BCS-011 COMPUTER BASICS AND PC SOFTWARE

June 2015

1.

(a) Convert the following hexadecimal numbers to equivalent binary and decimal : 4

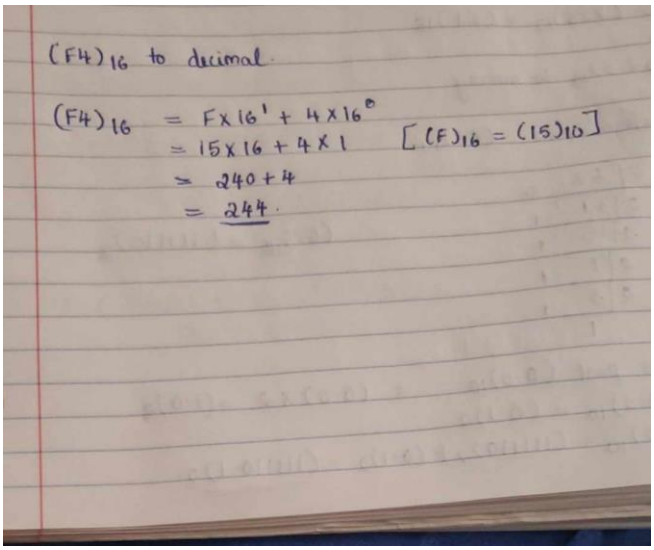
(i) (F4) 16

Ans: Divide the given hexadecimal number into individual digits. Assign 4-bit binary equivalents to each hexadecimal digit.

(F4)16 = F 4

1111 0100

(F4)16 = (11110100)2



(ii) (AC)16

Ans:

(AC)16 = A C

1010 1100

(AC)16 =(10101100)2

= 247.

$(AC)_{16}$ to decimal

$(AC)_{16} = A \times 16^1 + C \times 16^0$

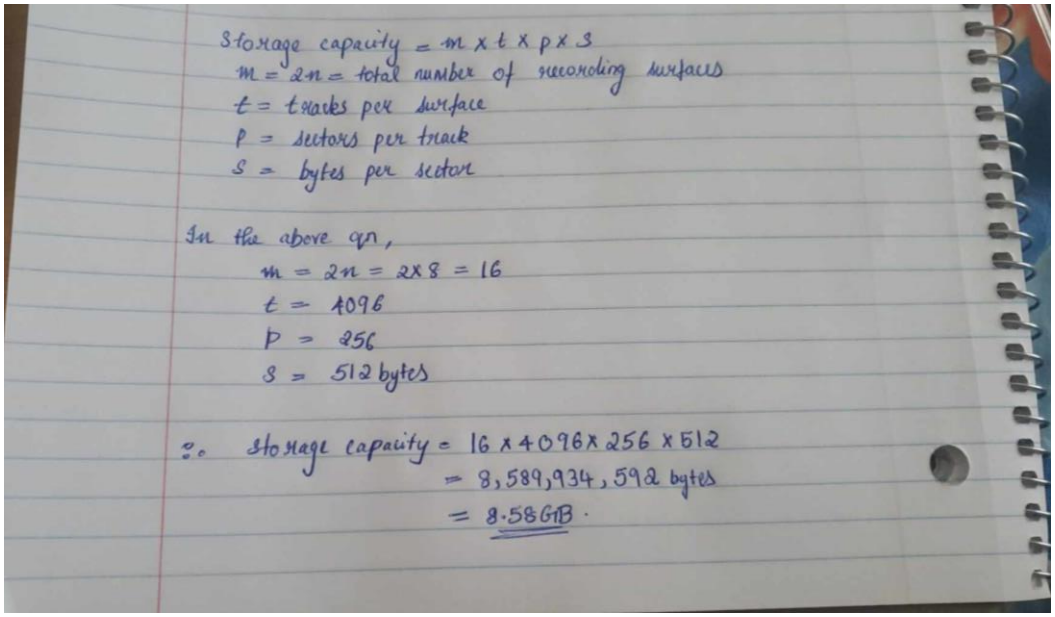
$= 10 \times 16 + 12 \times 1$ [$(A)_{16} = (10)_{10}$, $(C)_{16}$ =

$= 160 + 12$

$= 172$

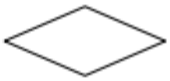
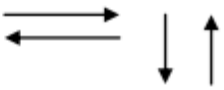
(b) A 3 inch diameter disk per track has 8 plates (16 recording surfaces), 256 sectors per track, 4096 tracks per surface, 512 bytes per sector. Calculate the disk capacity in GB. 6

Ans:

