

BHARTIYA SKILL DEVELOPMENT UNIVERSITY JAIPUR

Registration No:

SCHOOL OF COMPUTING SKILLS

END SEMESTER EXAMINATION, WINTER 2018-19

B. VOC. FIRST SEMESTER

ITN 1101 - Introduction to Computers

Time: 3 Hours

Max. Marks: 100

Instructions:

1. Calculator is strictly prohibited.
2. Missing data if any may be suitably assumed.

Section – A Attempt ALL Questions in this Section (20×1)Marks

Q1. Which one of the following is a computer network protocol?

- (A) HTTP
- (B) HTML
- (C) JAVA
- (D) BASIC

represented by which one of the following?

- (A) Control Unit and Arithmetic Logic Unit
- (B) Control Unit and RAM
- (C) Motherboard and Arithmetic Logic Unit
- (D) Control Unit and Mother Board

Q2. Which one of the following languages can be understood by a computer system?

- (A) Machine Language
- (B) Assembly Language
- (C) High-level Language
- (D) None of the Above

Q5. Which one of the following is the decimal equivalent of the binary number 11001?

- (A) 25
- (B) 50
- (C) 12
- (D) 10

Q3. Which one of the following refers to RAM?

- (A) Random Access Memory
- (B) Read Access Memory
- (C) Read Arithmetic Memory
- (D) Random Arithmetic Memory

Q6. Which one of the following is the binary equivalent of the decimal number 368?

- (A) 101110000
- (B) 110110000
- (C) 111010000
- (D) 111100000

Q4. A central processing unit (CPU) consists of two main parts. It is

Q7. The outputs of a logic gate is 1 when all its inputs are at logic 0. The gate is represented by which one of the following?

- (A) NAND or EX-OR
- (B) OR or EX-NOR
- (C) AND or EX-OR
- (D) NOR or EX-NOR

Q8. Which one of the following combinations can be used for making a half adder?

- (A) EX-OR Gate & NOR Gate
- (B) EX_OR Gate & OR Gate
- (C) EX-OR Gate & AND Gate
- (D) Four NAND Gates

Q9. Which one of the following is not the main function of an operating system?

- (A) Device Management
- (B) Memory Management
- (C) File Management
- (D) Time Management

Q10. Which one of the following represents universal gates?

- (A) NAND & NOR
- (B) NAND & OR
- (C) AND & NOR
- (D) AND & OR

Q11. Which one of the following is the 2's complement of 1101101

- (A) 101110
- (B) 111110
- (C) 110010
- (D) 10011

Q12. The information stored in RAM can be accessed in which one of the following ways?

- (A) By the user, number of times
- (B) By the user, only once.
- (C) By the manufacturer, number of times
- (D) By the manufacturer, only once.

Q13. A full added logic circuit will have which one of the following?

- (A) Two inputs and one output.
- (B) Three input and three output.
- (C) Two input and two output.
- (D) Three inputs and two outputs.

Q14. Different components of the motherboard of a PC unit are linked together by sets of parallel electrical conducting lines. Which one of the following represents these lines?

- (A) Conductors
- (B) Buses
- (C) Connectors.
- (D) Consecutives

Q15. Which one of the following memory medium is not used as main memory system?

- (A) Magnetic Core
- (B) Semiconductor
- (C) Magnetic Tape
- (D) Both A and B

Q16. A network of computers that is confined to a relatively small space is represented by which one of the following?

- (A) Wide Area Network

(B) Local Area Network

(C) Global Network

(D) Peer-to-Peer Network

Q17. An integrated circuit is represented by which one of the following?

(A) A Complicated Circuit

(B) (B) An Integrated Device

(C) Much costlier than a single transistor

(D) Fabricated on a tiny silicon chip

Q18. The type of memory for which information does not change on your computer is represented by which one of the following?

(A) RAM

(B) ROM

(C) ERAM

(D) RW/RAM

Q19. Which one of the following represents USB data storage device?

(A) Unlimited Service Band

(B) Unlimited Serial Bus

(C) Universal Serial Bus

(D) Universal Service Bus

Q20. Which of the following memories allows simultaneous read and write operations?

(A) ROM

(B) RAM

(C) EPROM

(D) None of the Above

Section – B Attempt any 06 Questions in this Section (6×5) Marks

Q1. Convert the following numbers to their decimal equivalent:

i) $(2AC)_{16}$

ii) $(FAB)_{16}$

iii) $(562)_8$

iv) $(1101011)_2$

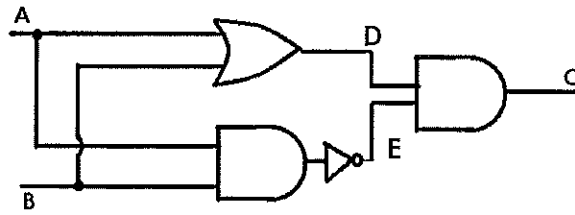
Q2. What are universal gates? Construct a logic circuit using NAND gates only for the expression $x = A.(B + C)$.

Q3. Explain the various generations of computers in detail.

Q4. What is a network protocol? Explain its various functions.

Q5. Explain the working of a SR Flip Flop with the help of a truth table.

Q6. Explain the output of the following logic diagram using a truth table.



Q7. What is an operating system? Explain its various functions in detail.

Q8. What is a software? Explain system software and application software with the help of examples.

Section – C – Answer ALL Questions in this Section (5×10) Marks

Q1. Explain the architecture of OSI model in detail.

Q2. What is a full-adder? Explain a full-adder with the help of truth-table and logic diagram.

Q3. Explain the architecture of 8051 microcontroller with the help of a block diagram.

Q4. Explain computer architecture with the help of a block diagram.

Q5. What are low level, middle level and high level languages? Explain their differences in detail.

ITN 1101 - Introduction to Computers (Sem I)
End Sem Exam (Winter 18-19)

Ans. 1. (A) HTTP

Ans. 2. (A) Machine Language

Ans. 3. (A) Random Access Memory

Ans. 4. (A) Control Unit and Arithmetic Logic Unit

Ans. 5. (A) 25

Ans. 6. (A) 101110000

Ans. 7. (D) NOR or EX-NOR

Ans. 8. (C) EX-OR Gate & AND Gate

Ans. 9. (D) Time Management

Ans. 10. (A) NAND & NOR

Ans. 11. (D) 10011

Ans. 12 (A) By the user, number of times

Ans. 13 (D) Three inputs and Two outputs

Ans. 14. (B) Buses

Ans. 15. (C) Magnetic Tape

Ans. 16. (B) Local Area Network

Ans. 17. (D) Fabricated on a tiny silicon chip

Ans. 18. (B) ROM

Ans. 19. (C) Universal Serial Bus

Ans. 20. (B) RAM

Ans. 1. (i) 684

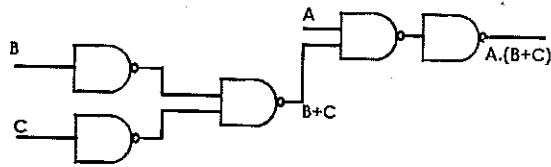
(ii) 4011

(iii) 370

(iv) 107

Ans. 2.

A universal gate is a gate which can implement any Boolean function without need to use any other gate type. The NAND and NOR gates are universal gates. In practice, this is advantageous since NAND and NOR gates are economical and easier to fabricate and are the basic gates used in all IC digital logic families.



Ans3.

- 1) First Generation (1942-1955):
 - Vacuum Tubes Technology used for internal operations.
 - Supported Machine Language only.
 - Very Costly and large space required.
 - Some Computer of this generation were: ENIAC, EDVAC.
- 2) Second Generation (1955 -1964):
 - Transistors Technology used for internal operations.
 - Magnetic Tapes and Disk use for secondary storage device.
 - Some Computer of this generation were: IBM 1620, IBM 1401.
- 3) Third Generation (1964 - 1975):
 - Integrated Circuits (IC)Technology used for internal operations.
 - Reduction in size and cost.
 - Some Computer of this generation were: IBM – 360 series, Honeywell – 6000 series.
- 4) Fourth Generation (1975 - 1989):
 - Large Scale Integration (LSI) and Very Large-Scale Integration (VLSI) Technology are used for internal operations.
 - All the higher-level language like C and C++, DBASE etc. are used in this generation.
 - Some Computer of this generation are: STAR 1000, CRAY -I (Super Computer).
- 5) Fifth Generation (1989 - Present):
 - VLSI and ULSI use for internal operations.
 - Devices based on Artificial Intelligence are still in development.

Ans 4.

A network protocol is a set of established rules that dictates how to format, transmit and receive data so computer network devices -- from servers and routers to endpoints -- can communicate regardless of the differences in their underlying infrastructures, designs or standards.

To successfully send and receive information, devices on both sides of a communication exchange must accept and follow protocol conventions. Support for network protocols can be built into software, hardware or both.

