

Name:.....

Class:.....

Answer all questions

- Who proposed the stored program concept first?
(1) Lady Ada Augusta (2) Charles Babbage (3) Howard Aiken
(4) Blaise Pascal (5) Von Neumann
- Which of the following components is generally seen outside the Central Processing Unit (CPU) of a Computer?
(1) RAM (2) Control Unit (3) ALU
(4) General purpose registers (5) L1 cache memory
- What is the two's complement representation of 45, if an integer is represented by 8 bits?
(1) 11010011 (2) 10110011 (3) 11001101 (4) 00101111 (5) 00101101
- Which of the following is another name for web publishing?
(1) Offline publishing (2) Desktop publishing (3) Media publishing
(4) Online publishing (5) Self publishing
- Which of the following secondary storage devices is generally considered to provide the fastest access to data?
(1) Compact Disc (2) Digital Versatile Disc (3) Internal hard disk
(4) Magnetic tape (5) Floppy disk
- Which of the followings is usually used to boot-up personal computers?
(1) Firmware (2) Malware (3) Adware (4) Ransomware (5) Liveware
- Which of the following is a main use of Complementary Metal-Oxide Semiconductor (CMOS) memory of a personal computer?
(1) Keeping inputs for processing (2) Holding instructions for operations
(3) Providing space for loading operating system (4) Retaining information for output
(5) Keeping Basic Input Output System setting for the booting procedure
- The execution of a series of non-interactive jobs on a personal computer with relative to the user is known as
(1) multitasking. (2) multiuser processing (3) multiprocessing.
(4) batch processing. (5) online processing
- Which of the following numbers is equivalent to the binary number 101111_2 ?
(1) 57_8 (2) 57_{16} (3) 57_{10} (4) 59_{16} (5) $5F_{16}$
- $5D_{16} + 10111_2 =$
(1) 73_8 (2) 75_{16} (3) 116_8 (4) 163_8 (5) 164_8

11. What is the binary representation of 9.25_{10} ?
(1) 1110011101 (2) 00001001.01 (3) 0000100101 (4) 1000100101 (5) 10001001.01

12. A on motherboard is used to expand the functionality of a computer.
Which of the following is the most appropriate to fill in the blank in the above statement?
(1) Bus (2) Clock (3) RAM (4) Slot (5) ROM

13. Consider the following HTML code:

```
<html>
  <head>
    <title>Country</title>
  </head>
  <body>
    <p><!-- <h1> Sri Lanka </h1> --></p>
  </body>
</html>
```

Which of the followings correctly describes the display, when the above code is rendered?
(1) The text "Country" appears on the title bar and the text "Sri Lanka" appears as a header.
(2) The text "Sri Lanka" appears on the title bar and the text "Country" appears as a header.
(3) The text "Country" appears on the title bar.
(4) The text "<!--<h1> Sri Lanka </h1>-->" appears on the title bar.
(5) The text "<!--<h1> Sri Lanka </h1>-->" appears in the body of the web page.

14. Consider the "Submit" button of an HTML form given below:



Which of the following tags/elements correctly implements the intended function of the above "Submit" button?

- (1) <input type = "submit" value = "Submit">
- (2) <input type = "button" value = "Submit">
- (3) <button type = "button" >Submit</ button>
- (4) <button type = "submit"></ button>
- (5) <button type = "submit" value = "Submit"></ button>

15. Which of the following CSS rules renders the image in the file "school.png" as the background of a web page?

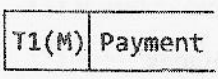
- (1) body { background = "school.png"; }
- (2) body { background: url ("school.png"); }
- (3) body { background-image = "school.png"; }
- (4) body { background-image: "school.png"; }
- (5) body { background-image: url ("school.png"); }

16. The transport layer protocol User Datagram Protocol (UDP) can be used for

- (1) reliable communication. (2) guaranteed delivery.
- (3) connection-oriented communication. (4)-ordered delivery.
- (5) exchanging state information among routers.