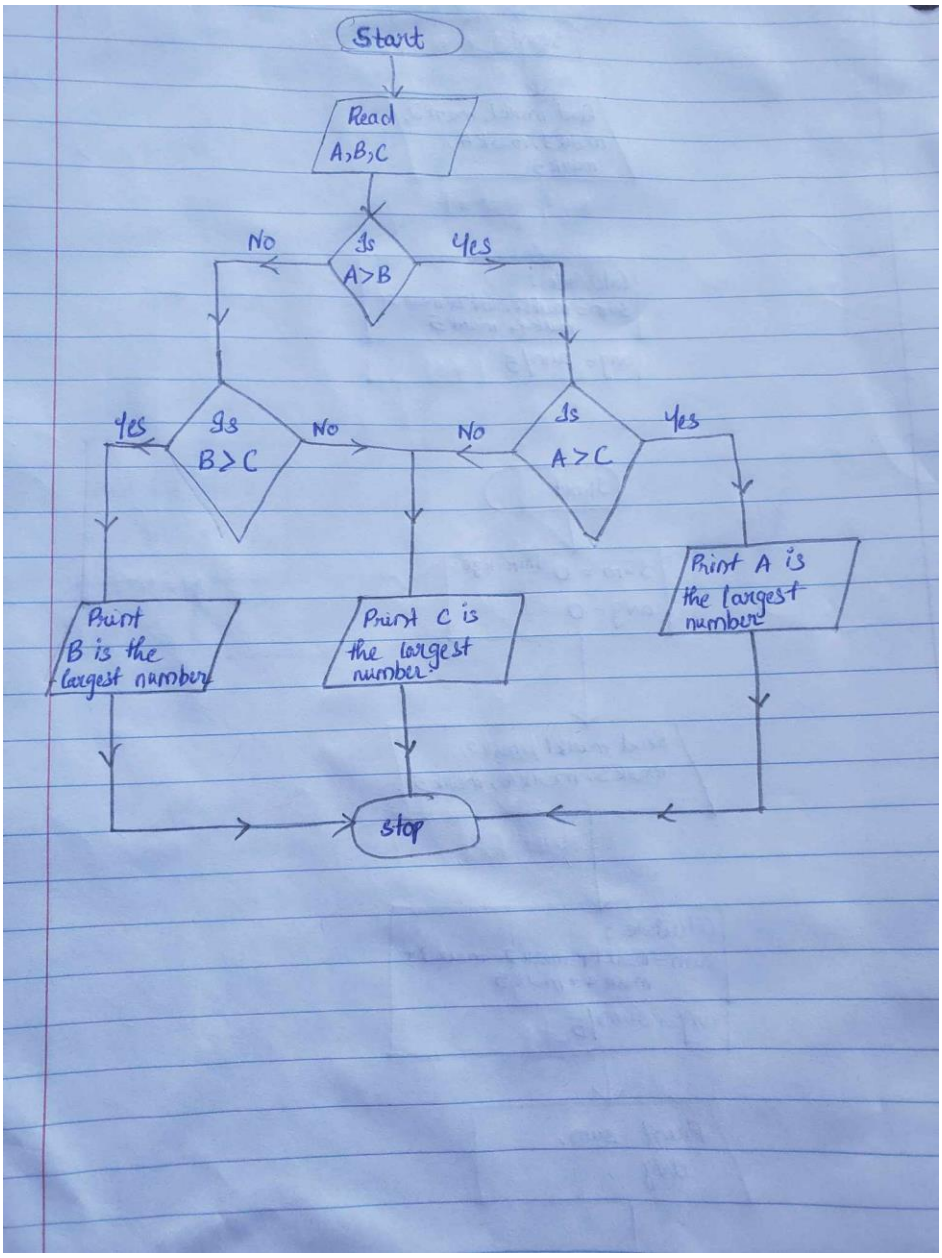


(c) What is a flow chart ? Draw a flow chart to find the maximum of three given natural numbers. 6

Ans: A flowchart is a graphical representation of an algorithm. It is a type of diagram that represents a workflow or process. A programmer refers to a flowchart for writing the program which describes what operations are to be carried out and in what sequence to solve a problem.

Terminal	Start, End	
Computational or processing	Process	
Input/Output Operation	Input-Output	
Decision making or Branching	Decision	
Flow Lines	Flow Direction	
Joining of two parts	Connector	

Flowchart to find maximum of three numbers:



(d) What is a laser printer ? Compare its features with an ink-jet printer. 6

Ans: This is a high quality, high speed and high-volume technology printer. In laser printers, a laser beam is used to produce an image on a drum. The light of the laser alters the electrical charge on the drum wherever it hits it. The drum is then rolled through a reservoir of toner, which is picked up by the charged portions of the drum. Finally, the toner is transferred to the paper through a combination of heat and pressure. Laser printers produce very high-quality text and graphics but are expensive. The technology used by them is the same as that of photocopying machines. The speed of laser printers varies

from 10 pages per minute to 200 pages per minute. Laser printers are also called page printers; because they print a whole page at one go.

Laser printers can be classified into 2 categories based on color:

* Monochrome laser printer, and

* Color laser printer

Monochrome laser printers use a single toner.

Color laser printers use four toners to print in full color. These printers are about five to ten times as expensive as their monochrome siblings. Color laser printers are popular and are being widely used, in spite of their cost. To print documents with graphics and photographs a color laser printer is a good option.

Advantages of laser printer:

- They are known for their high printing speed, making them suitable for busy environments.
- Produce sharp and precise prints, making them ideal for text-heavy documents and graphics.
- Laser printers are generally more reliable and require less maintenance than other types of printers.

Laser printer vs ink-jet printer:

Laser printer	Ink-jet printer
It is expensive than ink-jet printers.	It is cheap in price.
They do not have nozzle.	They have nozzle from which ink is sprayed on to paper and it gets printed.
Ink is in the form of toner powder, it does not dries up even if you don't use it for a long time.	Ink in the cartridges is in liquid form, which dries if not used for a long time.
A printer that uses laser and dry ink to print the information onto paper is called laser printer.	A printer that uses wet ink and nozzle assembly to produce the output onto paper is called the inkjet printer.
Laser printers can handle high-volume printing.	Ink-jet printers cannot handle high-volume printing.
The efficiency of laser printer is relatively high.	Ink-jet printers are less efficient than laser printers.

Laser printers are generally larger in size.	The size of inkjet printers is relatively smaller.

(e) What is a desktop computer ? Give a generic configuration of a desktop computer. 5

Ans: Desktop computer is popularly known as personal computer (PC). It is small in size and fitted on the top of a desk which can be used at a fixed location. Most of modern desktop computer has separate screens and keyboards. Generally in majority of the PCs, Microsoft Windows, LINUX and Mac OS x are used as operating system. Desktop computers are available in many different forms from large vertical tower cases to small form factor models. Advantages of desktop computer are that it may be used for day to day computational and internet communication activities of office, school etc. A PC provides more space for heat to escape. Also power consumption of a PC is not very high. There are many brands of PCs are available including HP, HCL, Wipro, Compaq etc. A PC also can be assembled as per specific requirements, instead of a particular brand.

A Configuration of Desktop computer:

Processor: Intel Pentium 4 around 3.0 GHZ

RAM: 1 GB DDR II RAM, DDR stands for double data rate type 2 RAM

Hard Disk: 320 GB SATA hard disk drive

Graphics: Intel Graphics Media Accelerator 950 (Intel GMA 950)

(f) What is E-mail ? Explain how an E-mail account is created. Also list the folders available in an E-mail account. 7

Ans: Electronic mail is commonly known as email. It is a communication method that uses electronic devices to deliver messages across computer networks. It is one of the most popular methods of digital communication. It is mostly used in business, education, technical communication, and document interactions. It allows communication with people all over the world without bothering them. It is a communication that happens in real time and can get important data across to people in various geographies. An email is a record of the communications that have happened and is stored on the server of the organization. Internet based E-mail system was designed by a computer engineer - Ray Tomlinson in late 1971 while working with ARPANET.