Standardized network protocols provide a common language for network devices. Without them, computers wouldn't know how to engage with each other. As a result, except for specialty networks built around a specific architecture, few networks would be able to function, and the internet as we know it wouldn't exist. Virtually all network end users rely on network protocols for connectivity.

Functions of Protocol:

Addressing

IP packet headers contain addresses that identify the sending computer and the receiving computer. Routers use this information to guide each packet across communication networks and connect the sending and receiving computers.

Reassembly

Internet Protocol keeps track of the way messages between computers are broken into packets. Since most messages are too big to fit in one packet, and since packets aren't sent in any organized order, they must be reassembled as they arrive at the recipient. IP dictates how packets are reassembled into usable messages.

Timeouts

Each IP packet contains a self-destructive counter that limits its lifetime. If a packet's defined lifetime expires, the packet is destroyed so that the Internet doesn't get overloaded with broken packets wandering aimlessly.

Options

IP includes optional features such as allowing the sending computer to decide the path its packets take to get to the receiving computer, to trace the path they take or to include added security in the packets.

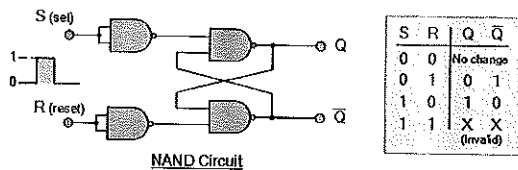
Ans 5.

The **SR flip-flop**, can be considered as one of the most basic sequential logic circuit possible. This simple flip-flop is basically a one-bit memory bistable device that has two inputs, one which will "SET" the device (meaning the output = "1"), and is labelled **S** and one which will "RESET" the device (meaning the output = "0"), labelled **R**.

Then the SR description stands for "Set-Reset". The reset input resets the flip-flop back to its original state with an output **Q** that will be either at a logic level "1" or logic "0" depending upon this set/reset condition.

A basic NAND gate SR flip-flop circuit provides feedback from both of its outputs back to its opposing inputs and is commonly used in memory circuits to store a single data bit. Then the SR flip-flop actually has three inputs, Set, Reset and its current output **Q** relating to its current state or history. The term "Flip-flop" relates to the actual operation of the device, as it can be "flipped" into one logic Set state or "flopped" back into the opposing logic Reset state.

The NAND Gate SR Flip-Flop



Ans 6.

A	B	D	E	C
0	0	0	1	0
0	1j	1	1	1
1	0	1	1	1
1	1	1	0	0

Ans 7.

An operating system is a program on which application programs are executed and acts as an communication bridge (interface) between the user and the computer hardware. The main task an operating system carries out is the allocation of resources and services, such as

allocation of: memory, devices, processors and information. The operating system also includes programs to manage these resources, such as a traffic controller, a scheduler, memory management module, I/O programs, and a file system.

Important functions of an operating System:

Security –

The operating system uses password protection to protect user data and similar other techniques. It also prevents unauthorized access to programs and user data.

Control over system performance –

Monitors overall system health to help improve performance. records the response time between service requests and system response to have a complete view of the system health. This can help improve performance by providing important information needed to troubleshoot problems.

Job accounting –

Operating system Keeps track of time and resources used by various tasks and users, this information can be used to track resource usage for a particular user or group of user.

Error detecting aids –

Operating system constantly monitors the system to detect errors and avoid the malfunctioning of computer system.

Coordination between other software and users –

Operating systems also coordinate and assign interpreters, compilers, assemblers and other software to the various users of the computer systems.

Memory Management –

The operating system manages the Primary Memory or Main Memory. Main memory is made up of a large array of bytes or words where each byte or word is assigned a certain address. Main memory is a fast storage and it can be accessed directly by the CPU. For a program to be executed, it should be first loaded in the main memory. An Operating System performs the following activities for memory management:

It keeps tracks of primary memory, i.e., which bytes of memory are used by which user program. The memory addresses that have already been allocated and the memory addresses of the memory that has not yet been used. In multi programming, the OS decides the order in which process are granted access to memory, and for how long. It Allocates the memory to a process when the process requests it and deallocates the memory when the process has terminated or is performing an I/O operation.

Processor Management –

In a multi programming environment, the OS decides the order in which processes have access to the processor, and how much processing time each process has. This function of OS is called process scheduling. An Operating System performs the following activities for processor management.

Keeps tracks of the status of processes. The program which perform this task is known as traffic controller. Allocates the CPU that is processor to a process. De-allocates processor when a process is no more required.

Device Management –

An OS manages device communication via their respective drivers. It performs the following activities for device management. Keeps tracks of all devices connected to system. designates a program responsible for every device known as the Input/Output controller. Decides which process gets access to a certain device and for how long. Allocates devices in an effective and efficient way. Deallocates devices when they are no longer required.

File Management –

A file system is organized into directories for efficient or easy navigation and usage. These directories may contain other directories and other files. An Operating System carries out the following file management activities. It keeps track of where information is stored, user access settings and status of every file and more... These facilities are collectively known as the file system.

Ans. 8.

Software, in its most general sense, is a set of instructions or programs instructing a computer to do specific tasks. Software is a generic term used to describe computer programs. Scripts, applications, programs and a set of instructions are all terms often used to describe software.

System software is a type of computer program that is designed to run a computer's hardware and application programs. If we think of the computer system as a layered model, the system software is the interface between the hardware and user applications. The operating system (OS) is the best-known example of system software. The OS manages all the other programs in a computer.

Other examples of system software include:

The BIOS (basic input/output system) gets the computer system started after you turn it on and manages the data flow between the operating system and attached devices such as the hard disk, video adapter, keyboard, mouse and printer.

The boot program loads the operating system into the computer's main memory or random access memory (RAM).

An assembler takes basic computer instructions and converts them into a pattern of bits that the computer's processor can use to perform its basic operations.

A device driver controls a particular type of device that is attached to your computer, such as a keyboard or a mouse. The driver program converts the more general input/output instructions of the operating system to messages that the device type can understand.

Application software, or simply applications, are often called productivity programs or end-user programs because they enable the user to complete tasks, such as creating documents, spreadsheets, databases and publications, doing online research, sending email, designing graphics, running businesses, and even playing games! Application software is specific to the task it is designed for and can be as simple as a calculator application or as complex as a word processing application. When you begin creating a document, the word processing software has already set the margins, font style and size, and the line spacing for you. But you can change these settings, and you have many more formatting options available. For example, the word processor application makes it easy to add color, headings, and pictures or delete, copy, move, and change the document's appearance to suit your needs.

Ans. 1

The OSI model is a seven layer architecture. It defines seven layers or levels in a complete communication system. They are:

OSI Model Layer 1: The Physical Layer

Physical Layer is the lowest layer of the OSI Model.

It activates, maintains and deactivates the physical connection.

It is responsible for transmission and reception of the unstructured raw data over network.

Voltages and data rates needed for transmission is defined in the physical layer.

It converts the digital/analog bits into electrical signal or optical signals.

Data encoding is also done in this layer.

OSI Model Layer 2: Data Link Layer

Data link layer synchronizes the information which is to be transmitted over the physical layer.

The main function of this layer is to make sure data transfer is error free from one node to another, over the physical layer.

Transmitting and receiving data frames sequentially is managed by this layer.

This layer sends and expects acknowledgements for frames received and sent respectively. Resending of non-acknowledgement received frames is also handled by this layer.

This layer establishes a logical layer between two nodes and also manages the Frame traffic control over the network. It signals the transmitting node to stop, when the frame buffers are full.

OSI Model Layer 3: The Network Layer

Network Layer routes the signal through different channels from one node to other.

It acts as a network controller. It manages the Subnet traffic.

It decides by which route data should take.

It divides the outgoing messages into packets and assembles the incoming packets into messages for higher levels.

OSI Model Layer 4: Transport Layer

Transport Layer decides if data transmission should be on parallel path or single path.

Functions such as Multiplexing, Segmenting or Splitting on the data are done by this layer

It receives messages from the Session layer above it, convert the message into smaller units and passes it on to the Network layer.

Transport layer can be very complex, depending upon the network requirements.

Transport layer breaks the message (data) into small units so that they are handled more efficiently by the network layer.

OSI Model Layer 5: The Session Layer

Session Layer manages and synchronizes the conversation between two different applications.

Transfer of data from source to destination session layer streams of data are marked and are resynchronized properly, so that the ends of the messages are not cut prematurely and data loss is avoided.

OSI Model Layer 6: The Presentation Layer

Presentation Layer takes care that the data is sent in such a way that the receiver will understand the information (data) and will be able to use the data.

While receiving the data, presentation layer transforms the data to be ready for the application layer.

Languages(syntax) can be different of the two communicating systems. Under this condition presentation layer plays a role of translator.