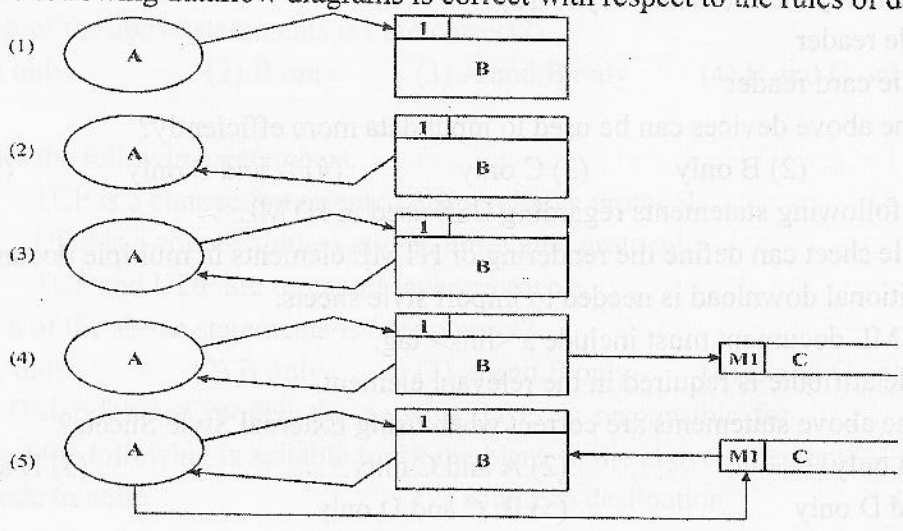
17. Which of the following statements regarding MAC addresses is correct?
- (1) Every network device has a unique MAC address.
 - (2) Every network host has a unique MAC address.
 - (3) Every network interface has a unique MAC address.
 - (4) It is assigned for a device at the time of installation.
 - (5) It is used for routing.
18. The first and the last IP addresses of a subnet are 192.192.48.0 and 192.192.63.255 respectively. Which of the followings is the subnet mask of this subnet?
- (1) 255.255.255.0
 - (2) 255.255.192.0
 - (3) 255.255.255.192
 - (4) 255.255.240.0
 - (5) 255.240.0.0
19. 172.16.48.200/24 is a
- (1) host address in a class B network.
 - (2) network address of a class C network.
 - (3) host address in 172.16.48.0/24 subnet.
 - (4) network address of a subnet with 255 hosts.
 - (5) host address with 8 network bits.
20. Which of the following statements best describes a nice to have non-functional requirement of an Automated Teller Machine (ATM)?
- (1) System shall facilitate users to withdraw money.
 - (2) System should let users to deposit money.
 - (3) System shall use 256-bit encryption for all communications.
 - (4) System should provide users a touch screen interface.
 - (5) System shall dispense money within 5 seconds.
21. The following symbol, appeared is a Data Flow Diagram (DFD) of a Sales Information System, represents a containing payment details



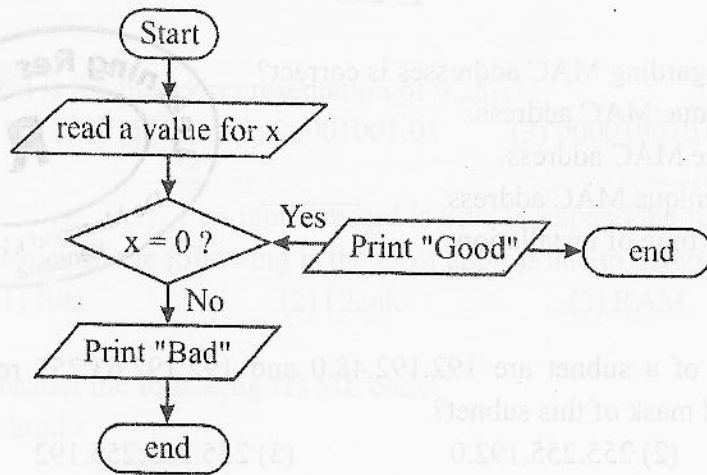
Which of the following is most appropriate to fill in the blank in the above statement?

- (1) file tray
- (2) cardboard file
- (3) file cabinet
- (4) data file in a hard disk
- (5) temporary data file in a hard disk

23. Which of the following dataflow diagrams is correct with respect to the rules of dataflow modeling?



24. Consider the following flowchart-



What is the error with the above flow chart?

- (1) It has two end-symbols.
- (2) Print is not a valid keyword.
- (3) It has no process box.
- (4) It has two print symbols.
- (5) A flow direction is not correct.

25. Requirements of a system can be classified as Mandatory (Essential), Desirable (Optional), Functional and Non-functional.

"ATM of a bank shall not allow more than three attempts to enter a user's secret number incorrectly"

Which of the followings correctly classifies the above requirement?

- (1) Mandatory, Functional
- (2) Mandatory, Non-functional
- (3) Desirable, Functional
- (4) Desirable, Non-functional
- (5) Mandatory or Desirable, Functional

26. Which of the following organs is a part of a closed system of the human body?

- (1) Eye
- (2) Ear
- (3) Heart
- (4) Kidney
- (5) Lung

27. Which of the following statements is correct?

- (1) Application software load applications into the main memory.
- (2) The programs stored in ROM are known as system software.
- (3) System software support data communication between peripheral devices.
- (4) Utility software is generally stored in ROM.
- (5) Utility software are incorporated in washing machines.

28. Consider the following data input devices:

- A- On screen keyboard (virtual keyboard)
- B- Bar code reader
- C- Magnetic card reader

Which of the above devices can be used to input data more efficiently?

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

29. Consider the following statements regarding CSS used in HTML:

- A- One style sheet can define the rendering of HTML elements in multiple documents.
- B- No additional download is needed to import style sheets.
- C- The HTML document must include a <link> tag.
- D- The style attribute is required in the relevant element.

Which of the above statements are correct when using External Style Sheets?

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

30. Consider the following statements on using NAND, NOR gates over NOT, AND, OR gates when constructing logic circuits:

- A- They make logic circuit design simpler.
- B- They help to construct logic circuits that consume less electricity.
- C- They make logic circuit construction more economical.

Which of the above statements is/are correct?

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

31. Consider the following system implementation methods:

- A- Direct
- B- Pilot
- C- Parallel

Which of the above method(s) is/are generally used to implement a home security system?