Steps to create an email account:

For sending or receiving email, you need to have to an email account. The email account may be provided by the organization for which you are working or else you can create an account with web-based email providers. If you are working on mail services provided by your organization ‘s mail server, you must install and use email client software such as Microsoft Outlook Express, Pegasus Mail, Apple Mail client, Mozilla Thunderbird etc. On the other hand, if you are using web-based mail services then you may use the mail services offered by any of the web-based mail service providers. Some of these web-based mail providers are – Windows Live mail, Yahoo mail, Gmail, Rediffmail, and many more.

Following are the steps to create an email account:

Step 1: Start the browser and open the Gmail Homepage www.gmail.com.

Step 2: Select the —Create an Account‖ button on the right.

Step 3: Fill all the fields and click —I accept. Create my account.

If there are no mistakes then an account will be created, otherwise the error will be displayed. Correct the errors and try again. Your email account is created.

Next time we visit the Gmail website, we can access the account as: Enter the username and password and click —Sign in button.

An email account has the following folders:

* Inbox: Inbox is the main folder in your email account. It contains all the e-mails that have arrived in your e-mail account. You can click on inbox to see the mails that you have not read (shown in bold) as well as the mails that you have already read (in normal font).

* Sent Mail: It shows all the e-mails sent by you from your e-mail account

* Drafts: This folder stores those messages that you have created but have not been sent by you so far. These messages are saved by you for more work.

* Spam: Spam is unsolicited e-mails or junk mails. It is generally e-mail advertising sent to groups of people. Spam can also be termed as unwanted e-mails. Spam mail is also a big cause of computer viruses. Spam mails are identified by the mail services and placed in this folder. These spam mails are automatically deleted after a few days.

* Trash: Deleted mail is put in the Trash folder. Trash folder allows you to get back an e-mail which has been deleted within a few days of deletion. After a few days, the mail is permanently deleted from the trash folder.

(g) What is E-learning ? What are its advantages and disadvantages ? List the steps of the process of creating of E-learning content. 6

Ans: E-learning is electronic based learning that uses latest technologies to support the delivery of training or education. E-learning as far as reach and access is concerned provides better opportunities for the learner. In addition, if e-learning uses Content and Learner Management System then can provide useful tips for teachers about the learners and usefulness of content. E-learning can also support interactivity.

Some of the key requirements for a good e-learning system are:

- A successful e-learning system depends on good student interaction, self motivation of individuals.
- A student has to study in an effective manner. This is essential as there is no teacher to motivate or drive the student.

Advantages of E-learning:

- Affordability: The cost of e-learning is one of its main advantages.
- It improves the IT skills of individuals and may improve their time management skills.
- Flexibility: Users are able to access educational content from anywhere with an internet connection. This means that students can continue their learning even if they are traveling or living in remote locations. The level of participation of student in learning may improve as it provides anytime, anywhere learning.
- Self-placed learning: E-learning gives students and workers the freedom to learn at their own pace, which can be useful for those who have varied learning preferences or have difficulty with a specific subject. Students can access educational materials and complete assignments via eLearning at their convenience and on their own timetable. Students can tailor their learning around their work and other responsibilities.
- It promotes active and independent learning.
- Through discussion boards and chats, one can interact with everyone online and also clear your doubts if any.
- The video instructions that are provided for audio and video learning can be rewound and seen and heard again and again if we do not happen to understand the topic.

Disadvantages of e-learning:

* The authenticity of a particular student's work is also a problem as online just about anyone can do a project rather than the actual student itself.

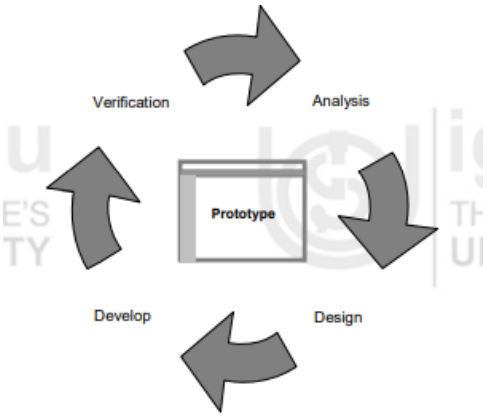
* The face-to-face learning experience is missing in e-learning. This can be a problem for those who learn better when they can work together with other students on the same subject.

* The interactive support that requires teacher at the other end may still be available in slotted time only. In traditional method, trainees can ask their trainers lots of questions and get immediate answers. On the other hand, in case of e-learning, the trainers usually work within their working hours and those trainees who learn out of these working hours may not be able to get an immediate response to their questions.

* E-learning requires reliable internet access and electronic devices which can be a challenge for some learners.

Steps for creating E-learning content:

Different steps in content development process are:



Analysis Phase: Analysis requires identifying the learning objectives for the development of content for the target audience. This phase also lists the financial, technological and time constraints for the e-learning project. It also enables identification of the gap between the expected knowledge of the target audience and what they should know after going through the course. This facilitates the design phase.

Design Phase: In most organizations the design phase involves the development of a storyboard that may include a concept flow, text, graphics, video, audio, animation if needed. In this phase you may also design the basic questions that must be answered by the learner after going through the learning content. This step may also design the interface and interactivity.

Implementation Phase: Implementation phase brings the design to live course material. You may take the help of various experts for this phase including content expert, graphic expert, interaction designer, web designer etc.

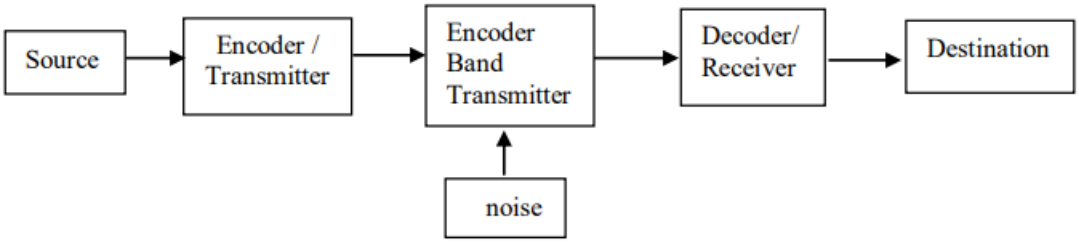
Verification Phase: during the Verification phase the contents so produced can be tested to determine if it is conveying what it is expected to convey. It may also be used to check the usability features of the product.