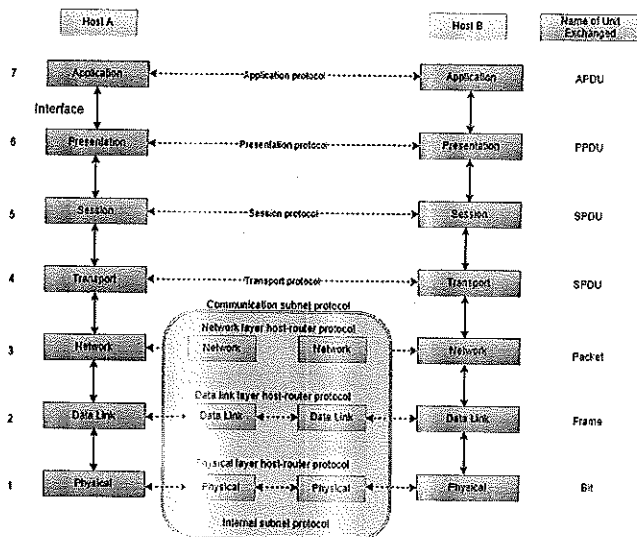
It performs Data compression, Data encryption, Data conversion etc.

OSI Model Layer 7: Application Layer

Application Layer is the topmost layer.

Transferring of files disturbing the results to the user is also done in this layer. Mail services, directory services, network resource etc are services provided by application layer.

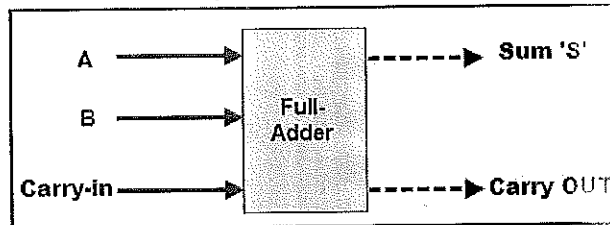
This layer mainly holds application programs to act upon the received and to be sent data.



Ans. 2

Full Adder

This adder is difficult to implement than a half-adder. The difference between a half-adder and a full-adder is that the full-adder has three inputs and two outputs, whereas half adder has only two inputs and two outputs. The first two inputs are A and B and the third input is an input carry as C-IN. When a full-adder logic is designed, you string eight of them together to create a byte-wide adder and cascade the carry bit from one



adder to the next.

Full Adder

The output carry is designated as C-OUT and the normal output is designated as S.

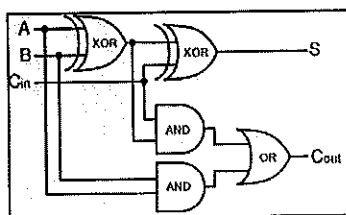
Full Adder Truth Table:

INPUTS			OUTPUT	
A	B	C-IN	C-OUT	S
0	0	0	0	0
0	0	1	0	1
0	1	0	0	1
0	1	1	1	0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

Full Adder Truth Table

With the truth-table, the full adder logic can be implemented. You can see that the output S is an XOR between the input A and the half-adder, SUM output with B and C-IN inputs. We take C-OUT will only be true if any of the two inputs out of the three are HIGH.

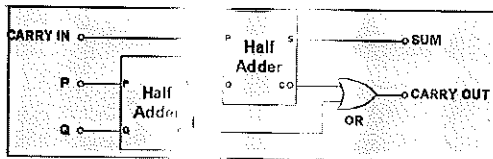
So, we can implement a full adder circuit with the help of two half adder circuits. At first, half adder will be used to add A and B to produce a partial Sum and a second half adder logic can be used to add C-IN to the Sum produced by the first half adder to get the final S output.



Full Adder Logic Circuit

If any of the half adder logic produces a carry, there will be an output carry. So, COUT will be an OR function of the half-adder Carry outputs. Take a look at the implementation of the full adder circuit shown below.

The implementation of larger logic diagrams is possible with the above full adder logic a simpler symbol is mostly used to represent the operation. Given below is a simpler schematic representation of a one-bit full adder.



Full Adder Design Using Half Adders

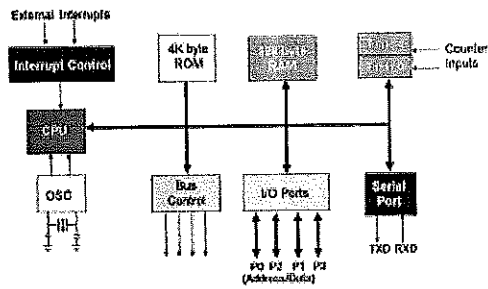
With this type of symbol, we can add two bits together, taking a carry from the next lower order of magnitude, and sending a carry to the next higher order of magnitude. In a computer, for a multi-bit operation, each bit must be represented by a full adder and must be added simultaneously. Thus, to add two 8-bit numbers, you will need 8 full adders which can be formed by cascading two of the 4-bit blocks.

Combinational circuit combines the different gates in the circuit for example encoder, decoder, multiplexer and demultiplexer. Characteristics of combinational circuits are as follows.

- The output at any instant of time, depends only on the levels present at input terminals.
- It does not use any memory. The previous state of input does not have any effect on the present state of the circuit.
- It can have a number of inputs and m number of outputs.

The relationship between the Full-Adder and the Half-Adder is half adder produces results and full adder uses half adder to produce some other result. Similarly, while the Full-Adder is of two Half-Adders, the Full-Adder is the actual block that we use to create the arithmetic circuits.

Ans 3.



CPU (Central Processor Unit):

As you may be familiar that Central Processor Unit or CPU is the mind of any processing machine. It scrutinizes and manages all processes that are carried out in the Microcontroller. User has no power over the functioning of CPU. It interprets program printed in storage space (ROM) and carries out all of them and do the projected duty. CPU manages different types of registers in 8051 microcontroller.

Interrupts:

As the heading put forward, Interrupt is a sub-routine call that reads the Microcontroller's key function or job and helps it to perform some other program which is extra important at that point of time. The characteristic of 8051 Interrupt is extremely constructive as it aids in emergency cases. Interrupts provides us a method to postpone or delay the current process, carry out a sub-routine task and then all over again restart standard program implementation.

The Micro-controller 8051 can be assembled in such a manner that it momentarily stops or break the core program at the happening of interrupt. When sub-routine task is finished then the implementation of core program initiates automatically as usual. There are 5 interrupt supplies in 8051 Microcontroller, two out of five are peripheral interrupts, two are timer interrupts and one is serial port interrupt.

Memory:

Micro-controller needs a program which is a set of commands. This program enlightens Microcontroller to perform precise tasks. These programs need a storage space on which they can be accumulated and interpret by Microcontroller to act upon any specific process. The memory which is brought into play to accumulate the program of Microcontroller is recognized as Program memory or code memory. In common language it's also known as Read Only Memory or ROM.

Microcontroller also needs a memory to amass data or operands for the short term. The storage space which is employed to momentarily data storage for functioning is acknowledged as Data Memory and we employ Random Access Memory or RAM for this principle reason. Microcontroller 8051 contains on-chip memory for program memory 4K so that it has 4KB Rom and it also comprise of data memory (RAM) of 256 bytes.

Bus:

Fundamentally bus is a group of wires which functions as a communication canal or mean for the transfer Data. These bus is comprise of 8, 16 or more cables. As a result, a bus can bear 8 bits, 16 bits all together. There are two types of buses:

Address Bus: Microcontroller 8051 consists of 16 bit address bus. It is brought into play to address memory positions. It is also utilized to transmit the address from Central Processing Unit to Memory.

Data Bus: Microcontroller 8051 comprise of 8 bits data bus. It is employed to cart data.

Oscillator:

As we all make out that Microcontroller is a digital circuit piece of equipment, thus it needs timer for its function. For this function, Microcontroller 8051 consists of an on-chip oscillator which toils as a time source for CPU (Central Processing Unit). As the productivity thumps of oscillator are steady as a result, it facilitates harmonized employment of all pieces of 8051 Microcontroller. **Input/output Port:** As we are acquainted with that Microcontroller is employed in embedded systems to manage the functions of devices.

Thus to gather it to other machinery, gadgets or peripherals we need I/O (input/output) interfacing ports in Micro-controller. For this function Micro-controller 8051 consists of 4 input/output ports to unite it to other peripherals. **Timers/Counters:** Micro-controller 8051 is incorporated with two 16 bit counters & timers. The counters are separated into 8 bit registers. The timers are utilized for measuring the intervals, to find out pulse width etc.

Ans. 4.