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

32. Consider the following three numbers in decimal, octal and hexadecimal notations, respectively.

A - 231_{10} B - 347_8 C - $E7_{16}$

Which of the above is/are equivalent to 11100111_2 in binary notation?

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

33. Consider the following statements.

- A - In public key encryption systems each pair of communicating entities share a single key for encryption and decryption.
- B - Phishing is a type of social engineering attack often used to steal user data such as user name and password.
- C - Port scanning is a method which can be used by attackers to identify open ports or services on a network host.
- D - Digital signatures can be used for email message authentication. Which of the above statements are correct?

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

34. Consider the following statements.

- A - DHCP server in an IP network dynamically allocates IP addresses to network devices.
- B - DNS server translates domain names to IP addresses.
- C - FTP server caches the recently accessed web pages.

Which of the above statements is / are correct?

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

35. Consider the following statements.

- A - TCP is a connection oriented and a reliable protocol.
- B - UDP is a connectionless and an unreliable protocol.
- C - TCP and UDP are transport layer protocols.

Which of the above statements is / are correct?

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

36. In the OSI reference model, the network layer is responsible for Communication.

Which of the following is suitable to fill the blank in the above statement?

- (1) node to node (2) source to destination (3) hop to hop

37. Which of the following indicate the number of host bits and the number of IP addresses respectively in a class C network?
- (1) 8 and 256 (2) 8 and 65536 (3) 16 and 256
 (4) 16 and 65536 (5) 24 and 256
38. To which of the following network classes does the IP address 192.248.254.1 belong?
- (1) A (2) B (3) C (4) D (5) E
39. In the OSI reference model, a protocol data unit of the network layer is referred to as a
 Which of the following terms is suitable to fill blank in the above statement?
- (1) frame (2) Segment (3) window (4) message (5) packet
40. Consider the following statements regarding HTML.
- A - HTML frames are used to divide a browser window into multiple sections.
 B - The rows attribute of <frameset> tag defines the number of vertical frames in an HTML page.
 C - <frameset cols= "100, 500, 100"> creates vertical frames with the specified number of millimeters.
- Which of the above statement/s is/are correct?
- (1) A only (2) B only (3) A and B only
 (4) B and C only (5) All A, B and C
41. Consider the following HTML code with labels ❶ - ❸ and the expected output

HTML code	Expected output
<pre> <html> <head><title>Coffee Shop</title></head> <body> <❶> <❷>Coffee </❷> <❸>black hot drink </❸> <❷>Milk </❷> <❸>white cold drink </❸> </❶> </body> </html> </pre>	<pre> Coffee black hot drink Milk white cold drink </pre>

- What is the correct order of tags for replacing the labels ❶, ❷ and ❸?
- (1) dt, dl, dd (2) dl, dt, dd (3) dd, dt, dl
 (4) dt, dd, dl (5) dl, dd, dt

42. Consider the following HTML code for creating a table.
- ```

<html>
<head><style> table, th, td {border: 1px solid black} </style>
</head><body>
<table>
<tr><th> Name: </th><td> kamal </td></tr>
<tr><th rowspan= "2"> Telephone: </th><td> 55577854</td></tr>
</tr><td>55577855 </td></tr>
</table>

```

</body>

</html>

Which of the following is the output generated by the above code?

|                                                                                                                                                 |            |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
|-------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|------------|----------|--|----------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------|-------|----------|--|----------|------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|------------|----------|--|----------|
| (1)                                                                                                                                             | (2)        | (3)   | (4)        | (5)      |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
| <table border="1"><tr><td>Name:</td><td>Kamal</td></tr><tr><td>Telephone:</td><td>55577854</td></tr><tr><td></td><td>55577855</td></tr></table> | Name:      | Kamal | Telephone: | 55577854 |  | 55577855 | <table border="1"><tr><td>Name:</td><td>Telephone:</td></tr><tr><td>Kamal</td><td>55577854</td></tr><tr><td></td><td>55577855</td></tr></table> | Name: | Telephone: | Kamal | 55577854 |  | 55577855 | Name: Telephone:<br>Kamal 55577854<br>55577855 | Name: Kamal<br>Telephone: 55577854<br>55577855 | <table border="1"><tr><td>Name:</td><td>Kamal</td></tr><tr><td>Telephone:</td><td>55577854</td></tr><tr><td></td><td>55577855</td></tr></table> | Name: | Kamal | Telephone: | 55577854 |  | 55577855 |
| Name:                                                                                                                                           | Kamal      |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
| Telephone:                                                                                                                                      | 55577854   |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
|                                                                                                                                                 | 55577855   |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
| Name:                                                                                                                                           | Telephone: |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
| Kamal                                                                                                                                           | 55577854   |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
|                                                                                                                                                 | 55577855   |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
| Name:                                                                                                                                           | Kamal      |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
| Telephone:                                                                                                                                      | 55577854   |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |
|                                                                                                                                                 | 55577855   |       |            |          |  |          |                                                                                                                                                 |       |            |       |          |  |          |                                                |                                                |                                                                                                                                                 |       |       |            |          |  |          |

43. Which of the following is the correct **HTML** statement for inserting an image?

- (1) <img href="image.gif" alt="MyImage">
- (2) <img alt="MyImage">image.gif</img>
- (3) <image src="image.gif" alt="MyImage">
- (4) <image src="image.gif" href="MyImage">
- (5) <image href="image.gif" src="MyImage">

44. Consider the following statements related to the development of computers over time.

- A - Both processing speed and power consumption of computer have increased.
- B - Processing speed of a computer has increased while physical size of a computer has decreased.
- C - Both power consumption and the physical size of a computer have reduced.

