



De Mazenod College Kandana

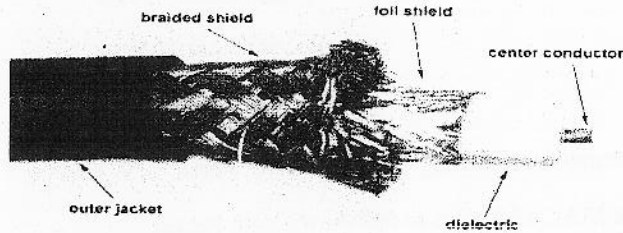
Information and Communication Technology 20 E  
1<sup>st</sup> Term Test December 2016 Grade 13



Answer all the questions.

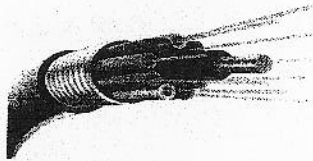
Time: 2 H

1. Identify following guided transmission media



- (1) Fiber optic cable
- (2) Shielded twisted pair cable
- (3) Unshielded twisted pair cable
- (4) Coaxial cable
- (5) RJ45 cable

2. Identify following guided transmission media



- (1) Fiber optic cable
- (2) Shielded twisted pair cable
- (3) Unshielded twisted pair cable
- (4) Coaxial cable
- (5) RJ45 cable

3. Identify following guided transmission media



- (1) Fiber optic cable
- (2) Shielded twisted pair cable
- (3) Unshielded twisted pair cable
- (4) Coaxial cable
- (5) Copper cable

4. Identify following guided transmission media



- (1) Fiber optic cable
- (2) Shielded twisted pair cable
- (3) Unshielded twisted pair cable
- (4) Coaxial cable
- (5) Copper cable



## De Mazenod College Kandana

Information and Communication Technology 20 E

1<sup>st</sup> Term Test December 2016 Grade 13

5. Two machines with IP address 192.248.16.30 and 192.248.16.90 are connected to a Local Area Network. Which of the followings are suitable subnet mask for this network?
- 1) 192.255.255.255
  - 2) 192.248.16.0
  - 3) 255.255.255.224
  - 4) 255.255.255.128
  - 5) 255.255.255.255
6. Consider the following statements regarding routing in IP networks.
- A. – Hubs use MAC addresses to deliver the data packet
  - B. –TTL is Time To live
  - C. – Switches can configure IP addresses to access internet

Which of the above statements is /are correct?

- 1) A –only
- 2) B –only
- 3) C –only
- 4) A & B only
- 5) B & C only

7. Which of following statements is true?

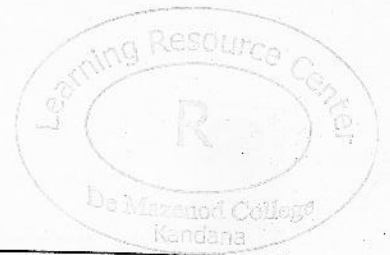
- 1) The first generation of computers were built using transistors.
- 2) Electronic Numerical Integrator And Computer(ENIAC) is second generation computer.
- 3) Ada Lovelace is the inventor of the Analytical Engine.
- 4) Alan Turing is considered as the first computer programmer.
- 5) The first calculating device is believed to be the Abacus.

8. Which of the following is a component of a central Processing Unit (CPU)?

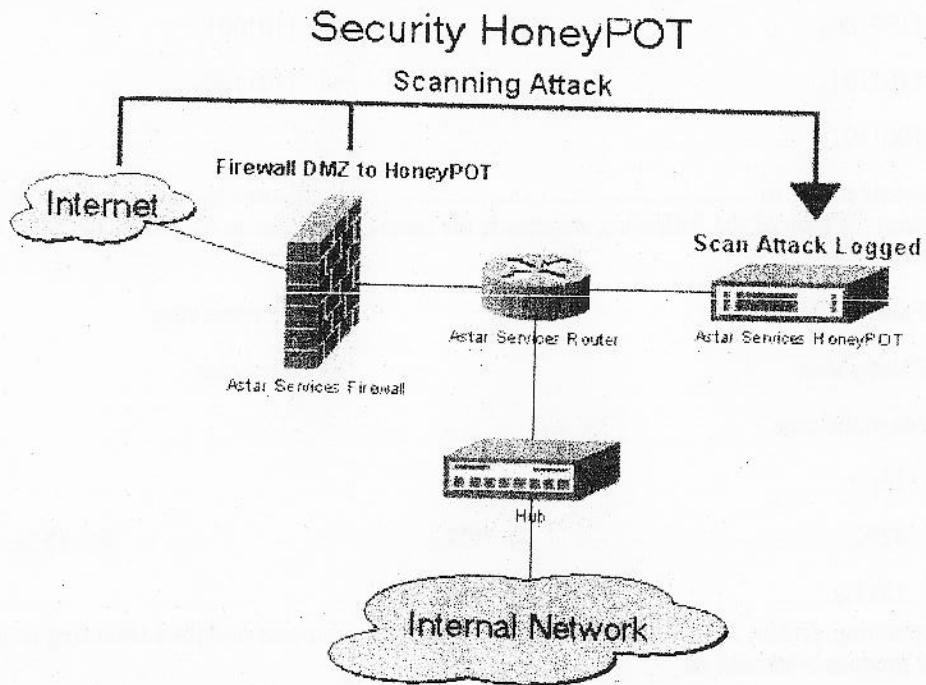
- 1) ROM
- 2) RAM
- 3) ALU
- 4) L3 Cache memory
- 5) Power supply unit