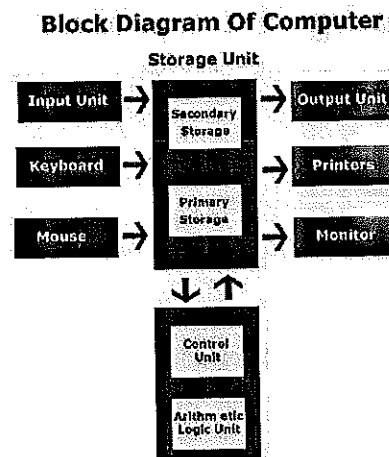
The Computer system consists of mainly three types that are central processing unit (CPU), Input Devices, and Output Devices. The Central processing unit (CPU) again consists of ALU (Arithmetic Logic Unit) and Control Unit. The set of instruction is presented to the computer in the form of raw data which is entered through input devices such as keyboard or mouse.

Later this set of instruction is processed with the help of CPU, and the computer system Produce an Output with the help of Output Devices mainly Printers and monitors. Large amount of data is stored in the computer memory with the help of primary and secondary storage devices temporarily and permanently. This are called as storage devices

The CPU is the heart | Brian of a computer because without the necessary action taken by the CPU the user cannot get the desired output. The central Processing unit [CPU] is responsible for processing all the Instruction which is given to computer system or PC. Below Block Diagram of Computer and Its Components are mentioned for Better Understanding

The Basic components & parts of computer system are :

- Input
- CPU
- ALU



Unit

- Output Unit
(Central Processing Unit)
- Storage Unit
(Arithmetic Logic Unit)
- Control Unit

Input Unit

Input unit connects the external environment with internal computer system. It provides data and instructions to the computer system. Commonly used input devices are keyboard, mouse, magnetic tape etc.

Input unit performs following tasks:

Accept the data and instructions from the outside environment.

Convert it into machine language.

Supply the converted data to computer system.

Output Unit

It connects the internal system of a computer to the external environment. It provides the results of any computation, or instructions to the outside world. Some output devices are printers, monitor etc.

Storage Unit

This unit holds the data and instructions. It also stores the intermediate results before these are sent to the output devices. It also stores the data for later use.

The storage unit of a computer system can be divided into two categories:

Primary Storage: This memory is used to store the data which is being currently executed. It is used for temporary storage of data. The data is lost, when the computer is switched off. RAM is used as primary storage memory.

Secondary Storage: The secondary memory is slower and cheaper than primary memory. It is used for permanent storage of data. Commonly used secondary memory devices are hard disk, CD etc.

Arithmetic Logical Unit

All the calculations are performed in ALU of the computer system. The ALU can perform basic operations such as addition, subtraction, division, multiplication etc. Whenever calculations are required, the control unit transfers the data from storage unit to ALU. When the operations are done, the result is transferred back to the storage unit.

Control Unit

It controls all other units of the computer. It controls the flow of data and instructions to and from the storage unit to ALU. Thus it is also known as central nervous system of the computer.

CPU

It is Central Processing Unit of the computer. The control unit and ALU are together known as CPU. CPU is the brain of computer system. It performs following tasks:

It performs all operations.

It takes all decisions.

It controls all the units of computer.

Ans.5.

Programming languages can be divided into three broad categories. These are High-Level, Middle-Level and Low-Level languages. These three types of languages are different based on various characteristics.

High level refers to programming languages that are written in a way that can be understood by a human. They are independent and programmers don't need to have any prior knowledge of the hardware in which the program will be used. Examples of high-level programming languages include C++ and Python.

Middle-level languages serve as a bridge between the hardware and programming layer of a computer. They operate within the abstraction layer of a computer. On the other hand, low-level languages are written to meet the needs of particular computer architecture and hardware requirements.

In this article, we are going to highlight key differences between high level, middle level, and low-level programming languages.

1. Speed

In terms of speed, programs written in low-level languages are faster than those written in middle and high-level languages. This is because these programs do not need to be interpreted or compiled. They interact directly with the registers and memory.

On the other hand, programs written in a high-level language are relatively slower. The main reason for this is they are written in human language. This means that the computer is forced to translate and interpret them into machine language before it executes them. All these processes are time-consuming.

The speed of the mid-level language is in between the high and low-level languages. It is neither too high nor too low.

2. Memory requirement

This is another parameter that we can use to differentiate these three types of languages. Low-level languages are very efficient in terms of memory. They consume less memory.

This is very different from high-level languages which are known for being memory-intensive. They consume a lot of memory especially when we consider that the fact that these languages still have to use a specific runtime environment. The memory-efficiency of medium level programming languages is not that high as compared to the ones of high-level languages.

3. Ease of use

Low-level languages are friendly to the machines but unfriendly to the human programmers. As a human programmer, it is quite hard to deal with binaries and mnemonics. The fact that each instruction is designed for a specific computer architecture makes the language more technical. In contrast, high-level languages are difficult to learn.

On the other hand, low-level languages are human-friendly. They consist of English statements which are easy to learn and memorized with ease. This explains why they are the most popular type of programming language.

4. Portability

In this context, the term portability refers to the ability of a language to be used in different computers. Low-level programming languages are less portable. This is because their instructions are machine-dependent. This simply means that each instruction is written for a particular machine. The codes for a particular machine cannot run in another computer architecture.

High-level languages are machine independent. One code can be used on a different machine and even on a different architecture without any difficulties. This means that high-level programming languages are highly portable. You can transfer a program written in a high-level language from one environment to another and it will still work.

5. Abstraction

In this context, abstraction refers to the relationship between the language with computer hardware. It is minimal or even zero abstraction between low-level languages with computer hardware. These languages interact seamlessly with the computer memory and register.

The gap between mid-level languages and hardware is quite significant. It is bigger than that of low-level languages but smaller than the one with high-level languages.

As expected, high-level languages have the maximum level of abstraction. This is because they operate from the topmost level of a computer where there is minimal interaction with hardware.

As you can see, there are clear differences between high level, mid-level, and low-level programming languages. We can also point out that each type of programming language is designed to serve its specific purpose. For this reason, we cannot recommend one type of programming over the other.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY JAIPUR

Registration No:

**SCHOOL OF COMPUTING SKILLS
END SEMESTER EXAMINATION, WINTER 2018-19**

B. VOC. FIRST SEMESTER

ITN1102 Computer Assembling & Peripheral Installation

Time: 3 Hours

Max. Marks: 100

Section-A Attempt all Questions in this Section

20x1 Marks

1. In which one of the following locations are the 1st computer instructions available on boot up?

- A. ROM BIOS
- B. CPU
- C. boot.ini
- D. CONFIG.SYS

2. In a network interface card, the term 10/100 refers to which one of the following?

- A. protocol speed
- B. a fiber speed
- C. megabits per seconds
- D. minimum and maximum server speed

3. Which one of the following Motherboard form factor uses one 20 pin connector?

- A. ATX
- B. AT
- C. BABY AT
- D. All of the above

4. A hard disk is divided into tracks which are further subdivided into which one of the following ?

- A. clusters
- B. sectors
- C. vectors
- D. heads

5. PCs give a single beep on boot up to indicate they are ok hardware wise. You boot your PC and don't get a beep. Which one of the following should you check first?

- A. System board
- B. RAM
- C. Speaker
- D. power supply

6. Which one of the following peripheral port provides the FASTEST throughput to laser printers?

- A. RS-232
- B. SCSI
- C. Parallel
- D. Serial

7. Which one of the following is the cause when the mouse pointer moves erratically?

- A. ball is dirty
- B. is not connected
- C. driver is not installed properly
- D. has an incorrect IRQ setting

8. The 40-pin connection on an I/O card is for which one of the following?

- A. Floppy drive
- B. SCSI drive
- C. IDE drive
- D. Zip drive

9. Which one of the following part of the laser printer should NOT be exposed to sunlight?

- A. Transfer corona assembly
- B. PC drum

- C. Primary corona wire
- D. Toner cartridge

10. Which one of the following voltage does a Pentium system use?

- A. +12 volts
- B. +5 volts
- C. +8 volts
- D. +3.3 volts

11. Which one of the following is not a primary storage device?

- A. Magnetic tape
- B. Magnetic disk
- C. Optical disk
- D. None of the above

12. Microprocessors can be used to make which one of the following?

- A. Computer
- B. Digital systems
- C. Calculators
- D. All of the above

13. Which one of the following is a temporary primary memory?

- A. PROM
- B. RAM
- C. EPROM
- D. ROM

14. Which one of the following is full form for CD-ROM

- A. Compactable Read Only Memory
- B. Compact Data Read Only Memory
- C. Compactable Disk Read Only Memory
- D. Compact Disk Read Only Memory

15. Which one of the following is a scanning technology?

- A. OCR

- B. OMR
- C. BCR
- D. All the above

16. Which one of the following is a special purpose output device that draws images with ink pens?

- A. Inkjet Printers
- B. Laser Printers
- C. Plotters
- D. Light pen

17. Which one of the following is system unit that holds a microprocessor chip, memory chip and expansion slots?

- A. Slots
- B. Ports
- C. Mother Board
- D. Daughter Board

18. Which one of the following port is used to connect DB-9 pin Modems?

- A. Serial Port
- B. Parallel Port
- C. PS/2 Port
- D. USB Port

19. Which one of the following full form for SMPS?

- A. Switch Mode Power Supply
- B. Simple Mode Power Supply
- C. Storage Mode Power Supply
- D. Storage Mode Power Shortage

20. Which one of the following is storage device used for BIOS?

- A. Primary
- B. Secondary
- C. Tertiary
- D. None of the Above

Section-B Attempt any Six Questions in this Section

(6x5) Marks

- Q 1. What is Hyper Threading? What is its use ?
- Q 2. Differentiates between serial and parallel ports.
- Q 3. What are the Causes of Overheating of Microprocessors?
- Q 4. Differentiate between SRAM and DRAM.