Which of the above statement is/are correct?

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

45. Consider the following statements relevant to external entities of Data Flow Diagrams.

- A - An external entity can be a person, system or organization that has predefined behavior.
- B - An external entity can be a source of input data for a process or/and a destination of the output process.
- C - External entities are always data stores.

Which of the above statements(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

46. Consider the following tasks.

- A - identifying the problems in the existing system
- B - suggesting alternative solutions
- C - prioritizing of the information system's requirements

Which of the above tasks is/are carried out during the preliminary investigations of system development cycle

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

47. Which of the following feasibility types is generally **not** carried out during the development of a system to be used only in-house?

- (1) economic feasibility
- (2) market feasibility
- (3) operational feasibility
- (4) organization feasibility
- (5) technical feasibility

system.

- I - Reads barcodes of items purchased and produces the invoice
- II - Accepts user's request and responds in less than 1 second
- III - Processes a minimum of 1,000 transactions per second

Which of the following is the correct classification of requirements?

- (1) I, II and III all functional
- (2) I - functional, II and III - non-functional
- (3) II - functional, I and III - non - functional
- (4) I and III - functional, II - non-functional
- (5) I, II and III all non - functional

49. Consider the following software development lifecycle models.

- A - spiral
- B - waterfall
- C - Rapid Application Development (RAD)

Which of the above requires defining and finalizing requirements in the early phases of the lifecycle?

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

50. Consider the following statements regarding *Structured* and *Object Oriented* software development methodologies.

- A - Structured analysis and design represents systems as a hierarchy of functions.
- B - Structured design is a system of interacting objects.
- C - Object oriented methodology combines data and processes into individual entities.

Which of the above statements is/are correct?

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

\*\*\*



22. Consider the following segment:

- A - BIOS is an example for application software.
- B - A utility software is an example for firmware.
- C - Spyware is an example for malware.

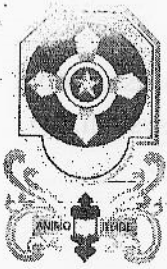
Which of the above is/are correct?

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

40. Consider the following statements.

- A - Disk defragmentation makes file that are fragmented in a disk, contiguous.
- B - Swapping is a memory management technique where the main memory contents which were not recently used are copied to disk to make the memory available for other processes.
- C - A File Allocation Table (FAT) is a table that an operating system maintains which provides a map of the clusters that a file has been stored in.





Information & Communication Technology (Structured Essay)

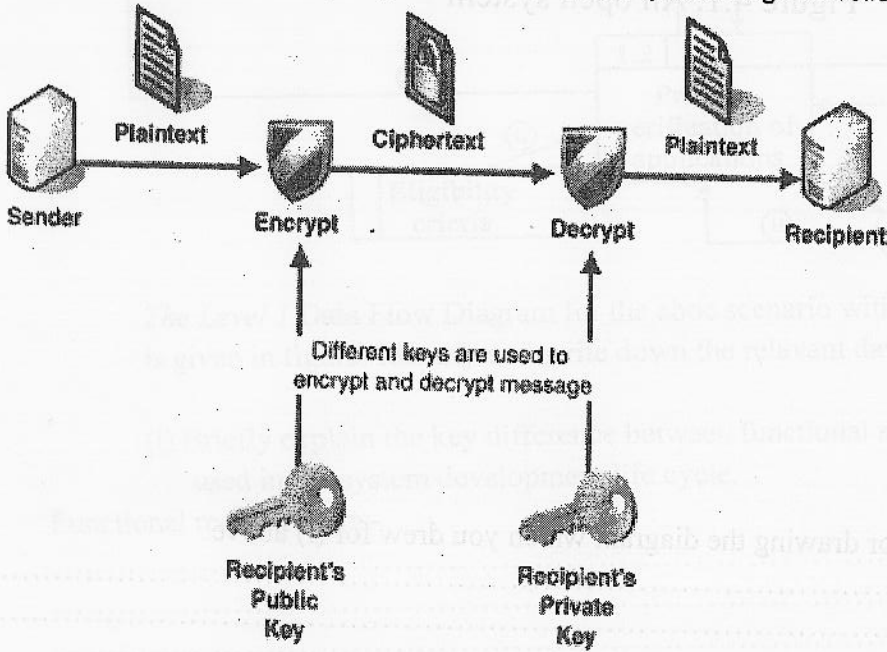
One hour

Name:.....

Class:.....

Answer all questions

1. Identify the following diagram and answer the questions given below.



a. Briefly explain what is encryption

.....  
.....  
.....

b. In an operating system, what are the events that change the state of a process in the 'running' state?

.....  
.....  
.....

c. Explain the main actions performed by an operating system during context switching.

.....  
.....  
.....  
.....

d. Explain what will happen during the booting process of a computer.

.....  
.....  
.....