2.

(a) What is data communication ? Explain data communication process with the help of a diagram. 7

Ans: Data communication is the process of transferring data from one place to another or between two locations. It allows electronic and digital data to move between two networks. The most important factors affecting the transfer of a signal over a medium are noise and attenuation. Noise is the external disturbances whereas attenuation is defined as degeneration of the signal. It is a process in which more than one computer transfers information, instructions to each other and for sharing resources.

Data communication process:



The communication system essentially consists of five parts:

i) Source
ii) An encoder
iii) The channel
iv) The Decoder
v) The destination

Data communication is the process of transferring data from one point to another. In computers, this is done between two device over a transmission media. Sender is a device that sends data messages. It can be a computer, mobile, telephone, laptop etc. This data is converted from digital form to analog form, which can be transmitted over a communication channel by an encoder. The processing might include, for example, any combination of modulation (discussed in later section), data reduction and insertion of

redundancy to combat the channel noise. Channel is the medium for transmitting signals from transmitter to receiver. It may be a telephone line, a high frequency radio link, a space communication link or a storage medium. A channel is usually subject to various types of noise disturbances, which on telephone line, for example, might take the form of a time-varying frequency response, crosstalk from other lines, thermal noise, and impulsive switching noise. Then, the decoders convert an analog signal into digital data, which can then be processed by the destination. The digital data is then accepted by the destination. Destination is the receiver. It can be a computer, telephone, mobile etc.

For example:

Suppose a student computer is connected through a modem to a telephone line. If she/he wants to send a file to his/her friend over a communication system, his/her computer is the source, the modem converts his digital file into analog signal that can be transmitted over the telephone line to the receiver's modem which at its end converts the signal back to the digital signal. The digital data then is accepted by the destination computer.

(b) What is a device driver ? Are device drivers hardware dependent ? Justify your answer. List four devices which require device drivers. 6

Ans: Device drivers are shared computer programs that provide an interface between the hardware devices and operating system or other higher level programs.

Device drivers are essential for a computer system to work properly because without a device driver the hardware fails to work accordingly, which means it fails in doing the function/action it was created to do. Instead of writing the same code for a device in multiple applications you share the code between applications. To ensure that the shared code is not compromised, you protect it from users and programs. Such a piece of code is called the device driver.

Device drivers and hardware dependency:

Device drivers are hardware dependent and operating system specific. They allow you to add and remove devices conveniently from your computer system without changing any of the applications using that device.

Devices which require device drivers:

* Keyboards

* Mouse

* Printers

* Graphics cards

(c) What is a subroutine ? Explain the steps of subroutine execution. Write a subroutine to find the sum of two given positive integers. 7

Ans: A subroutine is a type of subprogram, a piece of code within a larger program that performs a specific task and is relatively independent of the remaining code. Another definition is, a set of instructions that are used repeatedly in a program can be referred to as a subroutine. It is also called a procedure, routine or a method. Only one copy of this instruction is stored in the memory. A subroutine has no value associated with its name. All outputs are defined in terms of arguments; there may be any number of outputs.

subroutine to find the sum of three numbers:

```
SUBROUTINE sub1(a,b,c,sum)

REAL a,b,c,sum

Sum=a+b+c

RETURN

END
```

The following steps take place during the execution of subprograms:

1) Temporarily halt the execution of the calling program i.e main program.

2) Execute subprogram.

3) Resume execution of the calling program at the point immediately following the call of the subprogram.

subroutine to find the sum of two given positive integers:

```
SUBROUTINE sub1(a,b)

Int c,sum

sum=a+b

RETURN sum

END
```

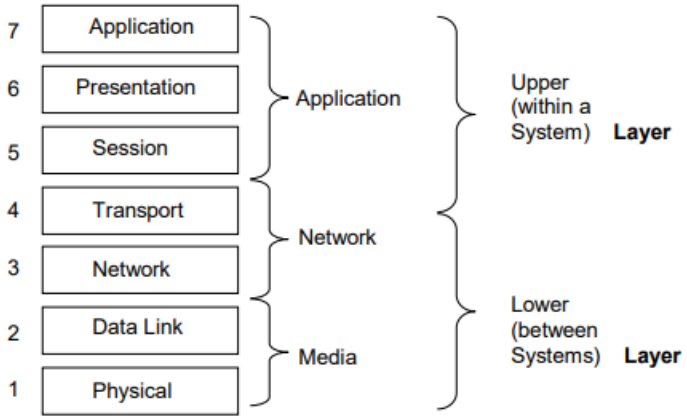
3.

(a) Explain OSI reference model of computer network. 7

Ans: OSI stands for Open Systems Interconnection. It was developed by ISO (International Organization for Standardization) in 1984. The OSI model is an abstract description for layered communications and computer network protocol design open system means that it can communicate with any other system that follows the specified standards, formats and semantics. Protocols specify how the different parties may communicate. It is a seven-layer architecture with each layer having specific functionality to perform. All these 7 layers work together to transmit data from one person to another across the globe. It is also referred to as the OSI Seven Layer Model.

A layer is a collection of conceptually similar functions that provide services to the layer above it and receives service from the layer below it. On each layer an instance provides services to the instances at the layer above and requests service from the layer below

The following are the layers of OSI model:



The OSI model is divided into two layers: upper layers and lower layers.

The upper layer of the OSI model mainly deals with the application related issues, and they are implemented only in the software. The application layer is closest to the end user. Both the end user and the application layer interact with the software applications.

The lower layer of the OSI model deals with the data transport issues. The data link layer and the physical layer are implemented in hardware and software. The physical layer is the lowest layer of the OSI model and is closest to the physical medium. The physical layer is mainly responsible for placing the information on the physical medium.

In its most basic form, it divides network architecture into seven layers which from top to bottom are the Application, Presentation, Session, Transport, Network, Data Link, and Physical Layers. In transmission side data flows from layer 7 to layer 1, then to cabling or suitable medium. When data reaches the reception side, it flows from layer 1 to layer 7.

Application Layer:It is the top-most layer of the OSI reference model. This layer is the layer for user interaction. We must have application software for dealing with the data.