- Q 5. Differentiate between RAM and ROM.
- Q 6. How is server motherboard different from a desktop motherboard?
- Q 7. What is multitasking? Discuss.
- Q 8. Name three types of printers and describe their advantages and disadvantages

Section-C Attempt all Questions in this Section

(5X10) Marks

- Q 1. Explain mother Board and its components.
- Q 2. Explain laser printer, its working, advantages and disadvantages.
- Q 3. Explain the working of SMPS.
- Q4. Write short notes on the following:
a) USB b) Expansion Cards c) Hard disk
- Q5. Explain the various options available in BIOS.



BHARTIYA SKILL DEVELOPMENT UNIVERSITY JAIPUR

Registration No:

**SCHOOL OF COMPUTING SKILLS
END SEMESTER EXAMINATION, WINTER 2018-19**

B. VOC. FIRST SEMESTER

Course Code: ITN1102

Time: 3 Hours

Course Name: Computer Assembling & Peripheral Installation

Max. Marks: 100

Section-A Attempt all Questions in this Section

20x1 Marks

1. Which of the following location are the 1st computer instructions available on boot up?

- A.ROM BIOS
- B.CPU
- C.boot.ini
- D.CONFIG.SYS

Ans A

2. Which of the following network interface card, the term 10/100 refers to ?

- A. protocol speed
- B. a fiber speed
- C. megabits per seconds
- D. minimum and maximum server speed

Ans C

3. Which of the following Motherboard form factor uses one 20 pin connector?

- A. ATX
- B. AT
- C. BABY AT
- D. All of the above

Ans A

4. Which of the following hard disk is divided into tracks which are further subdivided into?

- A.clusters
- B.sectors
- C.vectors
- D.heads

Ans B

5. Which of the following PCs give a single beep on boot up to indicate they are ok hardware wise. You boot your PC and don't get a beep. What should you check first?

- A. system board
- B. RAM
- C. microprocessor
- D. power supply
- E. Speaker

Ans E

6. Which of the following peripheral port provides the FASTEST throughput to laser printers?

- A. RS-232
- B. SCSI
- C. Parallel
- D. Serial

Ans C

7. Which of the following causes of mouse pointer moves erratically?

- A.ball is dirty
- B.is not connected
- C.driver is not installed properly
- D.has an incorrect IRQ setting
- E.None of the above

Answer: Option A



8. The 40-pin connection on an I/O card is for?

- A. Floppy drive
- B. SCSI drive
- C. IDE drive
- D. Zip drive
- E. None of the above

Answer: Option A

9. Which of the following part of the laser printer should NOT be exposed to sunlight?

- A. Transfer corona assembly
- B. PC drum
- C. Primary corona wire
- D. Toner cartridge
- E. None of the above

Answer: Option B

10. Which of the Following voltage does a Pentium system use?

- A. +12 volts
- B. + 5 volts
- C. + 8 volts
- D. +3.3 volts
- E. None of the above

Answer: Option D

11. Which of the following is not a primary storage device?

- a. Magnetic tape
- b. Magnetic disk
- c. Optical disk
- d. None of the above

Ans : d

12. Microprocessors can be used to make

- a. Computer
- b. Digital systems
- c. Calculators
- d. All of the above

Ans : d

13. Which of the following is a temporary primary memory?

- a. PROM
- b. RAM
- c. EPROM
- d. ROM

Ans : b

14. CD-ROM stands for

- a. Compactable Read Only Memory
- b. Compact Data Read Only Memory
- c. Compactable Disk Read Only Memory
- d. Compact Disk Read Only Memory

Ans d

15. Which of the following is a scanning technology?

- a. OCR
- b. OMR
- c. BCR
- d. All the above

Ans : d

16. A special purpose output device that draws images with ink pens is

- a. Inkjet Printers
- b. Laser Printers
- c. Plotters
- d. Light pen

Ans : c

17. What is there in the system unit that holds a microprocessor chip, memory chip and expansion slots?

- a. Slots
- b. Ports
- c. Mother Board
- d. Daughter Board

Ans : c

18. Which of the following port is used to connect DB-9 pin Modems ?

- a. Serial Port
- b. Parallel Port
- c. PS/2 Port
- d. USB Port

Ans : b

19. What is full form of SMPS?

- a. Switch Mode Power Supply
- b. Simple Mode Power Supply
- c. Storage Mode Power Supply
- d. Storage Mode Power Shortage

Ans : a

20. Which type of storage device is a BIOS?

- a. Primary
- b.
- c. Secondary
- d. Tertiary
- e. Not a storage device

Ans : a



Q 1. What Is Hyper Threading? What Is the Use of It?

A thread of execution, or simply a "thread," is one series of instructions sent to the CPU. Hyper-threading is a technology developed to help make better use of spare processing cycles. Hyper-threaded processors have a duplicate set of registers, small spaces of high-speed memory storage used to hold the data that is currently needed to execute a thread.

When a CPU core is delayed, waiting for data to be retrieved from another place in memory, it can use these duplicate registers to spend the spare computation cycles executing a different thread. The second set of registers will be pre-loaded with the data needed to execute the second thread, so the CPU core can begin work immediately

Q 2. Differentiates serial and parallel port?

Ans :

Subject	Serial Port	Parallel Port
Pins	9 pins	25 pins
Type of port	Male port	Female Port
Color	usually Purple in color	Usually Green in color
Data Transfer Rate	Slower than Parallel Port	Faster than Serial Port
Moving Bits	Serial move bits inline, one at a time.	Parallel moves bits next to each other
Usage of Wire	Serial ports are only used 2 wires for transmitting and receiving data	Parallel Port used 8 or more wire for transmitting and receiving data.

Q 3. What Are the Causes of Overheating of Microprocessor?

- Ans : : a) Processor fan may not be properly connected.
 b) Heat sink may be not contacted with the processor.
 c) Jumpers may be configured to over clock the CPU.
 d) Voltage supply incompatible

Q 4. Differentiate between SRAM and DRAM.

Static RAM stores each bit of data on six metal oxide semiconductor field effect transistors, or MOSFETs. SRAM is used in devices that require the fastest possible data access without requiring a high capacity. Some examples are CPU caches and buses, hard drive and router buffers and printers.

Dynamic RAM stores data using a paired transistor and capacitor for each bit of data. Capacitors constantly leak electricity, which requires the memory controller to refresh the DRAM several times a second to maintain the data.

Q 5. Differentiate between RAM and ROM.



Ans :

BASIS FOR COMPARISON	RAM	ROM
Basic	It is a read-write memory.	It is read only memory.
Use	Used to store the data that has to be currently processed by CPU temporarily.	It stores the instructions required during bootstrap of the computer.
Volatility	It is a volatile memory.	It is a nonvolatile memory.
Stands for	Random Access Memory.	Read Only Memory.
Modification	Data in RAM can be modified.	Data in ROM can not be modified.
Capacity	RAM sizes from 64 MB to 4GB.	ROM is comparatively smaller than RAM.

Q 6. How is server motherboard different from a desktop motherboard?

Ans : : A server motherboard usually has more than one CPU socket. It usually has more DIMM slots than a desktop motherboard. It usually supports ECC (may even require ECC) RAM. It will usually have multiple network interfaces. It may have a dedicated network interface for management. It might have different power connectors than a standard desktop motherboard.

Q 7. What is multitasking?

Ans : Multitasking refers to the simultaneously performance of multiple tasks and processes by hardware, software or any computing appliance. It enables the performance of more than one computer process at the same time with minimal lag in overall performance and without affecting the operations of each task. Multitasking is also known as multiprocessing.

Q 8. Name three types of printers and describe their advantages and disadvantages

- a. Ans : **Inkjet Printer** - Inkjets print documents by spraying ink onto paper, and can usually produce prints with a resolution of 300dpi
 - i. Fast printing speeds.
 - ii. Can produce really high quality print.
 - iii. Easy to use.
 - iv. They can produce vivid colors.
- b. **Laser Printer** - printer's capability of producing very high quality documents. In fact, laser printers can produce copies with a resolution of 600 dpi – 1200 dpi.
 - i. Very high resolution.