2. (a) (i) The Figure 4.1 represents an open system. Using the basic components: input, process, output and system boundary as given in the figure, draw a diagram to represent a closed system.

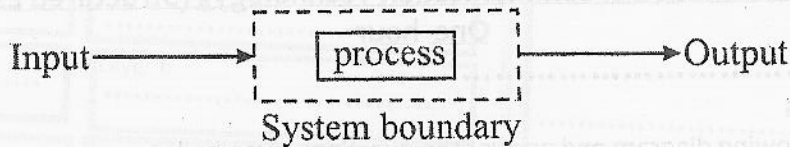


Figure 4.1: An open system

(ii) Explain the reason for drawing the diagram which you drew for (i) above.

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(b) The school admission process of a certain country is explained using the description and the data flow diagram given below.

The applicant sends the application to the respective school. The school sends an acknowledgement to the applicant. The school then verifies the information in the application by cheking the following.

- Eligibility of applicant : by using the eligibiliy criteria taken from the data store '*Eligibility Criteria*'
- Registration in the electorate : by requesting the electoral list from the Election Authority (Election Authority sends the Electoral list to the school)
- Residential status : by requesting the confirmation of residence from the Divisional Secretariat (Divisional Secretariat sends the confirmation of residence to the school)

After verification of information, the applicant is informed whether the applicayion has been accepted or rejected which in noted in the application and stoted in the data store "Applications". The school obtains the valid applications from the data store "Applications" and schedules the qualified applicants for interviews. Then it calls the applicants for interviews and send the interview schedule to the Education Authority. The interview schedule is stored in the data store "Interview Schedule".

(i) Write down the two's complement representation of  $12_{10}$  using 8 bits.

.....  
.....  
.....  
.....  
.....

(ii) Write down the two's complement representation of  $-68_{10}$  using 8 bits.

.....  
.....  
.....  
.....  
.....

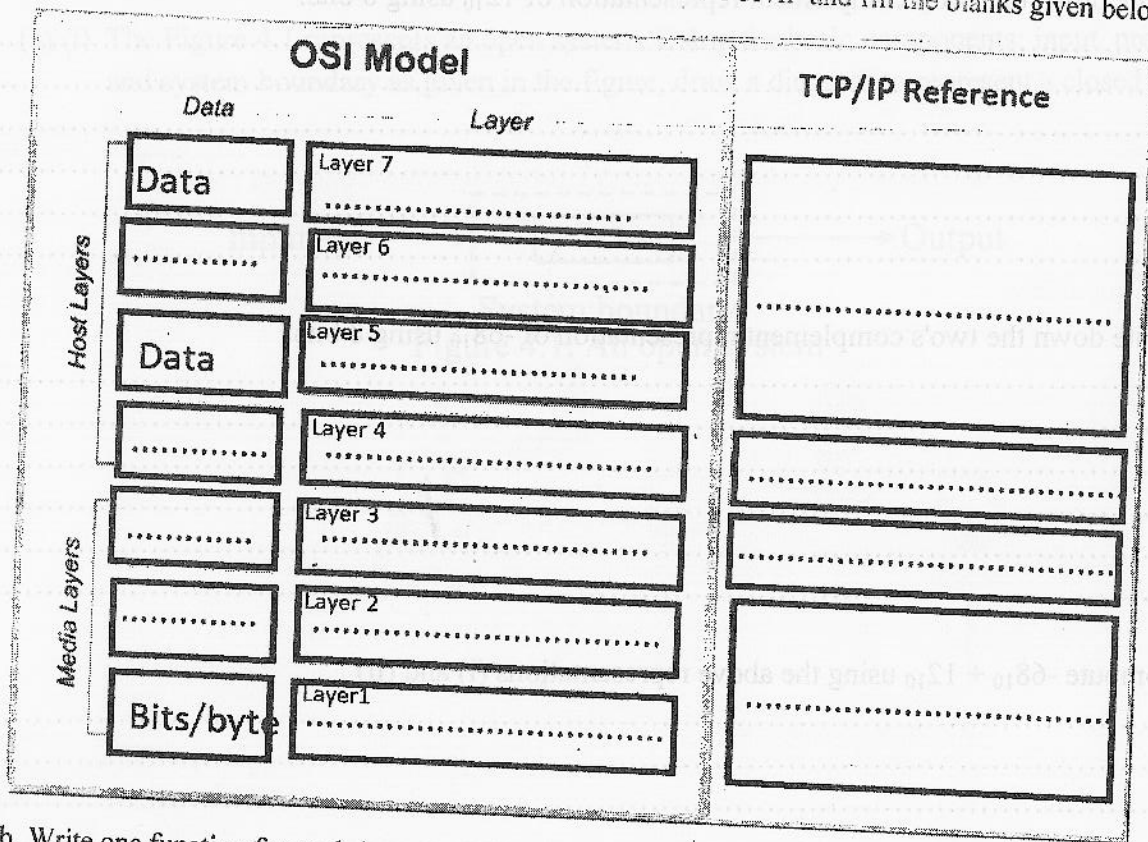
(iii) Compute  $-68_{10} + 12_{10}$  using the above representations (i) and (ii)

.....  
.....  
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.....  
.....  
.....

(iv) State one advantage of using two's complement representation for data in internal operations computer.