9. Which of the following is a component of a central Processing Unit (CPU)?

- (1) ROM
- (2) RAM
- (3) ALU
- (4) L3 Cache memory
- (5) Power supply unit



10. Identify the following honeypot diagram and answer the question given below



A – a honeypot is a computer security mechanism set to detect, deflect, or, in some manner, counteract attempts at unauthorized use of information systems.

B – A honeypot is valuable as a surveillance and early-warning tool.

C – it consists of a computer, data, or a network site that appears to be part of a network, but is actually isolated, (un)protected, and monitored, and which seems to contain information or a resource of value to attackers.

D – Honeypots can carry risks to a network, and must be handled with care. If they are not properly walled-off, an attacker can use them to break into a system.

Which of the above statements is /are correct?

1) B&C-only

3) A&B Only

5) A,B,C & D

2) C&D –only

4) A,B&C only



De Mazenod College Kandana

Information and Communication Technology 20 E  
1<sup>st</sup> Term Test     December 2016     Grade 13

---

11. Which of the following binary number is equivalent to  $109_{10}$ ?
- 1)  $1100100_2$
  - 2)  $1101101_2$
  - 3)  $1001101_2$
  - 4)  $1101001_2$
  - 5)  $1101100_2$
12. The content stored in .....is read by using the optical technology. Which of the following answers is the most appropriate to fill the blank in the above statement?
- 1) Flash memory
  - 2) Floppy disk
  - 3) Magnetic tape
  - 4) Compact disc
  - 5) Hard disk
13.  $101_{16} + 110_8 =$
- 1)  $429_{10}$
  - 2)  $1011_{10}$
  - 3)  $329_{10}$
  - 4)  $529_{10}$
  - 5)  $137_{10}$
14. In an operating system , suspending the currently executing process and then resuming or starting another process is termed as
- 1) Paging
  - 2) Context switching
  - 3) Swapping
  - 4) Interrupting
  - 5) blocking
15. In modern operating systems , the .....scheduler determines the transition of processes from the new state to the ready state. Which of the followings is the correct term to fill the blank in above statement?
- 1) Mid-term
  - 2) Long – term
  - 3) Very long term
  - 4) Very short term
  - 5) Short-term
16. Consider the following statements:
- A- Plagiarism is a common threat to information systems.
  - B- Plagiarism means claiming someone else’s creation as one’s own.
  - C- Privacy is a synonym for plagiarism.

Which of the above statements is /are correct?

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



De Mazenod College Kandana

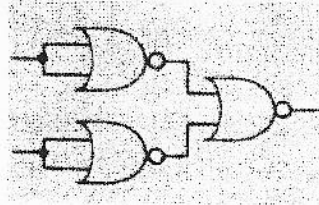
Information and Communication Technology 20 E  
1<sup>st</sup> Term Test December 2016 Grade 13



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

17. Consider the following logic circuit implemented using universal gates:

- 1) NOT Gate
- 2) AND Gate
- 3) OR Gate
- 4) NAND Gate



18. Charles Babbage is considered as the “Father of the computer” by some people. That is because he

- 1) Invented the mechanical calculator pascaline.
- 2) Invented the first re programmable electronic computing machine
- 3) Took the leadership in building the first personal computer at IBM.
- 4) Introduced the concept of “Input ,Process and Output “ that is used in modern computers. For the first time.
- 5) Is the founder of the first electronic digital computer ENIAC(Electronic Numerical Integrator And Computer).

19. First Generation computer were based on

- 1) Very Large Scale Integration(VLSI) technology.
- 2) Large Scale Integration (LSI) technology.
- 3) Integrated Circuits(ICS)
- 4) Transistors.
- 5) Vacuum tubes.

20. The decimal number equivalent to  $110110_2$  is

- 1) 39
- 2) 48
- 3) 54
- 4) 55
- 5) 108

21. Random Access Memory (RAM) modules are often compared by their capacity, measured in ..... and by their speed, measured in .....