Presentation Layer: It converts the data into suitable format. It does tasks like compression, decompression, encryption and decryption.

Session Layer: This layer manages connections between different application layers. This layer is responsible for the establishment of connection, maintenance of sessions, and authentication and ensures security.

Transport Layer: The transport layer provides services to the application layer and takes services from the network layer. This layer converts data into segments and reassembles the data stream. TCP and UDP are the protocols used in this layer. In this layer, data is converted into so called segments. It is responsible for the end-to-end delivery of the complete message. The transport layer also provides the acknowledgement of the successful data transmission and re-transmits the data if an error is found.

Network Layer: This layer translates logical address into physical address. This layer also fixes the route for data path. Router works in this layer. In this layer data is called a packet.

Data-Link Layer: This layer provides physical identification of a device using Media Access Control Address. The data link layer is responsible for the node-to-node delivery of the message. The main function of this layer is to make sure data transfer is error-free from one node to another, over the physical layer. It adds source and destination address to packets and convert them into frames. This is the layer that provides error free transmission.

Physical Layer: The lowest layer of the OSI reference model is the physical layer. This layer provides the functional requirements for activating a physical link. In this layer, data is carried from one device to another.

(b) What is a search engine ? Explain three categories of search engines. 8

Ans: A search engine can be defined as a tool to search diverse and disorganized sources of information available on the Internet. It is a software program that helps people find the information they are looking for online using keywords or phrases. Search engines have some automated programs that need to continuously keep visiting the web pages about the content they have and organize the information about web pages in some format. These programs are called spiders, robots, crawlers, wanderers and worms. Search

engines finds, classifies and stores information about the contents of various websites on the Internet.

Search engines are very useful to find information about anything quickly and easily. Using more keywords or different keywords improves the results of searches.

Different types of search engines available are:

a. Primary Search Engines: Such search engines use web crawlers or spiders to traverse the web and scan websites for key words, phrases, to generate database of web pages having some indexing or classification. Google and Alta Vista are examples of primary search engines.

Web directory: Web directories organize information into categories and subcategories or directories. You can search a web directory for all those entries that contain a particular set of keywords. Directories differ from search engines in the way they organize information. Yahoo is an example of web directory.

c. Meta search engines: This type of search engine does not compile databases. Instead, they search various individual search engines simultaneously on behalf of the user and retrieve hits from each of those databases. It passes your queries to many search engines and web directories and presents summarized results to the users. Some of the examples of meta search engines are — Dogpile, Infind, Metacrawler, Metafind and Metasearch.

(c) Explain any five major areas of application of computer systems. 5

Ans:

Banking : When there was no computer, every where manual system was followed which was a very complicated and hard work but now with the arrival of computer, every thing has become much more systematic and easy to use. Every bank is now using a computerized system because it is very fast and user friendly. Personal Computer banking lets us view our bank balance, request transfers between accounts and pay bills electronically. Now-a-days, online banking is getting very popular which offers more convenience and ease to the customers. Computers are used in banks for money transfer, voucher, ledger, bank sheet etc.

Education: Computer applications can be used in education for learning and for instruction. Instruction and learning can be divided into two major areas, teacher centered instruction and student-centered learning. Teacher-centered instruction examined the computer as the object of instruction as well as a tool of instruction and the management of instruction. With the advancement in the Technology and Internet, Online Education, e-learning, m-learning are getting very popular which offers more flexibility and convenience to the learners.

Student-centered learning views the computer as a tool for the student to use and create access, retrieve, manipulate, and transmit information in order to solve a problem. Understanding the concept of the computer as an information tool relies on accepting the fact that the computer is a productivity tool for the student and the teacher alike.

Computers are used widely in all educational research. Educational research includes functions relating to information gathering and processing. The teacher/researcher may examine student performance data in new and revealing ways. Bibliographic citations of studies performed by educators around the world can be acquired and perused by the desktop computer.

There are many uses of computer in schools and colleges e.g. every students details need to be stored so a computer program comes to help in. Multimedia, animations, graphics and charts could be used to teach the students and many boring topics can be made interesting using multimedia. Students could access internet for online help and courses for more information. Computers are used in a variety of ways in the educational field. Computers can be used in school management such as budget, inventory, student records, communications, library circulation, and library public access catalog.

Entertainment : Computers and Internet are a major source of entertainment. It is one of the latest forms of entertainment for the modern society. It allows us to play computer games, listen to music, watch videos and movies etc.

Home: Computers are used at homes for several purposes like online bill payment, watching movies or shows at home, home tutoring, social media access, playing games, internet access, etc. They provide communication through electronic mail. They help to avail work from home facility for corporate employees. Computers help the student community to avail online educational support.

Industry: Computers are used to perform several tasks in industries like managing inventory, designing purpose, creating virtual sample products, interior designing, video conferencing, etc. Online marketing has seen a great revolution in its ability to sell various products to inaccessible corners like interior or rural areas.

4.

(a) What is main memory ? Differentiate among RAM, Semiconductor memories and Cache memory. 7

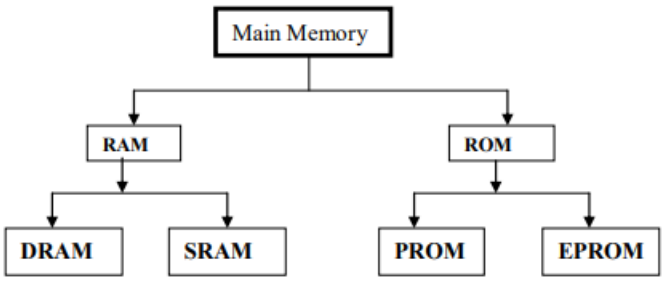
Ans: Main memory is also known as primary memory, semiconductor memory or random-access memory. It is a crucial component of a computer system. It stores programs and data which are currently needed by the CPU. The main memory stores the programs and data required by the CPU for carrying out its operations. The primary (main) storage is a

semiconductor device that is built using integrated circuits. The data is stored in binary form in main memory.

Another part of main memory is Read Only Memory (ROM). ROMs are those memories on which it is not possible to write the data. They can only be read. Thus RAM and ROM memories are used as the main memory of the computer.

Types of main memory :

Main Memory can be of various types like Random Access Memory (RAM) and Read-Only Memory (ROM). The below diagram shows different types of main memory.