.....  
.....  
.....

4). a. Identify the comparison of OSI reference model and TCP/IP and fill the blanks given below.



b. Write one function for each layer

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

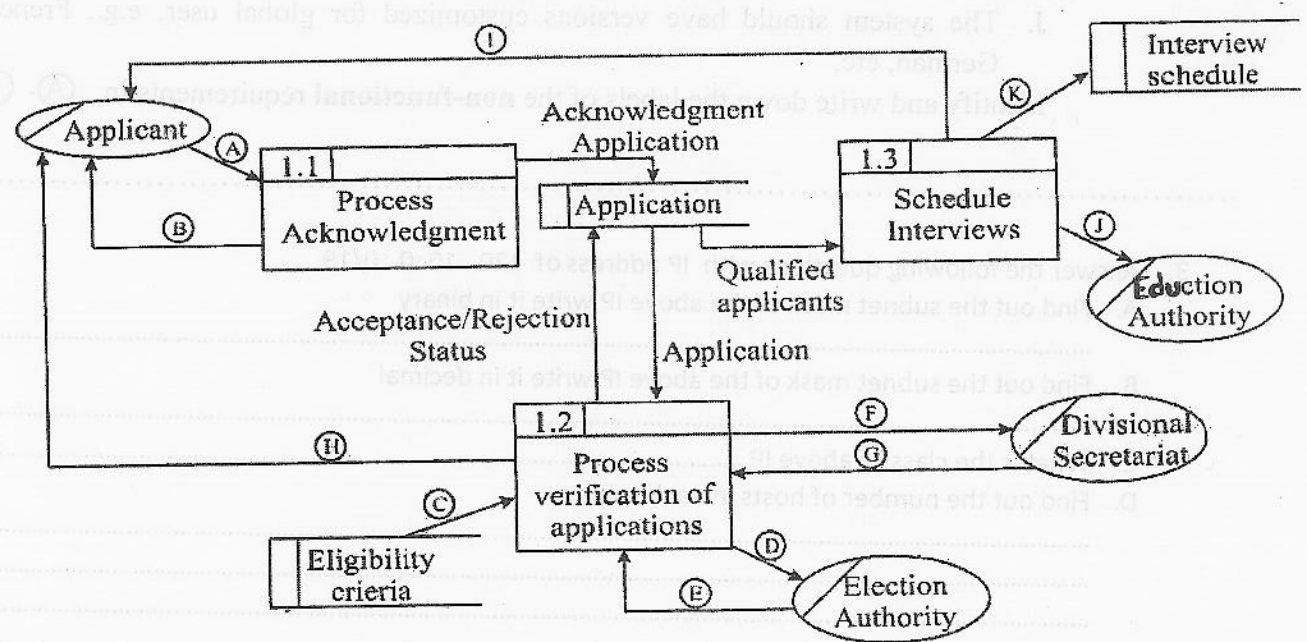
c. Write one device or protocol for each layer

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

e. Why does OSI reference model consider as an open system?

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The Level 1 Data Flow Diagram for the above scenario with some data flows labelled as (A)-(K) is given in figure. Identify and write down the relevant data flows against the labels (A)-(K)

(i) Briefly explain the key difference between functional and non-functional requirements as used in the system development life cycle.

Functional requirements:-

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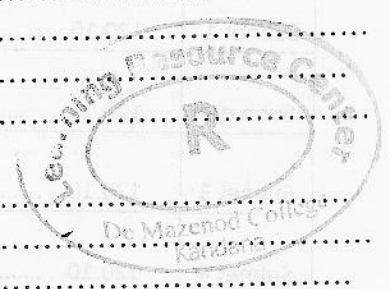
.....

Non-Functional requirements:-

.....

.....

.....



(ii) The following list includes some functional and non-functional requirements of a proposed e-commerce web portal that plans to sell products on catalogue:

- A. Enable user to find products based on a variety of item characteristics
- B. The system should work on any web browser
- C. The system should be easy to use
- D. Enable user to submit his/her comments on products and read other user's comments on items
- E. Data in the system should be preserved even in the case of a system failure
- F. Enable user to create and maintain a wish list of desired products
- G. Enable user to browse through products on catalogue
- H. The system should be available for use 24 hours a day, 7 days a week and 365 days a year
- I. The system should authenticate users through username and passwords

J. The system should have versions customized for global user, e.g., French, Japanese, German, etc.

Identify and write down the labels of the **non-functional** requirements in (A) - (J)

3. Answer the following questions with IP address of 120 . 10 . 0 . 0/19

A. Find out the subnet mask of the above IP write it in binary

.....

B. Find out the subnet mask of the above IP write it in decimal

.....

C. What is the class of above IP.....

D. Find out the number of hosts in each subnet

.....

.....

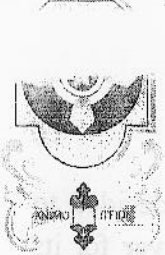
.....

E. Find out the block size

.....