- 1) Kilobytes, Gigabytes
- 2) Gigabytes, Megabits per second
- 3) Gigabytes, Megahertz
- 4) Megahertz, Kilohertz
- 5) Gigabits, Megabits per second



De Mazenod College Kandana

Information and Communication Technology 20 E  
1<sup>st</sup> Term Test December 2016 Grade 13

22. An application which requires more memory space than maximum memory space available in the primary memory of a computer is ready for execution. Which of the following is used by the operating system of that computer to satisfy this need?

- 1) Random Access Memory(RAM)
- 2) Read Only Memory(ROM)
- 3) Cache memory
- 4) Virtual Memory
- 5) Extended Memory

4D8  
23. ~~48B~~+00101011<sub>2</sub> =

- 1) 48B<sub>16</sub>
- 2) 310<sub>16</sub>
- 3) 503<sub>16</sub>
- 4) 513<sub>16</sub>
- 5) 559<sub>16</sub>

24. The feature in modern operating systems which allows the automatic installation of new hardware device connected to a computer is commonly known as

- 1) Add/Remove Hardware.
- 2) Easy installer
- 3) Plug and play
- 4) Add Hardware Utility
- 5) Fetch and Store,

25. Consider the following statements about flowcharts;

A- A flowchart is a pictorial representation of an algorithm

B- Flow chart may have more than one “stop” or “End” termination symbols.

C- Algorithms can be represented only by using flowcharts.

Which of the above statements is/are correct?

- 1) A-only
- 2) B-only
- 3) C-only
- 4) A&B-only
- 5) B&C -only

26. Which of the following is not a typical use of Random Access Memory(RAM)of a personal computer

- 1) Keeping data for processing.
- 2) Holding instructions for operations
- 3) Providing storage for operating system.
- 4) Retaining information for output.
- 5) Keeping the BIOS program for boot-up

27. Consider the following statements about social networking sites:

A- They are being used increasingly as a medium for election campaigns.



De Mazenod College Kandana

Information and Communication Technology 20 E  
1<sup>st</sup> Term Test December 2016 Grade 13



- B- A user's true identity is always guaranteed in a social networking site.
- C- They are absolutely necessary to maintain human relationship in the modern society.

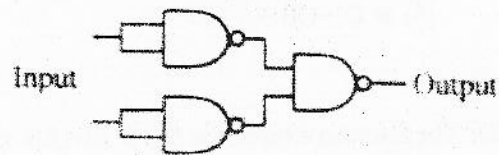
Which of the above statement(s) is/are correct?

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

28. Consider the following combinatory circuit implemented using universal gates:

The above circuit is equivalent to a/an

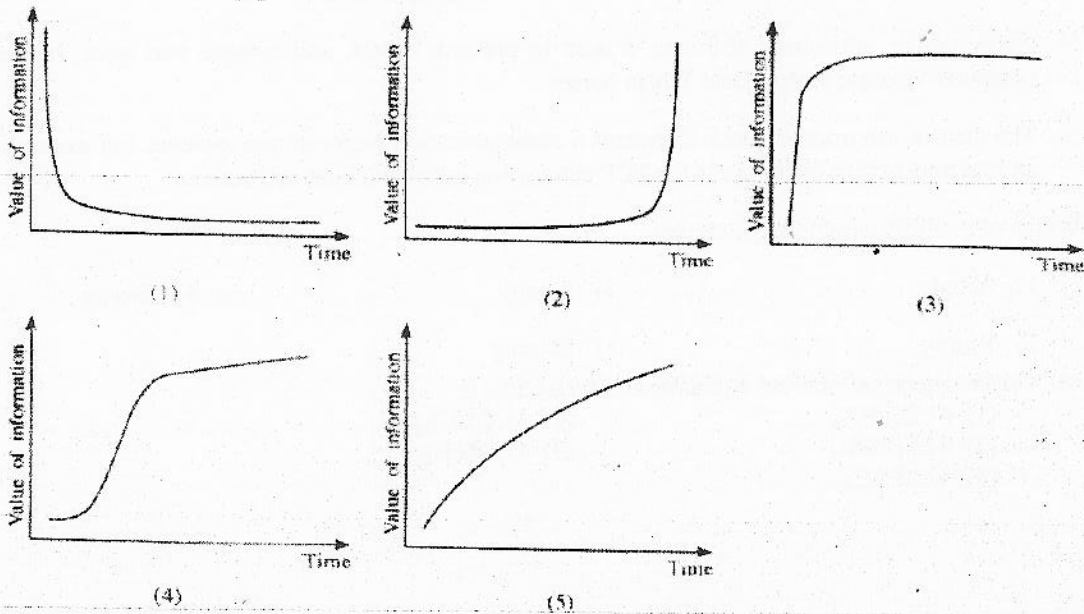
- 1) AND gate
- 2) OR gate
- 3) NAND gate
- 4) NOR gate
- 5) NOT gate



