

A. 174_{10}

B. 256_8

C. $A5_{16}$

15. Which of the above is equivalent to binary 10101110?

    (1) A only   (2) B only.   (3)A and B only.

    (4) B and C only.   (5) A,B and C

16. What is the answer of 0010_2 **XOR** $1010_2 =$

    (1) 1000_2 (2) 1010_2 (3) 1100_2

    (4) 1001_2 (5) 1110_2

17. 11101000 is the two's complement of eight bits of a given number, the number is,

    (1) 36   (2) 24   (3) -36

    (4) -24   (5) -28

18. At the end of a cricket match, the team X scored 275and the team Y scored 250. Which of the following statement represents the scores of X and Y respectively?

    (1)423_8 and FA_{16} (2)423_8 and 371_8 (3)213_{16} and FB_{16}

    (4)113_{16} and 472_8 (5)421_8 and FA_{16}

19. Which of the following represents the ascending order of four numbers 10001111_2, 170_8, 46687_{10}, $2F_{16}$?

    (1) $170_8, 10001111_2, 2F_{16}, 46687_{10}$ (2) $10001111_2, 46687_{10}, 170_8, 2F_{16}$

    (3) $2F_{16}, 170_8, 10001111_2, 46687_{10}$ (4) $46687_{10}, 10001111_2, 170_8, , 2F_{16}$

    (5) $10001111_2, 46687_{10}, 2F_{16}, 170_8$

20. Which of the following statements is correct regarding The American Standard Code(ASCII)for Information Interchange ?

    (1) Can store 2^8 amount different values

    (2) Does not represent many world languages

    (3) The characters do not use a linear procedure.

    (4) Doesn't match with modern codes.

    (5) Mismatches with different versions

21. Which of the following is not a valid Binary Coded Decimal (BCD) value?

    (1) 10001000   (2) 11110001   (3) 10010111

    (4) 00110101   (5) 00110001

22. Which of the following is a characteristic of open source software?
    (1) Can obtain source code
    (2) Permission must be taken to use software
    (3) Software must be bought/ paid
    (4) Permission must be taken to distribute again
    (5) None of the above

23. Which of the following is the simplified answer of Boolean equation $\overline{\overline{x} \cdot \overline{y}} \ \overline{(x + y)}$?
    (1) 0   (2) 1   (3) x
    (4) y (5) xy

24. Which is the equivalent expression for $(A+B)(A+\bar{B})$ is,
    (1) B   (2) A   (3) $\bar{B}$
    (4) $\bar{A}$ (5) AB

25. Which of the following Boolean equation is in the term of Product of Sum (POS)?
    (1) $(AB)(A\bar{B} + C)(B + \bar{C} + D)$
    (2) $(\overline{A + B} + C)(A + \bar{B} + C)(A+B)$
    (3) $(A + B + \bar{C})(B + \bar{D})$
    (4) $A(\overline{A + B + C})(B + C)$
    (5) $(B + C)(A + B + \bar{C})(A.\bar{B})$

26. Which of the following logic statement does not produce 1 as the result?
    (1) $A\bar{A}(A + \bar{A})$
    (2) $(A + \bar{A})(B + \bar{B})$
    (3) $1 + AB$
    (4) $A\bar{A} + \bar{B} + B$
    (5) $(A\bar{A} + \bar{B}B + A + \bar{A})$
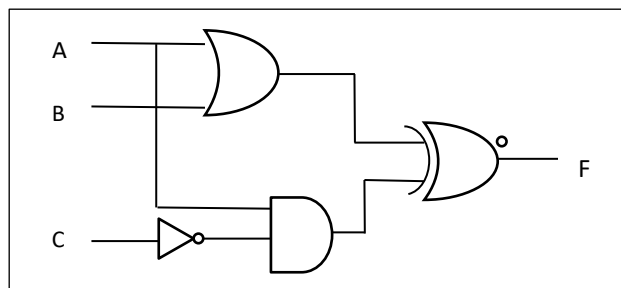
27. What is the Boolean expression relevant to the output of the given truth table?
    (1) $(AB + A\bar{B})$
    (2) $\bar{A} + B(A + \bar{B})$
    (3) $(A + \bar{B})(\bar{A} + \bar{B})$
    (4) $\bar{A}\bar{B} + AB$
    (5) $\bar{A}$