F. Fill in the blanks

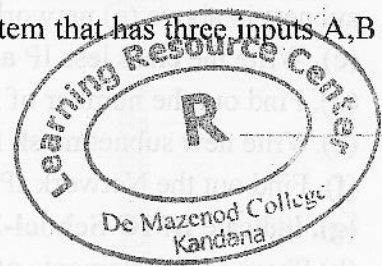
| Subnet   | Network IP       | Broadcast IP     | First Host IP    | Last Host IP     |
|----------|------------------|------------------|------------------|------------------|
| Subnet 1 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |
| Subnet 2 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |
| Subnet 3 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |
| Subnet 4 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |
| Subnet 5 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |
| Subnet 6 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |
| Subnet 7 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |
| Subnet 8 | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . | 120.10 . . . . . |



Name:.....

Class:.....

Answer only four questions



1. Suppose a logic circuit needs to be implemented for a digital system that has three inputs A,B and C one output Z. Its behavior is as follows:  
 If the input C=1, the output Z has the value of A.  
 If the input C=0, then output Z has the value of B.

- (a) Obtain the truth table for the output Z.
- (b) Write down a product of sums (POS) Boolean expression for Z.
- (c) Simplify the Boolean expression for Z obtained in (b) above using Kmaps.(Write the simplified answer in POS)
- (d) Using the simplified expression in (c) above, construct a logic circuit for the system using **either** 2-input NAND gates only or 2-input NOR gates only.

2. An engine of a motor vehicle can be started by using the **FUEL**, **PLUG** and **AIR** according to the following conditions. If the **FUEL** type is petrol then switching on the **PLUG** is good enough to start the engine.

If the **FUEL** type is diesel then the activation of the **PLUG** is not a compulsory task, to start the engine. Assume adequate **AIR** should be supplied to the **DIESEL** engine.

Consider switching on and switching off status of a **PLUG** and the fuel type, either petrol or diesel or supply of adequate **AIR** or not, represented by the Boolean 1 and 0 respectively.

Consider **FUEL type**→A    **PLUG**→B    **AIR**→C

\*\*Consider Petrol as 1 and diesel as 0\*\*

\*\*Adequate air is compulsory to start diesel engine\*\*

- a). Clearly show the truth table and Boolean expression in POS and SOP.
- b). Simplify using Boolean algebraic rules.
- c). Construct a logic circuit using only NOR gate to control the engine.

3. **DMC-Office-Zone** exposes an organization's external-facing services such as web servers (public IP addresses) to the Internet while hiding away the rest of the network behind a firewall.

A network with a **DMC-Office-Zone** belonging to an organization has been assigned the public IP address range 123.45.67.0 with subnet mask 255.255.255.224.

The DMZ contains the web server and the mail server.

(a). Draw a network diagram for above requirements.

**DMC-Office-Zone** divided in to 6 subnets called "**DMC-School-Zone**" for internal use having the private IP address range 10.0.0.0 with the default subnet mask 255.0.0.0.

**DMC-School-Zone** contains following labs

- 1. AL ICT Lab
- 2. OL ICT Lab
- 3. Library



4. Primary ICT Lab
5. Primary School Staffroom
6. Upper School Staffroom

Computers in each subnet can access resources in all other subnets. The organization decided to connect subnets to the Internet through a **proxy sever**. There is also an **application server** for its internal clients.

(b). Name the devices required to establish this network and Indicate **DMC-School-Zone** with 6 subnets in above (a) network diagram.

(c). Write the class less IP address of **DMC-School-Zone**.

(d). Find out the number of host in each subnet.

(e). Write new subnet mask for **DMC-School-Zone**.

(f). Find out the Network IP, First IP, Broadcast IP and Last IP address of each lab.

(g). Indicate **DMC-School-Zone** with 6 subnets in above (a) network diagram.

(h). Show all the elements of the network with appropriate IP addresses.

4. Environmental Institute of Colombo intends to develop a website to provide information on an ICT competition for students. A web page from this website and another web page with the entry form to register for the competition are shown in the Figure 4.1 and Figure 4.2 respectively.

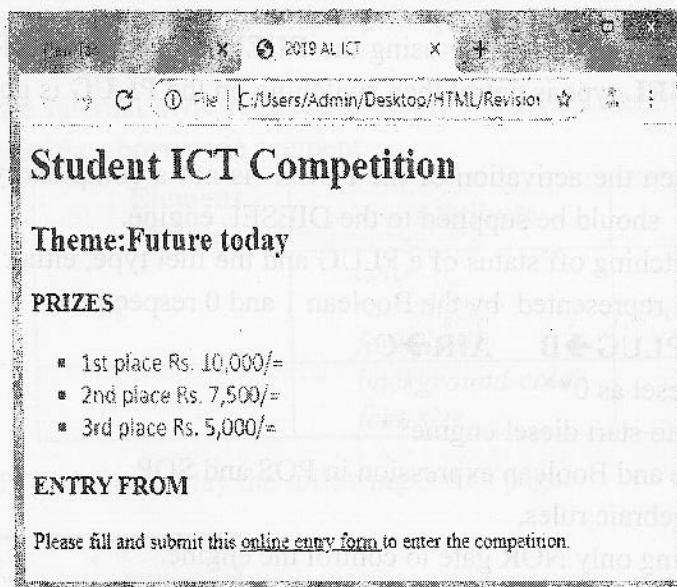


Figure 4.1

- (a) Using appropriate HTML tags, create an HTML file required to render the web page as shown in Figure 4.1. Your code should satisfy the following requirements.