RAM(Random Access Memory): The Read and write memory (R/W memory) of a computer is called a RAM. The user can write information into RAM and read information from it. It is called random access since any memory location can be accessed in a random manner for reading and writing. The access time is the same for each memory location. Random Access Memory (RAM) is really the main store and is the place where the program and software we load gets stored.

It usually refers to “temporary” memory, which means that when the system is shut down, the memory is lost.

RAM is further divided into static RAM and Dynamic RAM.

Read Only Memory: A Read-Only memory (ROM) is a non-volatile memory, i.e., the information stored in it is not lost even if the power supply goes off. Thus a Read Only Memory (ROM) is one in which information is stored permanently. , the information from ROM can only be READ and it is not possible to WRITE fresh information to it. It is much cheaper compared to RAMs when produced in large volumes. ROM is used for storing a special set of instruction, which the computer needs when it starts up (boots up). The contents of ROMs are decided by the manufacturers. The contents are permanently stored in a ROM at the time of manufacture.

ROM is further divided into Programmable ROM (PROM) and Erasable PROM.

RAM	Semiconductor memory	Cache Memory
RAM stands for Random Access Memory. It is a memory unit that communicates in a straightforward manner with the CPU. The user can write information into RAM and read information from it. It is called random access since any memory location can be accessed in a random manner for reading and writing.	The semiconductor memory is an electronic, static device. There are no moving parts in it.	Cache Memory is used to store data that is used often so that it can be quickly accessed when needed.
The size of RAM is greater.	It has smaller storage capacity.	The size of cache memory is less.
It is expensive but not as expensive as cache.	It is very expensive.	It is expensive than RAM.
It holds programs and data that are currently executed by the CPU.	It holds the programs and data required by the CPU for carrying out its operations.	It holds frequently used data by the CPU.

(b) What is application software ? How is application software different from system software ? List the names of two application and two system software. 7

Ans: Application software is the set of programs necessary to carry out operations for a specified application. These are programs written by programmers to enable computer to perform a specific task such as inventory control, accounting, railway reservation, billing or any such type of applications in real life. These software are user-oriented applications. Application software enables a non-computing background people to carry out various computer related tasks more effectively and efficiently on a PC.

It is a specific-purpose software. These are usually written in high level language such as C, C++, Java etc.. It acts as an interface between the end-user and system software. A computer system can always run without an application software.

System software	Application software
It is a set of programs which are used to run the system.	Application software is the set of programs necessary to carry out operations for a specified application.

These are programs written by programmers to enable computer to perform a specific task such as inventory control, accounting, railway reservation, billing or any such type of applications in real life.	These are programs written by programmers to enable computer to perform a specific task such as inventory control, accounting, railway reservation, billing or any such type of applications in real life.
It is a general-purpose software.	It is a specific-purpose software.
They are usually written in low-level language such as Assembly language.	These are usually written in high level language such as C, C++, Java etc..
Example for system software is operating system.	Example for application software is media player, calculator etc.
It acts as an interface between the application software and computer hardware.	It acts as an interface between the end-user and system software.
A computer system can't run without system software.	A computer system can always run without an application software.

2 Examples of application software: Media Player, Calculator

2 examples of system software: Operating system, compiler

Some of the examples of application software are:

* media player

* calculator

* Word Processor

* Spreadsheet

* Presentation software

(c) What is wiki ? Explain the characteristics of wiki. Explain the uses of wiki for a university. 7

Ans: Wiki stands for "What I Know Is". Wiki's are a powerful tool for creating collaborative knowledge resources created by the community. A wiki is a page or collection of Web pages designed to create and edit contents. Wiki supports hyperlinks and has simple text syntax for creating new pages. Wiki's are also used to create websites, to enhance the features of community websites and for knowledge management. The collaborative encyclopedia, Wikipedia is one of the best-known wiki's. It contains very large number of articles – all created and moderated by the community. Ward Cunningham developed the first wiki software - WikiWikiWeb in 1995.

Characteristics of Wiki are:

* A wiki invites all registered users to edit any page or to create new pages within the wiki Website.

* Wiki promotes meaningful topic associations between different pages by making page link creation very easy.

* Wiki promotes discussion and also keeps the history of changes of a document.

Documents can be written using a markup language. We can see a wiki page using web browser. Wiki pages are connected through hyperlinks. Therefore, a wiki is database for creating, editing, browsing, and searching through information.

Uses of wiki for a university:

Wiki can be a valuable tool for a university in various ways:

- Collaborative Knowledge Sharing: Wiki platforms allow students, professors and researchers to collaborate and contribute information on various topics. This can lead to a wealth of knowledge being shared among the university community.
- Resource for Coursework: Professors can create and edit wiki pages for their courses, providing students with additional resources, lecture notes, references and study materials. This can enhance the learning experience and help students better understand the subject matter.
- Research Projects: Wiki can be used as a platform for collaborative research projects where students and faculty members can share findings, data and analyses. This can foster a sense of community and cooperation among researchers within the university.
- Documentation and Information Sharing: Universities can use wiki platforms to document policies, procedures and guidelines for students and staff. This can ensure that everyone has access to the most up-to-date information and resources.
- Encouraging critical thinking and writing skills: By contributing to wiki pages, students can develop their critical thinking, research and writing skills. They learn to communicate complex ideas in a clear and concise manner, which is essential for academic and professional success.

5.

(i) Collaborations with the context of Internet

Ans: Collaboration is defined as an act or process of working together on a project or some intellectual activity. Collaboration involves both communication and sharing of ideas.

Some of the important areas where collaboration is useful are physical science, high-energy physics, Health Science, environmental studies etc.

The collaboration helps in sharing of resources. These resources may be your intellectual efforts, hardware computing power or any other form of activity. Collaboration helps in solving complex problem domains by distributing the problems.

Most of the tools used on the internet can be used for some form of collaboration. For example, google docs is one such tool that may enable you to create a collaborative project report online. One can create a document using it and share it with your colleagues who in turn may be able to add content to it from anywhere, edit it and discuss about it using a discussion group.

Another software that can be used for collaboration is Google Wave. It allows you a shared web space for discussion or working together in a group. You may use text, photographs, maps etc. for this purpose. This software also combines collaboration with email, chat, messaging etc.