- ii. Fast results.
 - iii. High volume printing.
 - iv. No smears at all.
- c. Multi Function Printers (MFP) : Multi Function Printers are also commonly known as all-in-one printers. With this type of device, our printing, scanning, faxing and photocopying needs are covered.
- i. They take up less room.
 - ii. They are usually lower in cost. Though it may seem expensive compared to the other types of printers, if we consider buying a fax machine, scanner, photocopier and a printer,

Section-C Attempt all Questions in this Section

(5X10) Marks

Q 1. Explain mother Board and its components.

Ans: A motherboard is one of the most essential parts of a computer system. It holds together many of the crucial components of a computer, including the central processing unit (CPU), memory and connectors for input and output devices. The base of a motherboard consists of a very firm sheet of non-conductive material, typically some sort of rigid plastic. Thin layers of copper or aluminum foil, referred to as traces, are printed onto this sheet. These traces are very narrow and form the circuits between the various components. In addition to circuits, a motherboard contains a number of sockets and slots to connect the other components.

Main components of mother board are:

1. Input: This is the process of entering data and programs in to the computer system. The input unit takes data from us to the computer in an organized manner for processing.

2. Storage: The process of saving data and instructions permanently is known as storage.

The storage unit performs the following major functions:

- All data and instructions are stored here before and after processing.
- Intermediate results of processing are also stored here.

3. Processing: The task of performing operations like arithmetic and logical operations is called processing. The Central Processing Unit (CPU) takes data and instructions from the storage unit and makes all sorts of calculations based on the instructions given and the type of data provided.

4. Output: This is the process of producing results from the data for getting useful information.

Similarly the output produced by the computer after processing must also be kept somewhere inside the computer before being given to us in human readable form. Again the output is also stored inside the computer for further processing.

5. Control: The manner how instructions are executed and the above operations are performed.

Controlling of all operations like input, processing and output are performed by control unit. It takes care of step by step processing of all operations inside the computer.

FUNCTIONAL UNITS

The functional unit is divided into three separate units for its operation. They are

Arithmetic Logical Unit (ALU)

Logical Unit : The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing the output is returned back to storage unit for further processing or getting stored.

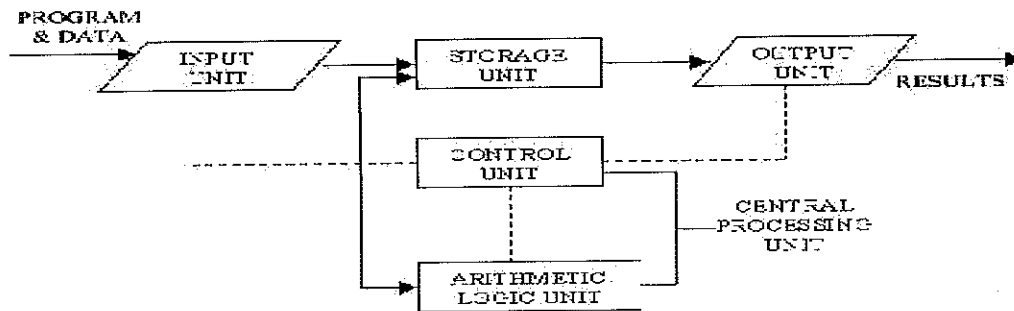
Control Unit (CU)

Control Unit is responsible for co ordinating various operations using time signal. The control unit determines the sequence in which computer programs and instructions are executed. Things like processing of programs stored in the main memory, interpretation of the instructions and issuing of signals for other units of the computer to execute them.

Central Processing Unit (CPU)



The ALU and the CU of a computer system are jointly known as the central processing unit. CPU is the brain of any computer system. It is just like brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer functions by activating and controlling the operations.



Q 2. Explain laser printer, its working, advantages & disadvantages.

Ans: Laser Printer- A laser printer is a type of printer that uses a laser and electrical charge model instead of the traditional printing of ink onto paper. Laser printers have increased the neatness and sophistication of print projects, with typical resolutions of 600 dots per inch or higher.

Its working:

When we print something, our computer sends a vast stream of electronic data (typically a few megabytes or million characters) to our laser printer. An electronic circuit in the printer figures out what all this data means and what it needs to look like on the page. It makes a laser beam scan back and forth across a drum inside the printer, building up a pattern of static electricity. The static electricity attracts onto the page a kind of powdered ink called toner. Finally, as in a photocopier, a fuser unit bonds the toner to the paper.

Advantages

- Laser prints are generally very high and very accurate.
- For high volume **printing laser printers** are considerably cheaper to run.
- **Printing** is fast so they can cope large volumes.
- Due to the technology used prints from a **laser printer** emerge from the **printer** dry to the touch.

Disadvantages

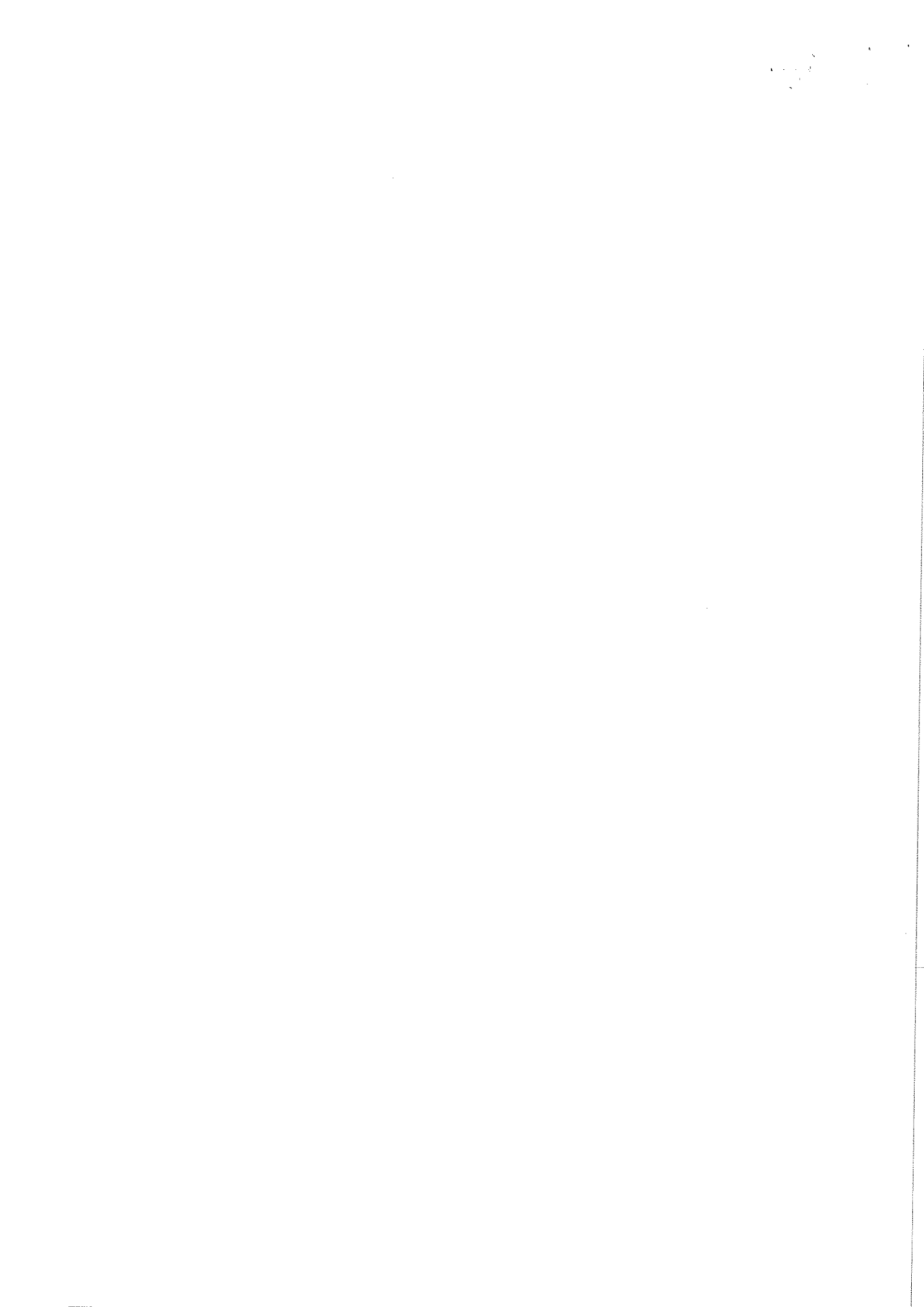
- Buying a **laser printer** can be expensive when compared to an inkjet.
- Colour **laser printers** are significantly more expensive than a colour inkjet.
- **Laser printers** are larger and heavier as they need to comprise the imaging drum and **laser** technology.

Q 3. Explain working of SMPS .