It is required to format the text of the list in 'Calibri' font, 14 points high, in red color. The list should be bulleted with squares. Format the list by using internal or external style sheets only.

Further, when a user clicks on the hypertext 'online entry form' on the web page, the entry form given in Figure 4.2 should be rendered on a new tab/page. Assume that the name of the HTML file of the web page with the entry form is 'form.html'.

The screenshot shows a web browser window with the URL 'C:/Users/Admin/Desktop/HTML/Revisor'. The page title is 'ICT Competition online entry form 2019'. The form contains the following elements:

- Theam:** Future today
- Name:** [Text input field]
- Gender:**  Female  Male
- Grade Category:** Grade 1-2 (dropdown menu)
- Software type:**
  - Web Site
  - Pascal Programming
  - Python Programming
  - Java
- Buttons:** 'clear your Entries!' and 'OK! submit!'

Figure 4.2

- (b) Using appropriate HTML tags, create an HTML file to render the entry form given in Figure 4.2. The options for 'Grade Category' are given in the Figure 4.3. Your code should satisfy the following requirements. When the 'Clear your Entries' button is clicked, all the entries of the form should be cleared. Similarly, when the 'Submit' button is clicked, the form should be submitted to the server.

The dropdown menu for 'Grade Category' is open, showing the following options:

- Grade 1 - 2 (selected)
- Grade 3 - 6
- Grade 7 - 10
- Grade 11 - 13

Figure 6.3: Options for Grade Category

5. A Hotel Management School in Sri Lanka has decided to computerize its course management to offer an efficient service to its local and overseas candidates. A candidate can access the website of the Hotel Management School and find the his/ her eligibility for the courses provided by the Hotel Management School. Then the candidate is allowed to select a course and enroll for the eligible course by providing his/her personal and educational qualifications. A candidate can apply for maximum of three courses. The registrar of the Hotel Management School views all the applications and decides whether to accept or reject an application. Once accepted, the candidate should enroll for the selected course by paying 1/3 of the course fee plus Rs.1,000/= as processing fee within three months of selection through the payment gateway attached to the system.
- Draw the Business Activity Model (BAM) and define the system boundary giving reasons.
  - Draw the system development life cycle
  - Draw the waterfall diagram

6.

- (a) (i) State **two** benefits of using Cascading Style Sheets (CSS).  
 (ii) Write the output of the following HTML code segment when rendered by a web browser

```
<html><body>
<u> Important Sites </u>

National Institute of Education
Department of Examination
 </body>
</html>
```

- (iii) Write the output of the following HTML code segment when rendered by a web browser.

```
<html><body>
<p><center> Department of Examination
 Pelawatta

 Battaramulla </center></p><hr>
</body></html>
```

- (b) Consider the following HTML code segment:

```
<body>
<h1> Introduction to Web Technologies </h1>
<h3>HTML </h3>
<p> HTML is the standard markup language for creating web pages </p>
</body>
```

Write down the internal style required to apply the styles mentioned in the following table for the elements *h1* and *p* in the above code segment.

Element Name	Attribute	Attribute Value
<i>h1</i>	<i>color</i> <i>text-align</i> <i>font-family</i>	<i>blue</i> <i>center</i> <i>Arial</i>
<i>p</i>	<i>background-color</i> <i>font-size</i>	<i>Yellow</i> <i>12px</i>

- (c). Write HTML code to display the following 3 web page.

(i) Web page 1

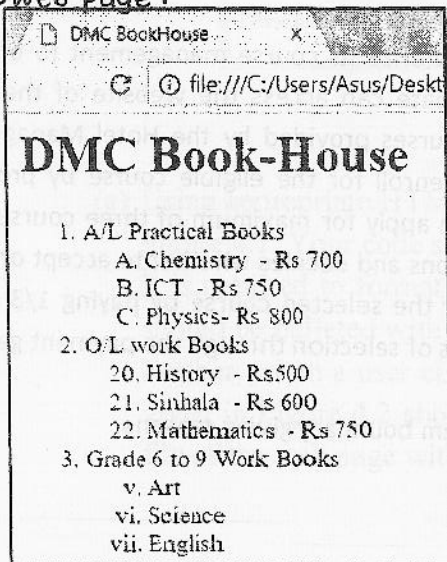


Figure 6.1

(ii) web page 2

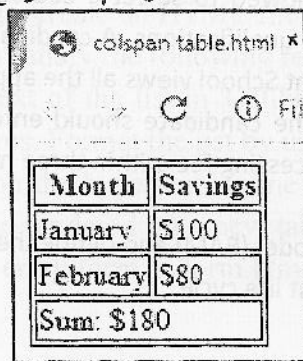


Figure 6.2

(iii) web page 3

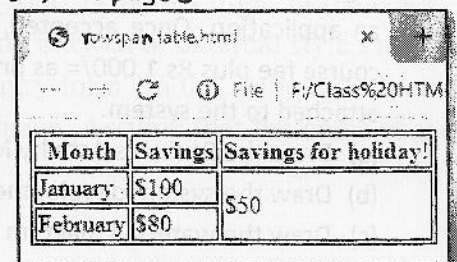


Figure 6.3