29. The Boolean expression  $(A+A')+(A')$  simplifies to

- (1) A
- (2) A'
- (3)  $A+A'$
- (4) 1
- (5) 0

30. Which of the following graphs illustrates the Golden rule of information?









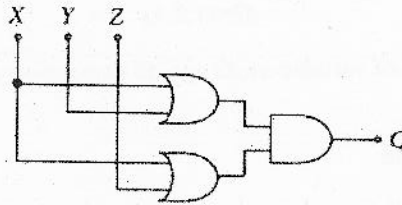
# De Mazenod College Kandana

Information and Communication Technology 20 E[II]  
1<sup>st</sup> Term Test December 2016 Grade 13

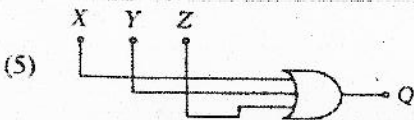
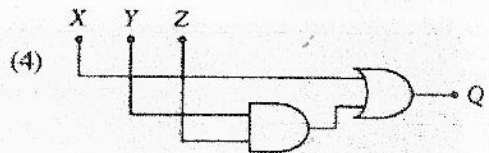
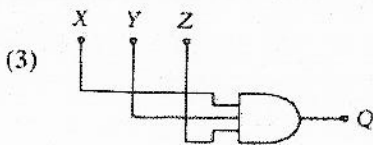
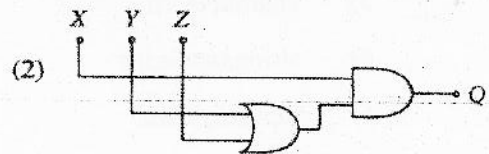
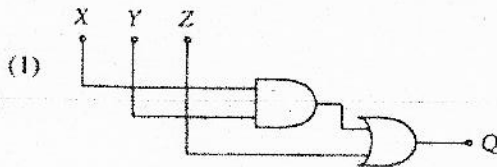


36. Which of the following statements is an example for an essential non-functional requirement of an Internet banking system?
- 1) System shall facilitate its users to open accounts.
  - 2) System shall facilitate its users to check account balance.
  - 3) System shall use a 256 bit encryption for all communications
  - 4) System should facilitate its users to order cheque books
  - 5) System should be able to render information on all popular web browsers.

37. Consider the following logic circuit:



Which of the following circuit diagrams represents a simplified version of the above circuit?



38. Which of the following python code segments is syntactically incorrect?

(1) <pre>if x &gt; 0:     y = 2</pre>	(2) <pre>if x &gt; 0:     y = 2 else:     y = 3</pre>	(3) <pre>if x &gt; 10:     y = 1 elseif x &gt; 5:     y = 2</pre>
(4) <pre>if x &gt; 10:     y = 1 elif x &gt; 5:     y = 2 else:     y = 3</pre>	(5) <pre>if x &gt; 10:     y = 1 else:     if x &gt; 5:         y = 2     else:         y = 3</pre>	



# De Mazenod College Kandana

Information and Communication Technology 20 E[II]  
1<sup>st</sup> Term Test December 2016 Grade 13

39. Which of the following python code segments is syntactically incorrect?

- |   |   |  |  |  |
|---|---|--|--|--|
| 1) While x>0:<br><br>X=4<br><br>Print X<br><br>X-=1 | 2) X=4<br><br>While X>0:<br><br>Print X<br><br>X-=1 | 3) X=4<br><br>while x>0:<br><br>print(z)<br><br>z-=1 | 4) x=4<br><br>while x>0:<br><br>x-=1<br><br>print(x) | 5) z=4<br><br>while z>0:<br><br>print(z)<br><br>z-=1 |
|---|---|--|--|--|

40. Consider the following python program segment:

d1=“(1,2,3)”

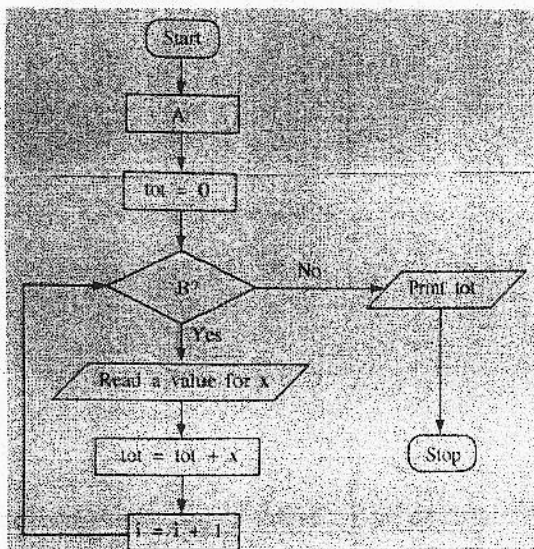
d2=(1,2,4)

d3=[1,2,(1,2)]

What would be the types of variable d1,d2 and d3 respectively after the execution of the program segment?