Q4. Write short notes on the following:

- a) USB b) Expansion Cards c) Hard disk

Ans : a) **Expansion cards** : An expansion card is an electronic card/board that is used to add extra functionality to a computer. It is inserted into an expansion slot on the motherboard of a computer. Expansion cards contain edge connectors that are used to create an electronic link between motherboard and card, thus enabling these two to communicate. Many different classes of expansion card are available, including sound cards, video graphics cards, network cards and so on. All expansion cards are used to enhance the quality of their specific function. For example, video graphics cards are used to enhance the video quality on a computer.



Q5. Explain the various options available in BIOS .

Ans : BIOS is usually the first program be activated when we start up our computer. It is a temporary program which controls the computer from the time it powers on to the time the operating system takes over. Its working mechanism is mainly through program to interact and control other parts of the computer, including disc drives, video cards, sound cards, network cards, USB ports as well as hard drives. It is on ROM, so it cannot store variable data. If we have any problem on getting into BIOS or setting BIOS, we can visit BIOS Settings for CD/DVD.

CMOS is another chip on the motherboard, however, the main difference compared with BIOS is that it is on ROM, so that it can help to store variable data. It allows individual users to change the time, date for devices startups, and it can also help us enable or disable hardware drives like previously stated USB and hard drive. It can store all the particular parameters.



BHARTIYA SKILL DEVELOPMENT UNIVERSITY JAIPUR

Registration No:

SCHOOL OF COMPUTING SKILLS END SEMESTER EXAMINATION, WINTER 2018-19 B. VOC. FIRST SEMESTER

ITN1104 Basic Computer Networking

Max. Marks: 100

Time: 3 hours

Section-A

Attempt ALL Questions in this Section

20x1 Marks

<p>Q1. Which one of the following is the full form of DNS?</p> <p>a) Dynamic Name System b) Dynamic Network System c) Domain Name System d) Domain Network Service</p>	<p>Q2. Which one of the following is the meaning of Bandwidth in a Network?</p> <p>a) Transmission capacity of a communication channels b) Connected Computers in the Network c) Class of IP used in Network d) None of Above</p>
<p>Q3. Which one of the following represents a Data communication system spanning states, countries, or the whole world?</p> <p>a) LAN b) WAN c) MAN d) None of the mentioned</p>	<p>Q4. Which one of the following transmission media has the highest transmission speed in a network?</p> <p>a) coaxial cable b) twisted pair cable c) optical fiber d) electrical cable</p>
<p>Q5. Each IP packet must contain which one of the following?</p> <p>a) Only Source address b) Only Destination address c) Source and Destination address d) Source or Destination address</p>	<p>Q6. Which one of the following provides a connection-oriented reliable service for sending messages?</p> <p>a) TCP b) IP c) UDP d) All of the above</p>
<p>Q7. Which one of the following is correct answer as to why IP Protocol is considered as unreliable?</p>	<p>Q8. Which one of the following is the multiple access protocol for channel access control?</p>

<p>a) A packet may be lost b) B. Packets may arrive out of order c) C. Duplicate packets may be generated d) D. All of the above</p>	<p>a) CSMA/CD b) CSMA/CA c) Both CSMA/CD & CSMA/CA d) None of the mentioned</p>
<p>Q9. Which one of the following does the network layer deal with?</p> <p>a) bits b) frames c) packets d) none of the mentioned</p>	<p>Q10. Which one of the following does the 4 byte IP address show?</p> <p>a) network address b) host address c) both network address & host address d) none of the mentioned</p>
<p>Q11. Which one of the following is the work of a Router in a network?</p> <p>a) Forwards a packet to all outgoing links b) B. Forwards a packet to the next free outgoing link c) C. Determines on which outgoing link a packet is to be forwarded d) D. Forwards a packet to all outgoing links except the originated link</p>	<p>Q12. Internet is the example of which one of the following?</p> <p>a) Cell switched network b) circuit switched network c) Packet switched network d) All of above</p>
<p>Q13. Which one of the following is the use of sub netting?</p> <p>a) It divides one large network into several smaller ones b) It divides network into network classes c) It speeds up the speed of network d) None of above</p>	<p>Q14. Which one of the following are not the Networking Devices?</p> <p>a) Gateways b) Linux c) Routers d) Firewalls</p>
<p>Q15. Which one of the following is the use of Ping command?</p> <p>a) To test a device on the network is reachable b) To test a hard disk fault c) To test a bug in a Application d) To test a Pinter Quality</p>	<p>Q16. Which one of the following does the Routing table of a router keep track of?</p> <p>a) MAC Address Assignments b) Port Assignments to network devices c) Distribute IP address to network devices d) Routes to use for forwarding data to its destination</p>
<p>Q17. Which of the following is a time-sensitive service?</p> <p>a) File transfer b) File download</p>	<p>Q18. Which of the following is true for headers? In the layer hierarchy, as the data packet moves from the upper to the lower layers, they are</p>

c) E-mail d) Internet telephony	a) Added b) Removed c) Rearranged d) Modified
Q19. Which one of the following is the meaning of Straight-through Cable? a) Four wire pairs connect to the same pin on each end b) The cable Which Directly connects Computer to Computer c) Four wire pairs not twisted with each other d) The cable which is not twisted	Q20. Bluetooth is which one of the following type of networks? a) personal area network b) local area network c) virtual private network d) none of the mentioned

Section-B

Attempt Six Questions in this section

6x5 Marks

- Q 1. What is subnet mask? Explain.
- Q 2. What do you mean by topology? What are the most popular topologies? Discuss.
- Q 3. What is a private IP address? Explain.
- Q 4. List the advantages of fiber optics over other media?
- Q 5. Define Socket address. Which layer uses this address?
- Q 6. You need to connect two computers for file sharing. Is it possible to do this without using hub or a router? Explain.
- Q 7. Describe the different Guided Media.
- Q 8. When you move the NIC cards from one PC to another PC, does the MAC address get transferred as well? Give reasons for your answer.

Section-C

Attempt ALL Questions in this Section

5x10 Marks

- Q 1. What are the applications of Computer Networks?
- Q 2. What are the differences between Connection-oriented transmission and Connectionless transmission?
- Q 3. Explain the TCP/IP Model with a neat diagram.
- Q 4. Calculate Subnets, Valid Hosts, Broadcast ID, Network ID for IP address 192.168.10.44/29.
- Q 5. What are the responsibilities of the Data Link Layer? Discuss.



SCHOOL OF COMPUTING SKILLS
END-SEMESTER EXAMINATION – 2019
WINTER SEMESTER, B. VOC. PROGRAM

Course Code: ITN004**Time: 3 Hour****Course Name: Basic Computer Networking****Max. Marks: 100**Answer Key

Section-A

20x1 Marks

Note: Attempt all Questions in this Section

A1. c	A2. a
A3. b	A4. c
A5. c	A6. a
A7. d	A8. c
A9. c	A10. c
A11. c	A12. c
A13. a	A14. b
A15. a	A16. d
A17. d	A18. a
A19. a	A20. a

Section-B Short-Answer Type Questions

6x5 Marks

Note: Attempt any Six Questions in this Section

A1. A subnet mask is combined with an IP address in order to identify two parts: the extended network address and the host address. Like an IP address, a subnet mask is made up of 32 bits.

A2. Topology refers to the way in which the workstations attached to the network are interconnected.

The most popular topologies are:

Bus, Ring, Star, Tree

A3. Private IP addresses are assigned for use on intranets. These addresses are used for internal networks and are not routable on external public networks. These ensures that no conflicts are present among internal networks while at the same time the same range of private IP addresses are reusable for multiple intranets since they do not "see" each other.

A4. One major advantage of fiber optics is that is it less susceptible to electrical interference. It also supports higher bandwidth, meaning more data can be transmitted and received. Signal degrading is also very minimal over long distances. It is supporting up to 400 Gbps of traffic on one single link at present and further work is in progress to increase the BW further.

A5. The combination of IP address and port address is called Socket address. Transport layer uses the Socket address.

A6. Yes, you can connect two computers together using only one cable. A crossover type cable can be use in this scenario. In this setup, the data transmit pin of one cable is connected to the data receive pin of the other cable, and vice versa.

A7. Twisted pair cable consists of two insulated copper wires twisted together. It is used in telephone line for voice and data communications.

Coaxial cable has the following layers: a metallic rod-shaped inner conductor, an insulator covering the rod, a metallic outer conductor (shield), an insulator covering the shield, and a plastic cover. Coaxial cable can carry signals of higher frequency ranges than twisted-pair cable. Coaxial cable is used in cable TV networks and Ethernet LANs. Fiber-optic cables are composed of a glass or plastic inner core surrounded by cladding, all encased in an outer jacket. Fiber-optic cables carry data signals in the form of light. The signal is propagated along the inner core by reflection. Its features are noise resistance, low attenuation, and high bandwidth capabilities. It is used in backbone networks, cable TV networks, and fast Ethernet networks.