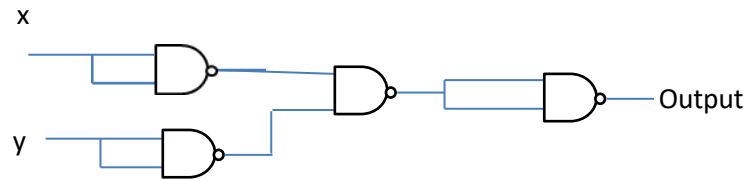| A	B	F
0	0	1
0	1	1
1	0	0
1	1	0

28. In order to get the output as 1 from the following logic circuit, the input for A,B and C must be ...., ..., ..., respectively. What is the suitable answer to the blanks?

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

29. Which is the logic gate represented by the following logic circuit?

    (1) AND   (2) OR   (3) NAND

    (4) NOR   (5) NOT

30. A process is,

    (1) a function that exists in secondary memory

    (2) a concept of main memory

    (3) a high-level programming language stored in the hard disc

    (4) a running program

    (5) None of the above

31. The strategy of temporary stopping (suspending) a logically executed action is called,

    (1) Preemptive scheduling

    (2) Shortest job first

    (3) Round Robin

    (4) First come first serve

    (5) Non preemptive scheduling

32. Which of the following is/are false?

    A- Smaller pages create a larger page tables

    B- Small paging helps to increase internal fragmentation

    C- Input-output switching can be done well with large pages

    (1) A only   (2) B only   (3) C only

    (4) A and B only   (5) A and C only

33. The process of multiple programs rotate simultaneously in computer operating systems is called,

    (1) Fragmentation   (2) Multi task   (3) Paging

    (4) Exchanging   (5) Parallelism

34. Consider the following statements on FAT 32 file formatting

    A- The length of the filename is unlimited   B- Unable to compress files

    C- Encryption is used for security

    Which of the statement/s is/are correct?

    (1) A only   (2) B only   (3) C only

    (4) A and C only   (5) A, B and C only

35. Which type of operating system listed below is suitable for operate a tsunami warning system?

    (1) Single user single task operating system

    (2) Single user multi task operating system

    (3) Multi user single task operating system

    (4) Real time operating system

    (5) Multi threading operating system

36. The number of bits allocated to the virtual memory reference 110011011101 is 4. How many bits are allotted to its page number?

    (1) 7   (2) 4   (3) 8

    (4) 12   (5) 16

37. Memory Fragmentation Unit is,

    (1) A unit that contributes to context switching

    (2) Helps in swapping.

    (3) Contributes to simulation

    (4) Contributes to memory fragmentation

    (5) Used to store data in schedulers

38. Which of the following statement is correct regarding schedulers?

    (1) Long-Term scheduler is a Central Processing Unit scheduler

    (2) Short-term scheduler is associated with virtual memory

    (3) More time is required for the midterm scheduler

    (4) Midterm scheduler is the process swapping scheduler

    (5) Long-Term scheduler is the fastest scheduler

39. Which of the following are the tasks run by BIOS (Basic Input Output System) when booting a computer?

    A- Sending signals from power supply to motherboard

    B- Sending signals from the motherboard to clock generator

    C- Testing the basic components of the computer- POWER ON SELF TEST (POST)

    D- Run the instructions in the CMOS (Complementary Metal Oxide Semiconductor)

    E- Embedding the operating system into main memory through the Boots Strap Loader program

    (1) A and B only   (2) B and C only   (3) C and D only

    (4) A,C and D only   (5) B,D and E only

40. File attribute/s of a file created in a computer is/are,

    A- File name and file type   B- Data contains in a file

    C- A protocol with information about each file

    Which statement/s is/are correct?