- 1) tuple,tuple,tuple
- 2) string,tuple,tuple
- 3) char,tuple,list
- 4) string,tuple,list
- 5) tuple,tuple,list

41. The algorithm represented by the following flowchart reads 5 numbers and prints the sum of them.





In order to execute the above flowchart correctly, A and B should be replaced by.....respectively. Which of the followings is suitable to fill the blank in the above statement?

- 1) i=0 and i<=5
- 2) i=1 and i=5
- 3) i=0 and i>5
- 4) i=1 and i<=5
- 5) i=1 and i>=5

42. Which of the following python programs computes the sum of 5 given integers

```

(1) i = 1
    tot = 0
    while i > 5:
        x = int(input())
        tot = tot + x
        i = i + 1
    print(tot)

(2) i = 1
    tot = 0
    while i <= 5:
        x = int(input())
        tot = tot + x
        i = i + 1
    print(tot)

(3) i = 1
    tot = 0
    while i == 5:
        x = int(input())
        tot = tot + x
        i = i + 1
    print(tot)

(4) i = 0
    tot = 0
    while i > 5:
        x = int(input())
        tot = tot + x
        i = i + 1
    print(tot)

(5) i = 0
    tot = 0
    while i <= 5:
        x = int(input())
        tot = tot + x
        i = i + 1
    print(tot)

```

43. The binary number equivalent to the 0.CAD<sub>16</sub> is

- (1) 0.1101 1010 1101<sub>2</sub>
- (2) 0.1100 1011 1101<sub>2</sub>
- (3) 0.1100 1010 1100<sub>2</sub>
- (4) 0.1100 1010 1111<sub>2</sub>
- (5) 0.1100 1010 1101<sub>2</sub>

44. The binary number equivalent to the BAD<sub>16</sub> is

- (1) 1001 1010 1101<sub>2</sub>
- (2) 1011 1110 1101<sub>2</sub>
- (3) 1011 1011 1101<sub>2</sub>
- (4) 1011 1010 1001<sub>2</sub>
- (5) 1011 1010 1101<sub>2</sub>

45. The octal number equivalent to the BAD.CAD<sub>16</sub> is

- (1) 5655.6355<sub>8</sub>
- (2) 5655.6555<sub>8</sub>
- (3) 5565.6255<sub>8</sub>
- (4) 5565.6655<sub>8</sub>
- (5) 5655.6255<sub>8</sub>



De Mazenod College Kandana

Information and Communication Technology 20 E[II]  
1<sup>st</sup> Term Test December 2016 Grade 13

46.  $F(X,Y,Z)=\{0,1,3,4,6\}$  what will be the correct answer after simplifying using the K-map

- (1)  $X'Y'+X'Z+X'Z'$
- (2)  $X'Y'+X'Z$
- (3)  $X'Z+XZ'$
- (4)  $X'Y'+X'Z'+XZ'$
- (5)  $X'Y'+X'Z+XZ'$

47. Select the class D IP address among following IP address

- (1) 126.0.0.2
- (2) 190.12.4.1
- (3) 222.44.54.2
- (4) 239.33.4.3
- (5) 254.222.2.1

48. Select the class E IP address among following IP address

- (1) 126.0.0.2
- (2) 190.12.4.1
- (3) 222.44.54.2
- (4) 239.33.4.3
- (5) 254.222.2.1

49. Consider the following pseudo code:

```
Begin
    total = 0
    For count = 1 To 10
        If (count is odd) Then
            total = total + count
        EndIf
    Next count
    Display total
End
```

What is the output of the above pseudo code?

- (1) 10
- (2) 15
- (3) 20
- (4) 25
- (5) 55

50. Meaning of software piracy is .....

- (1) Stealing of software at home.
- (2) Coping software.
- (3) Stealing of software from manufacturing company.
- (4) Coping from purchased software.
- (5) Making of illegal copies of software on which the user has no copy right .