Other web-based collaboration tools are:

Zoho: Zoho is a division of ZOHO Corporation, a US-based Software Company. Zoho is a very good site for collaboration. It not only allows simple mundane tasks like group editing, document sharing, group chat, etc. but also provides some management tasks like milestone tracking, invoice creation, and other team tasks.

Volunteer Computing: It allows r hardware resources to be used for the purpose of some online project.

(ii) LAN and WAN

Ans:

Local Area Network:

A local area network (LAN) is a collection of devices connected together in one physical location, such as a building, office, or home. A LAN can be small or large, ranging from a home network with one user to an enterprise network with thousands of users and devices in an office or school.

Characteristics of LAN:

- It connects computers in a single building, block or campus, i.e. they work in a restricted geographical area.

- LANs are private networks, not subject to tariffs or other regulatory controls. For the Wireless LANs there are additional regulations in several countries.
- LANs operate at relatively high speed when compared to the typical WAN (.2 to 100 MB /sec).
- There are different types of Media Access Control methods in a LAN, the prominent ones are Bus based Ethernet, Token ring.
- LAN is a low-cost and effective network type capable of connecting multiple devices on a single transmission medium.
- Setting up a LAN network can be done at low costs. If there's a need for expansion, it can be done quickly.

Advantages of LAN:

- It allows sharing of expensive resources such as Laser printers, software and mass storage devices among a number of computers.
- LAN allows for high-speed exchange of essential information.
- It contributes to increased productivity. A LAN installation should be studied closely in the context of its proposed contribution to the long range interest of the organization.
- A LAN connection is relatively inexpensive to set up and maintain.
- The local nature of a LAN also makes troubleshooting quick and cost-effective.
- LAN is very adaptable. You can add or remove devices, move printers and computers to different areas of the building, and modify user information for existing devices with minimum hassle.

Disadvantage of LAN :

Some type of security system must be implemented if it is important to protect confidential data. The security may be further low if it is a wireless LAN.

Wide Area Network:

Wide Area Network is a network system connecting cities, countries or continents, a network that uses routers and public communications links. The largest and most well-known example of a WAN is the Internet.

WANs are used to connect LANs and other types of networks together, so that users and computers in one location can communicate with users and computers in other locations. Many WANs are built for one particular organization and are private.

WANs are often built using leased lines. At each end of the leased line, a router connects to the LAN on one side and a hub within the WAN on the other. Leased lines can be very expensive. Instead of using leased lines, WANs can also be built around public network or Internet.

Characteristics of WAN:

1) It generally covers large distances (states, countries, continents).

2) Communication medium used are satellite, public telephone networks which are connected by routers.

3) Routers forward packets from one to another on a route from the sender to the receiver.

(iii) Basic Storage devices

Ans:

Some of the basic storage devices are :

Hard disk drives : Hard disks are on-line storage devices. This means that the device (hard-disk) is permanently connected to the computer system and when the computer is on, the device (hard-disk) is available to store information or to retrieve information. HDD stores programs, data, operating system, compiler, assemblers, application programs etc. HDD contains magnetic disks, access arms and read/write heads into a sealed, air filtered enclosure. This technique is known as Winchester technique. Winchester disk is another name for “hard disk drive”. The read/write head reads data from the disk and writes data to the disk. A disk is mounted (or stacked) on the disk drive, which has the motor that rotates it. Hard disks together with read/write heads, access mechanism and driving motor constitute a unit called hard-disk-drive (HDD) unit. The whole unit is fixed. Hard disk is also known as platter. It can not be removed or inserted into a HDD unit. To increase the storage capacity several hard-disks (platters) are mounted (stacked) vertically, normally at a distance of an inch. This is known as disk pack or multi-platter configuration. A set of corresponding tracks in all surfaces of a disk pack (i.e. the tracks with the same diameter on the various surfaces) is called a cylinder (see Figure 3.13). Here the concept of cylinder is very important because data stored on the same cylinder can be retrieved much faster than if it were distributed among different cylinders.

Pen Drive: It is a convenient and flexible data storage medium which can store up to 256 GB data. It can be used for the same purposes as floppy-disks or CD-ROMs. Pen Drives are a smaller, faster, durable and more reliable storage medium. It is a portable USB flash

memory device. It is integrated with a Memory System USB (Universal Serial Bus) interface. It can be used to quickly transfer data from one system to another. The pen drive derives its name from the fact that many of these devices resemble a small pen or pencil in shape and size. Flash drives implement the USB mass storage device class so it is possible for modern operating systems to read and write from them without installing the device driver software.

Magnetic Tapes : A Magnetic tape is a sequential access type secondary storage device. It is used for backups in servers, workstations, and large computers. The main advantages of magnetic tapes are that they are cheaper and since these are removable from the drive, they provide unlimited storage capacity (20 GB to 150 GB). The read/write heads of magnetic tape drives record data in the form of magnetized spots on the iron oxide coating of the plastic tape. The main drawback of magnetic tapes is that they store information sequentially. A file or some particular information stored on a magnetic tape cannot be accessed directly on random basis as is possible in the case of hard-disks or floppy disks. These devices are slower, but due to their low cost, they are still widely used for massive data warehouse and other business storage requirements. The storage capacity of a tape is measured by multiplying its length and data recording density.

Optical Memories : Optical memories or Optical disks are alternate mass storage devices with huge capacity (up to 20 GB). Information is written to or read from an optical disk using a laser beam. Only one surface of an optical disk is used to stored data. An optical disk is relatively inexpensive. The main draw back of the optical disk system is its slow average access time. These include: CD-ROM, WORM (Write Once Read Many), DVD-ROM, DVD-R etc.