    (1) A only   (2) B only   (3) A and B only

    (4) A and C only   (5) All A, B and C

41. Which of the following is the subnet mask address if 6 subnets are created referred to the address195.100.10.65?

    (1) 195.100.10.62   (2)   195.100.10.31   (3)   195.100.10.64

    (4) 195.100.10.95   (5)   195.100.10.127

42. The correct statement about the TCP and UDP protocol is,

    (1) TCP ensures a constant data rate between the source and the receiver

    (2) Application layer port numbers is not used UDP

    (3) UDP does not use port numbers

    (4) TCP ensures the transmission of non-sequential data packets to the client

    (5) TCP transmits data packets faster than UDP

43. If 192.192.192.192/24, how many host computers are there in sub net IPv4?
    (1)   254   (2)   128   (3) 256
    (4)   512   (5)   255

44. Consider the following statements
    A- Data transmit in both sides called as half duplex.
    B- PSTN (Public Switch Telephone Network) uses half duplex mode
    C- Sequential bit transmission is more suitable over parallel bit transmission in long-distance data transmission
    Which statement/ statements is/are correct?
    (1) A only   (2) B only   (3) C only
    (4) A and B only   (5) A and C only

45. Which server converts a URL in to an IP address & it redirects to the web client?
    (1) Web server   (2) DHCP server   (3) FTP server
    (4) DNS server   (5) File server

46. A large number of cables and multiple interfacing cards are required to build a computer network. What will be the topology of this network?
    (1) Star topology   (2) Ring topology   (3) Tree topology
    (4) Mesh topology   (5) Bus topology

47. Which equipment is used to establish communication between two separate local area network as a one network?
    (1) Switch
    (2) Hub
    (3) Router
    (4) Repeater
    (5) Bridge

48. Network manager is said the IP address given in a computer network is 192.192.20.48/20. Which is the correct answer that contains the number of possible hosts?
    (1) 1024   (2) 128   (3) 512
    (4) 256   (5) 4094

49. Which of the following protocol is used when downloads software from the internet?
    (1) POP3   (2) SMTP   (3) FTP
    (4) HTTP   (5) HTTPS

50. What is the most appropriate medium transmit election results in each district to the main election office securely?
    (1) Radio waves
    (2) Coaxial cables
    (3) Microwaves
    (4) Fiber optic
    (5) Copper cables

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Information and Communication Technology

| 20 | S | II |

පැය 02 යි
Time: 02 hours

- Answer all questions in part A.
- Answer only selected four questions from part B.
- Write your answers given space below for questions in part A.

Part A (structured essay)

1.

  (a) (i) Secondary storage used for data store can be divided into three main types. Name the types with appropriate examples.

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  (ii) Name three basic service models based on Cloud Computing and write the function of them

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  (iii) Write down the advantages and disadvantages one per each of manual data processing and automated data processing.

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  (b) (i) Fill in the blanks regarding system software given table below.

System software	Write two exaples for each.
Operating systems	....
Utility software	....
Language translating software	....

Generation of computers	Name a computer type regarding the generation	Name the basic technology used
1 generation	....	....
2 generation	....	....
3 generation	....	....
4 generation	....	....
5 generation	....	....

(ii)

2.   (a) Consider, you are given the following numbers.

$x = 4F_{16}$

$y = -25_{10}$

(i) Convert the numbers x and y above, in to two's complement. Use 8 bits to represent a number.

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(ii) Using the answers in (i) above, solve the following equation and find the X value. Explain how the carry out generated by the most significant bit is handled bit.