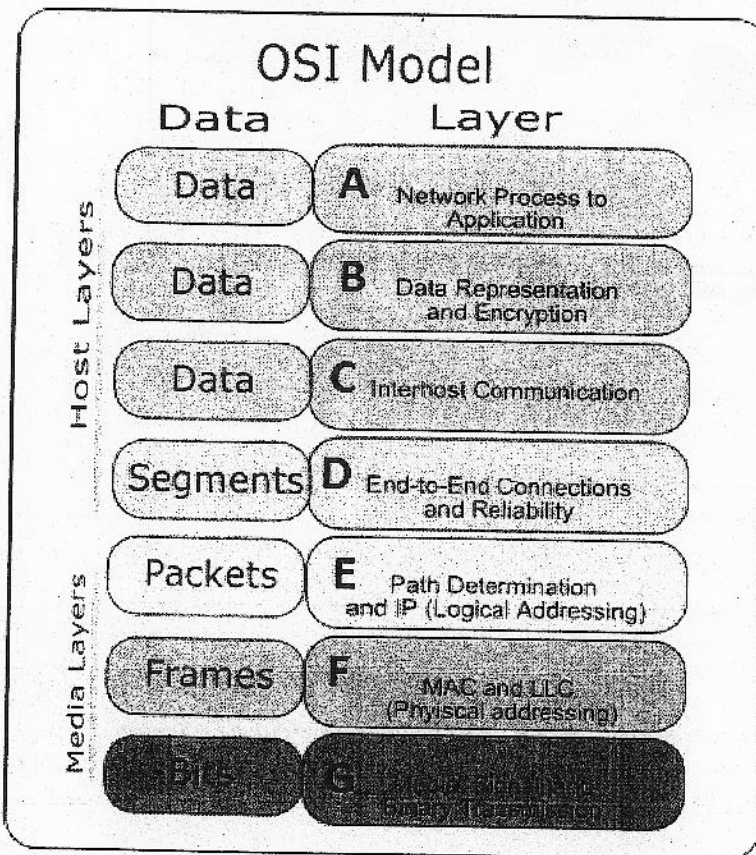


Part A Structured Essay Time :- 1 hour Total:100 marks

Answer all the questions on this paper itself.

1.

A. Identify the following OSI model and name the A,B,C,D,E,F and G layers in order



- A.....
- B.....
- C.....
- D.....
- E.....
- F.....
- G.....

B. Give one example software or hardware for each level in order

- A. ....
- B. ....
- C. ....
- D. ....
- E. ....
- F. ....
- G. ....

C. What is VPN stands for? .....

D. Explain what is VPN ?

.....  
.....

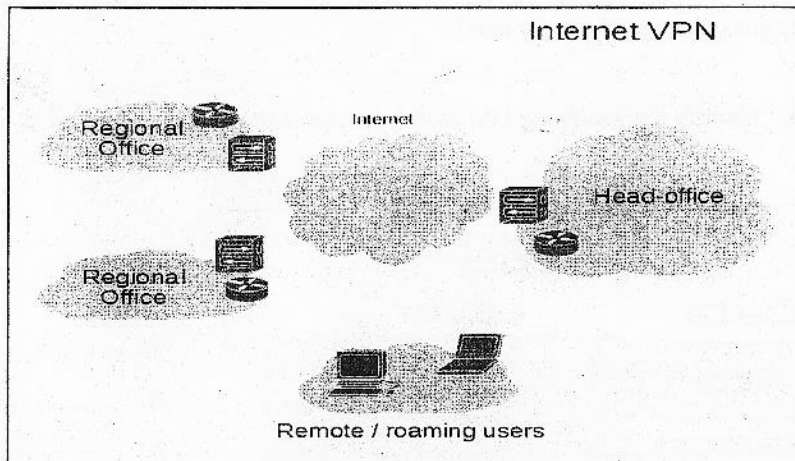


# De Mazenod College Kandana

Information and Communication Technology 20 E[II]

1<sup>st</sup> Term Test      December 2016      Grade 13

E. Draw the VPN through Internet cloud



2. Give main functions of the following servers

A. Web Server

.....  
.....

B. Mail Server

.....  
.....

C. Proxy Server

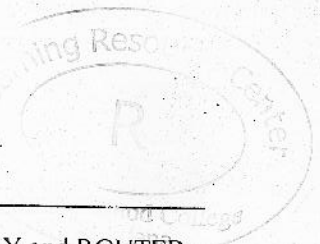
.....  
.....