(iv) Disk Management

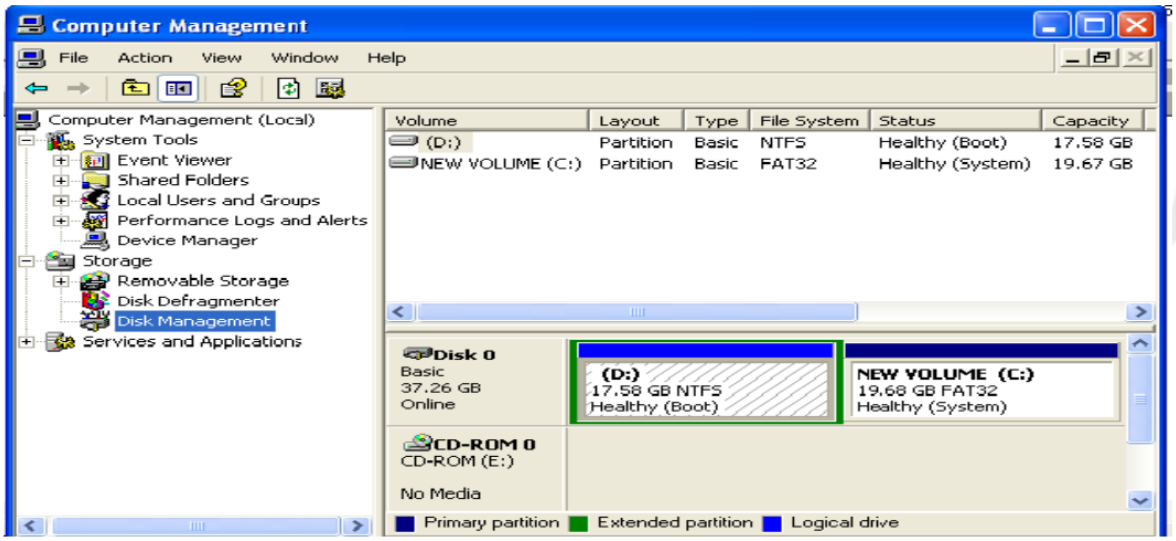
Ans: Disk Management is a tool used to manage system disks and their partitions locally or remotely. With disk management utility we can perform most disk related tasks such as initialization of disks, creation of volumes, formatting volumes, etc. it allows one to create fault-tolerant disk systems. Disk management is easy to use and its user interface and wizards allow us to carry out various disk related functions very efficiently.

How to open Disk Management:

1. Click My Computer, and then open Control Panel. Click Administrative Tools, and then double-click Computer Management.
2. In the console tree, click Storage and then click Disk Management.

You can also open Disk Management in following way :

1. Click Start, then click Run, type compmgmt.msc, and then click OK.
2. In the console tree, click Disk Management. The Disk Management window appears.



In Disk Management window, the upper section displays lists of all the partitions in the disk, and the bottom section contains the graphical representation of the drives in the computer.

(v) Computer Virus

Ans: Computer Virus:

It is a small software program that is designed to enter a computer without users permission or knowledge, to interfere with computer operation and to spread from one computer to another. A computer virus needs to attach itself to a document or program to infect other computers or programs. There are various types of computer virus that can be classified by their origins, techniques of attack, modes of spreading, forms of infections, hiding locations and the kind of damage caused. Examples of computer viruses are: Randex, Melissa.A and Trj.Reboot.

(vi) Software Licensing

Ans: Until early 1970‘s, sharing of software was the accepted norm. In late 1960‘s, the situation changed after the software cost increased and manufacturers started to unbundle the software and hardware. Copyright was used by companies to impose restrictions on programmers.

Software licensing governs the usage and redistribution of software. Software licensing is the underlying technology and process that enables software suppliers and device manufacturers to monetize and protect their products and services. A software license establishes rules of used and outlines any restrictions that may apply.

Types of software licensing:

The licensing type generally depends on whether the software is open source software, is meant for individual use or enterprise wide commercial use:

Individual license: allows you to install the software only on a single stand alone machine. It may be a perpetual license or Subscription based. Perpetual license allows you to install and use the software indefinitely. Subscription based license allows you to use the license for the specified time, after which you may renew the subscription or remove the software.

Open Source License: It grants you the right to freely modify and redistribute the software.

Commercial License: These are mostly for the large enterprises that use software for commercial purposes.

Following are the main licensing models:

Traditional model : This includes single user-single license, multi users-shared license, temporary or fixed-period licenses. This has mostly been used for large proprietary mainframe applications.

Transaction-based model : The pricing is based on providing a committed business service, for ex, processing payroll for a global company as part of HR offering and this can be priced per employee. Larger the employee base at a given location, lower the price / employee can be. This model came into existence with the evolution of software architecture from mainframes to internet based.

Rental model : This has come into picture as Software as a Service (SaaS) and Platform as a Service (PaaS) models have evolved over a period of time. Here, the buyer need not need make upfront investment in hardware and software, rather these come as bundled service to them.

Technology Partnerships : Such agreements provide the consumer unlimited access to vendor‘s technology. Such contracts are typically multi-year in nature where the consumer pays a fixed annual fee, which can be adjusted in the subsequent years based on the actual usage.

(vii) Object Oriented Language

Ans: Object oriented language (OOl) is a high-level language that implements objects and their associated procedures within the programming context to create software programs. The popular object-oriented languages are Java, C#, PHP, Python, C++ etc.

It is a paradigm that provides many concepts such as inheritance, data binding, polymorphism etc.

It is the most popular programming model among developers. It is well suited for programs that are large, complex and actively updated or maintained.

The OOPs concept includes the following:

* Object: It is a basic unit of Object-Oriented Programming and represents the real-life entities. An object is a real-world entity that has attributes, behavior and properties. It is referred to as an instance of the class. It occupies space in the memory.

* Class: A class is a blueprint or template of an object. It is a user-defined data type. Inside a class, we define variables, constants, member functions and other functionality. It binds data and functions together in a single unit.

* Inheritance: It is an important pillar of OOP. It is the process by which a new class is created using an existing class. It is a way to compartmentalize and reuse code since it allows classes to inherit commonly used state and behavior from other classes. The new classes are called the derived classed and the main class is called the parent class.

* Data Abstraction: It is one of the most essential and important features of object-oriented programming. Data abstraction refers to providing only essential information about the data to the outside world, hiding the background details or implementations.

Encapsulation: is a mechanism through which a protective wrapper is created to hide the implementation details of the object and the only thing that remains externally visible is the interface of the object. (i.e.: the set of all messages the object can respond to). Encapsulation prevents code and data from being arbitrarily accessed by other code defined outside the wrapper.

* Polymorphism: Polymorphism is the characteristic of being able to assign a different meaning specifically, to allow an entity such as a variable, a function, or an object to have more than one form. It is the ability to process objects differently depending on their data types and to redefine methods for derived classes.