$Z = x + y$

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(b) Simplify the followings using bitwise logical operations

(i) 10001111 **AND** 00011101

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(ii) Briefly explain about difference between Half adder and Full adder

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3.   Consider the process state diagram given below.
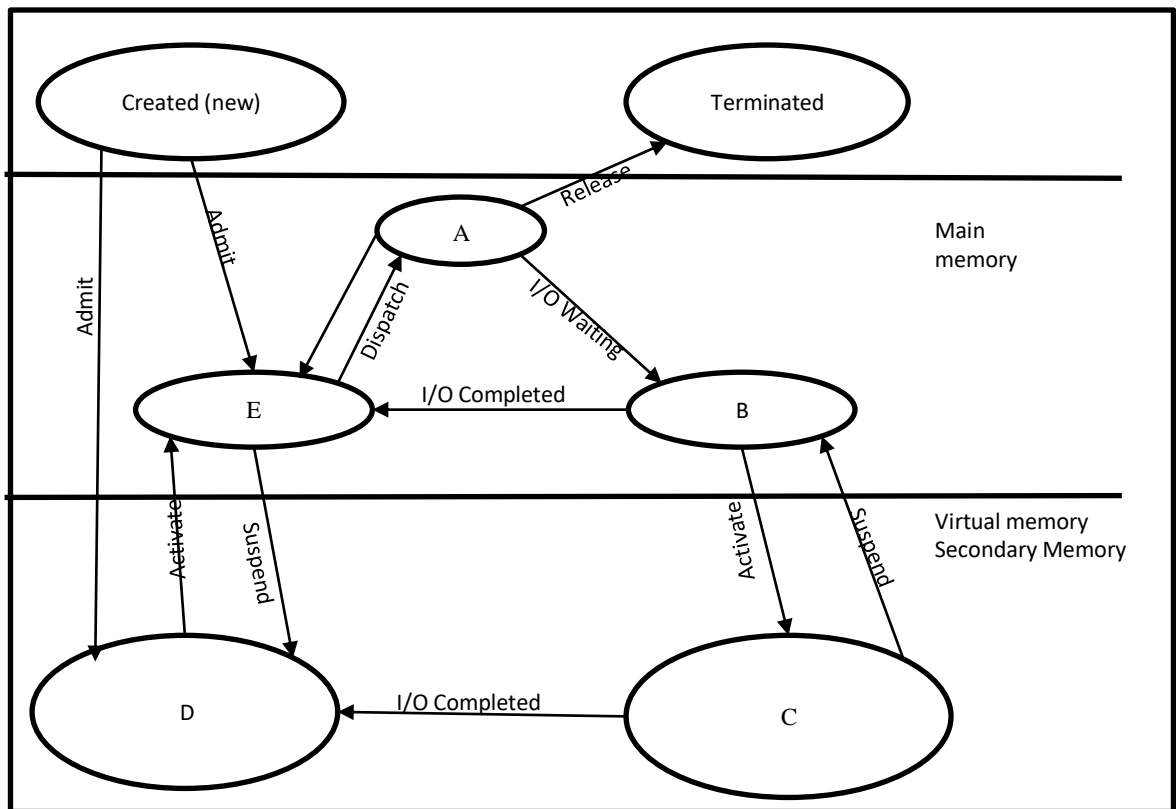
(i) What are the states represented by A, B, C, D and E?

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(ii) What is the scheduler that contributes to the process exchange between B and C?

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(iii) How is the process exchange from new to D called?

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(iv) (a) Briefly explain about virtual memory

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(b) Explain on device drivers using examples

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(c) If 2 bytes are addressable of a memory with 32 bit virtual memory address.
What is the size of its memory address?

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(d) How many pages would be needed to save a 32bit process in the above
memory?

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4.   (i) Write down three ways to protect computers from unauthorized access

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(ii) Write the TCP / IP protocol format in the following table

4	---
3	---
2	---
1	---

(iii) Write the functions of the TCP / IP format layers separately.

Layer	function/s
4	---
3	---
2	---
1	---

Part B (Essay)

1. (i)   For what purpose does the data bus and control bus be used on the computer?

    (ii) What is Application software?

    (iii) Write the octal value corresponding to 1011.10112

    (iv) Information and communication technology helps a lot to development and destruction of the society. Briefly explain good and bad consequences on Information technology separately.