D. DHCP Server

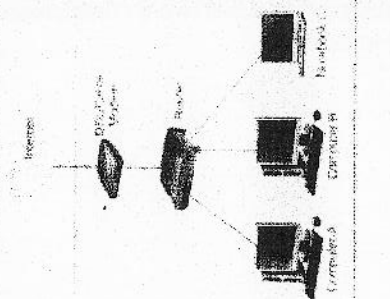
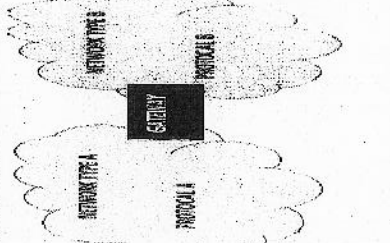
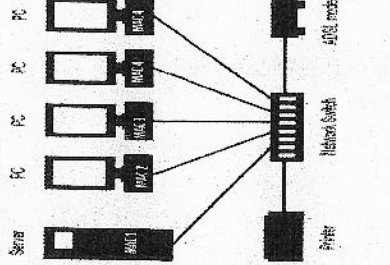
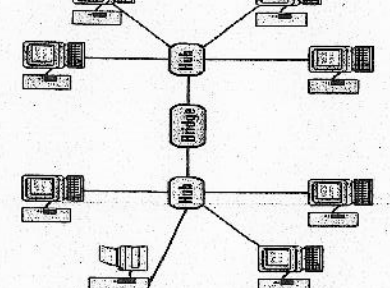
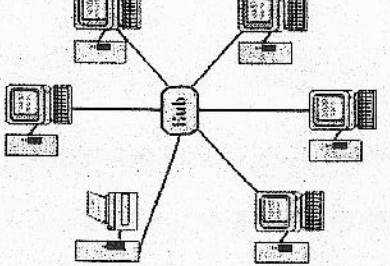
.....  
.....

E. DNS Server

.....  
.....



F. Compare the difference between HUB, BRIDGE, SWITCH, GATEWAY and ROUTER

HUB	BRIDGE	SWITCH	GATEWAY	ROUTER
				
<p>Difference i.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference i.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference i.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference i.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference i.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
<p>Difference ii.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference ii.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference ii.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference ii.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>Difference ii.</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>



De Mazenod College Kandana

Information and Communication Technology 20 E[II]

1<sup>st</sup> Term Test      December 2016      Grade 13

---

3.

(a) Assume that in particular digital device integers are represented in 8 bits two's complement form. However, the results of computations are printed in decimal.

\*\*\*\*\* (show the working for each question) \*\*\*\*\*

(I) Give the representation of  $10_{10}$  in the above device.

(II) Give the representation of  $-25_{10}$  in the above device.

(III) Explain how the computation  $10_{10} - 25_{10}$  done by the device by using your representations given in sections (i) and (ii) above.

(IV) List the steps necessary to transform the result obtained in (iii) above into decimal form in order to print the answer.

(V) Albert Einstein quoted "Energy cannot be created or destroyed; it can only be changed from one form to another"

a. State whether the process of changing energy from one form to another is a closed system





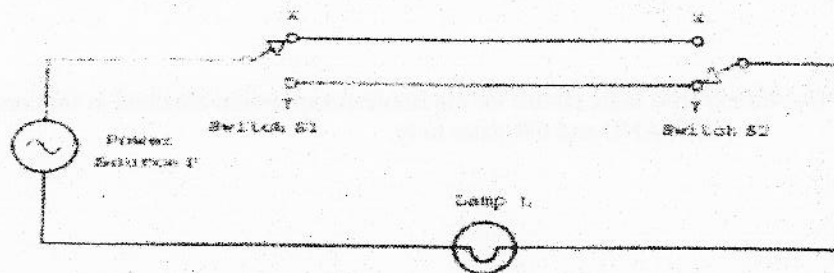
b. State reason to justify your answer with (a) above

4. In residential electrical wiring, the following circuit has been used to operate a light in a staircase.

As in the above circuit, two switches S1 and S2 are installed at the bottom and the top of the staircase to operate the lamp L. The lamp turned on by using the switch S1 at the bottom of the staircase can be turned off by using the switch S2 at the top of the staircase.

Further, the lamp turned on by using switch S2 at the top of the staircase can also be turned off by using the switch S1 at the bottom of the staircase. Moreover the lamp L turned on by a switch can be turned off by the same switch.

Assume that the connections to positions X and Y of a switch in the above circuit are represented by the truth values 1 and 0 respectively and the turned on and off state of the lamp L are represented by the truth value 1 and 0 respectively.



(i) Construct a truth table to represent the functionality of the above circuit.

(ii) Derive a Boolean expression to represent the truth table obtained in section (i) above.



## De Mazenod College Kandana

Information and Communication Technology 20 E[II]  
1<sup>st</sup> Term Test      December 2016      Grade 13

---

(iii) What is the logic gate which is equivalent to the functionality of the Boolean expression obtained in section (ii) above?

(iv) Construct a logic circuit for the Boolean expression obtained in section (ii) above with NOT, AND and OR gates only.



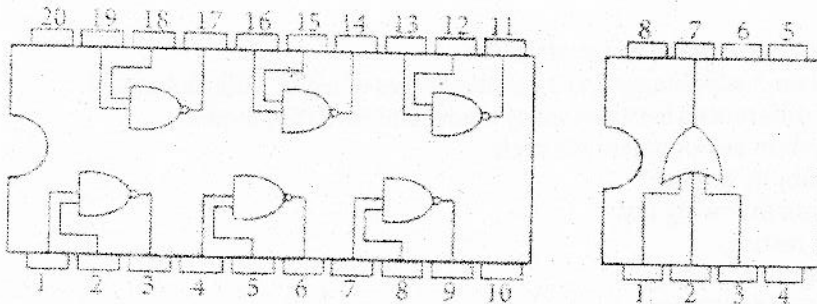
Part B

Essay

2 Hours

1. Top secret recipe for making milk rice at the restaurant chain SLFC is kept in an electronic safe at their head office. The lock (L) of the safe can either be in locked or unlocked states represented by logical truth values 0 and 1 respectively. This lock has three different key holes K1, K2 and K3 each with a unique key. These keys are in the custody of three directors of SLFC. The lock opens when at least two keys are inserted into the corresponding key holes. The situation where the corresponding key is properly inserted into any key hole is represented by the logical truth value 1 and all the other situations are represented by the logical truth value 0.

Assuming that only the following Integrated Circuits (ICs) are available, construct a logic circuit to operate the lock (L) of the safe, by using the truth tables and Boolean algebra. Clearly show the truth tables, Boolean expressions and Boolean algebraic rules used to construct your circuit.



2.

The IP address 125.214.169.218 is assigned to the server [www.doenets.lk](http://www.doenets.lk). The ping 125.214.169.218 issued from the machine A reported a round trip time (RTT) of 20ms.

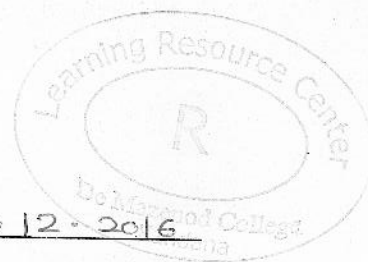
However, the ping [www.doenets.lk](http://www.doenets.lk) command, issued some time later from the machine A, reported an error.

- (i). Draw a network diagram to depict the server, machine A and any other required components to describe the above scenario.
- (ii) Identify two possible causes for the above behavior and explain them using the diagram developed in section (a) (i) above.
- (a) An organization has only one public IP address, 192.248.17.1, allocated to it. The organization has decided to allow web browsing on the computers on its LAN with 100 computers. It also wants to optimize the usage of its internet connection by reducing the traffic on the link as much as possible.
- (b) Draw a network diagram to satisfy the above requirements. Explain the major decision you made.



# De Mazenod College Kandana

Information and Communication Technology 20 E[II]  
1<sup>st</sup> Term Test December 2016 Grade 13



1.12.2016

3. A university in Sri Lanka has around 8000 students. It has only one library. Currently, three library assistants provide all the library services such as lending, returns and answering the queries(questions) from the students. It is observed that about 90% of the students uses the library facilities from 7:00a.m to 9:00a.m., 12 noon to 1:00 p.m and 6:00p.m to 7:00 p.m. Long queues of student can be seen in front of the three counters named by the three library assistant during those hours. This situation has led to student's unrest since they have to waste their time long queues. Library assistants are also not happy due to the due to heavy work load and sometimes this has them to make mistakes.
- Identify and state three functional requirements associated with the above university library system.
  - Identify and state three non-functional requirements related to the above system with justifications.
  - Propose two different computerized solutions and one non computer-based solution to solve the problems in the university library system.

4.

- Draw the waterfall model and explain it
- Briefly explain 3 advantages and 3 disadvantages of using waterfall model
- Compare 3 differences between spiral model and waterfall model
- Draw the system development life cycle
- Name 4 feasibility studies
- Briefly explain following test
  - Unit testing
  - Integrated Testing
  - Acceptance Testing
  - Test case
  - White box testing
  - Black box testing

5.

- Draw the algorithm to find out the power value of two till 20 as following
- Write python codes by using "for loop." and show the power value of two till 20 as following;

```

2^0 = 1
2^1 = 2
2^2 = 4
2^3 = 8
2^4 = 16
2^5 = 32
2^6 = 64
2^7 = 128
2^8 = 256
2^9 = 512
2^10 = 1024
2^11 = 2048
2^12 = 4096
2^13 = 8192
2^14 = 16384
2^15 = 32768
2^16 = 65536
2^17 = 131072
2^18 = 262144
2^19 = 524288
2^20 = 1048576
  
```

- Draw an algorithm to represent input any number and display the multiplication table of a given number from 1 to 12
- Write python code to display multiplication table for any given number using for loop.