    (v)   Explain how Fetch Execute Cycle works using diagrams.

    (vi) Briefly explain on program counter which regards to common function register in computer central processing Unit.

    (vii) Briefly explain attenuation when data transmit.

    (viii) Write three examples for mobile phone operating systems

2. (i)   Write a description on main types of processing data in a computer

    (ii) Write the advantages of using direct input devices compared to the keyboard.

    (iii) Explain parallel computing briefly.

    (iv) $100111_2 + 10110_2 + 10111_2$
          Simplify above binary numbers and find the answer.

    (v)   Convert the decimal number of 0.125 to a binary

    (vi) Convert the binary number 1010.110_2 to a decimal

3.
    (a)   Simplify the Boolean expression given below using a Karnaugh map.
          $F(A, B, C, D) = A'B'C' + A'BC + BC'D + B'CD' + AB'C'D'$

    (b)   An automated system has been designed for supplying water in a particular time period daily to manage usage of water without wasting in a particular area.
          After the specified period of time, the main valve of the house automatically stops. If not, the water meter will be able to operate because of the air pressure of the main pipeline. Three automated sensors have been introduced to automatically activate the pump to supply water during that time of day to a house.
          Water Volume Sensor (P) mounted in the tank and once the tank reaches the maximum water level, the sensor will operate. The logical value of it is 1 and then closes the valve automatically.

          When there is not enough water in the tank, the water volume sensor should be turned off and the logical value of is 1. When there is not enough water in the tank, the main valve that receives the water is automatically opened.

          The sensor is operated at the time the water is processed by the time sensor (Q) and the logical value is 1.

          A water sensor (R) has been installed to detect the release of water in the main water pump to the home. The sensor is activated when residences s use water and the logical value is 1.

When there is not enough water in the tank, the main water valve for the house is automatically opened. But that time should be the watering time. Even when the tank has enough water, the main water valve for the home is automatically opened when residents use the water.

(i) Build a truth table that automatically opens / doesn't open the main water valve to the home
(ii) Build the Boolean expression in SOP form for the opening of the main valve automatically.
(iii) Simplify the Boolean expression given above using Boolean algebraic theorems.
(iv) Build logic circuits using only the NAND gate for the simplified expression

4.
  (a) (i) It has been observed that when a person searches for data in a computer memory, access to that data takes a long time. What could be the mechanism that the data is stored in the above memory?
      (ii) Explain briefly the ways to access data
  (b) Another process is getting started to run because of interrupt done by it to a currently running process of 64 KB and it was suspended.
      (i) How is the above situation called?
      (ii) What is the unit that helps it?
      (iii) Briefly explain paging and framing

5. There are 4 Local Area Networks (LAN) in a school. They are for A /L, O /L, 6-9 computer labs and office. These local area networks are located in the same floor of a building, and the available computer numbers are as follows.

Local Area Network	No of computers
A/L ICT laboratory	60
O/L ICT laboratory	100
6-9 ICT laboratory	30
Office	05

For this purpose, the network IP address of 10.25.2.0/24 is given. Each local area network is connected to each other via server room. It provides internet service and allows for common file sharing through the server room. E-Learning system has been provided through the school internal web server in the server room. It facilitates downloading of past exam papers and assignments and uploading answer sheets for assignments.

The server room is located in the Deputy Principal's office which is 200 m away from the computer network building. Internet users to optimize the Internet and the network need to provide adequate security.

(i) Suggest a Network Topology to network within the Laboratory
(ii) Name an appropriate media to connect server room to the computer networked building and justify that why mentioned media is more appropriate.

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(iii) Draw a network diagram for the school entire computer network system

(iv) Fill in the blanks following table with the appropriate subnet IP addresses for each network.

Network	Sub Network IP	Broadcast address	Subnet Mask	IP Range
A/L ICT laboratory				
O/L ICT laboratory				
6-9 ICT laboratory				
Office				
Server room				