A8. Yes, that's because MAC addresses are hard-wired into the NIC circuitry, not the PC. This also means that a PC can have a different MAC address when the NIC card was replace by another one.

Section-C Essay Type Questions

5x10 Marks

Note: Attempt all Questions in this Section.

A1. Computer networks are used for:

1. Information:

One of the applications of computer networks is the ability to provide access to remote information.

- Pay bills; carry out transactions on bank accounts etc.
- Shop from home by inspecting the catalogues of thousands of companies available online.
- Ask the newspaper for full information about your interesting topics such as corrupt politicians, big fires, football and so on.
- Access information about health, science, art, business, cooking, sports, travel, and government and so on. All this is available on the information systems like the World Wide Web (WWW).

2. Communication:

The popular application of computer networks is electronic mail or e-mail which widely used by

millions of people to send and receive text messages. With real-time e-mail, remote users can Communicate even by seeing and hearing each other at the same time. It is also possible to have virtual meetings called videoconference on-line among remote users.

3. Entertainment:

A huge and growing application is entertainment. It entertains people by allowing video demand, and has multiple real-time games etc.

A2. Both connection-oriented transmission and connectionless transmissions are in the transport layer of the OSI model. In connection-oriented transmissions the receiving system acknowledges received data, but in a connectionless transmission the receiving system does not acknowledge receipt of data. Connection-oriented is reliable but has slow communication, while connectionless transmissions are not reliable and are faster.

TCP	UDP
Reliable	Unreliable
Connection-oriented	Connectionless
Segment retransmission and flow control through windowing	No windowing or retransmission
Sequencing	No sequencing
Acknowledge sequencing	No acknowledgment

A3. TCP/IP PROTOCOL SUITE

TCP/IP is normally considered to be a 4-layer system. The 4 layers are as follows:

- Application layer
- Transport layer
- Network layer
- Data link layer

a) Application layer

This is the top layer of TCP/IP protocol suite. This layer includes applications or processes that use transport layer protocols to deliver the data to destination computers.

Some of the popular application layer protocols are:

- HTTP (Hypertext transfer protocol)
- FTP (File transfer protocol)
- SMTP (Simple mail transfer protocol)
- SNMP (Simple network management protocol) etc.

b) Transport Layer

This layer provides backbone to data flow between two hosts. This layer receives data from the application layer above it. There are many protocols that work at this layer but the two most commonly used protocols at transport layer are TCP and UDP.

c) Network Layer

This layer is also known as Internet layer. The main purpose of this layer is to organize or handle the movement of data on network. By movement of data, we generally mean routing of data over the network.

d) Data Link Layer

This layer is also known as network interface layer. This layer normally consists of device drivers in the OS and the network interface card attached to the system. Both the device drivers and the network interface card take care of the communication details with the media being used to transfer the data over the network.

A4. IP address 192.168.10.44/29. The steps to perform this task are the following:

a) Total number of subnets: Using /29 number indicates that 5 bits are used to identify the subnet. To find the total number of subnets available simply raise 2 to the power of 5 (2^5) and you will find that the result is 32 subnets.

Note that if subnet all-zeros is not used then we are left with 31 subnets and if also all-ones subnet is not used then we finally have 30 subnets.

b) Hosts per subnet: 3 bits are left to identify the host therefore the total number of hosts per subnet is 2 to the power of 3 minus 2 (1 address for subnet address and another one for the broadcast address) (2^3-2) which equals to 6 hosts per subnet.

c) Subnets, hosts and broadcast addresses per subnet: To find the valid subnets for this specific subnet mask you have to subtract 248 from the value 256 ($256-248=8$) which is the first available subnet address.

Actually the first available one is the subnet-zero which we explicitly note. Next subnet address is $8+8=16$, next one is $16+8=24$ and this goes on until we reach value 248. The following table provides all the calculated information.

Note that our IP address (192.168.10.44) lies in subnet 192.168.10.40.

Subnet	0	8	16	...	40	...	248
First Host	1	9	17	...	41	...	249
Last Host	6	14	22	...	46	...	254
Broadcast	7	15	23	...	47	...	255

A5. The Data Link Layer transforms the physical layer, a raw transmission facility, to a reliable link and is responsible for node-node delivery.

a. Framing

b. Physical Addressing

c. Flow Control

d. Error Control

e. Access Control

BHARTIYA SKILL DEVELOPMENT UNIVERSITY JAIPUR

Registration No:

SCHOOL OF COMPUTING SKILLS END SEMESTER EXAMINATION, WINTER 2018-19 B. VOC. FIRST SEMESTER

ITN 1105 **Basics of Operating Systems
and Windows Client Administration**

Max. Marks: 100

Time: 3 Hours

Section-A

Attempt ALL questions in this section

(20x1) Marks

1. Which one of the following is an operating system?
 - a) collection of programs that manages hardware resources
 - b) system service provider to the application programs
 - c) link to interface the hardware and application programs
 - d) all of the above
2. Which one of the following statements is **NOT** true?
 - a) kernel is the program that constitutes the central core of the operating system
 - b) kernel is the first part of operating system to load into memory during booting
 - c) kernel is made of various modules which cannot be loaded in running operating system
 - d) kernel remains in the memory during the entire computer session
3. Which one of the following information is contained in the Program Counter?
 - a) The address of next instruction to be executed
 - b) Address of stack
 - c) Address of memory location
 - d) None of the above
4. Which one of the following is the main function of the command interpreter?
 - a) to get and execute the next user-specified command
 - b) to provide the interface between the API and application program
 - c) to handle the files in operating system
 - d) none of the above
5. Which one of the following is another name for Threads?
 - a) Process
 - b) Program
 - c) Light weight processes
 - d) None of the above
6. Which one of the following systems allows only one process execution at a time?
 - a) uniprogramming systems
 - b) uniprocessing systems
 - c) unitasking systems
 - d) none of the above
7. Which one of the following is correct for deadlock situation for a set of processes?
 - a) each process is blocked and will remain so forever
 - b) each process is terminated
 - c) all processes are trying to kill each other
 - d) none of the above
8. For which one of the following reasons can a process be terminated?
 - a) normal exit
 - b) fatal error
 - c) killed by another process
 - d) all of the above
9. Which one of the following is not a process state?
 - a) New
 - b) Old
 - c) Waiting
 - d) Running

10. Which one of the following is a synchronization tool?
- thread
 - pipe
 - semaphore
 - socket
11. Which one of following modules gives control of the CPU to the process selected by the short-term scheduler?
- dispatcher
 - interrupt
 - scheduler
 - none of the above
12. Which one of the following terms defines the interval from the time of submission of a process to the time of completion?
- waiting time
 - turnaround time
 - response time
 - throughput
13. Which one of the following scheduling algorithms allocates the CPU first to the process that requests the CPU first?
- first-come, first-served scheduling
 - shortest job scheduling
 - priority scheduling
 - none of the above
14. Which one of the following conditions must be satisfied to solve the critical section problem?
- Mutual Exclusion
 - Progress
 - Bounded Waiting
 - All of the above
15. Which one of the following addresses is generated by the CPU?
- physical address
 - absolute address
 - logical address
 - none of the above
16. In which one of the following scheduling algorithms is time quantum defined?
- shortest job scheduling algorithm
 - round robin scheduling algorithm
 - priority scheduling algorithm
 - multilevel queue scheduling algorithm
17. Which one of the following phenomena is allowed by using Virtual memory?
- execution of a process that may not be completely in memory
 - a program to be smaller than the physical memory
 - a program to be larger than the secondary storage
 - execution of a process without being in physical memory
18. In which one of the following conditions does a page fault occur?
- a page gives inconsistent data
 - a page cannot be accessed due to its absence from memory
 - a page is invisible
 - all of the above
19. In which one of the following conditions is a thrashing?
- it spends a lot of time executing, rather than paging
 - it spends a lot of time paging, rather than executing
 - it has no memory allocated to it
 - none of the above
20. What is the mounting of the file system?
- crating of a file system
 - deleting a file system
 - attaching portion of the file system into a directory structure
 - removing portion of the file system into a directory structure

Section-B Answer any SIX questions

(6X5) Marks

- What is a process? Explain giving an example.
- What is time sharing system? Discuss.
- Explain how server systems are classified?
- What is asymmetric clustering? Explain.
- What is Round Robin scheduling algorithm? Show using an example.
- Which scheduling algorithm does the following table refer to? Draw a Gantt Chart and calculate the average waiting time for the following table showing number of processes, burst time and their priority:

PROCESS	BURST TIME	PRIORITY
P1	21	2
P2	3	1
P3	6	4
P4	2	3

7. State the main difference between logical and physical address spaces.
8. What is Direct Access Method? Explain.

Section-C Attempt ALL questions

(5X10) Marks

1. Explain in detail Distributed Operating Systems with specific reference to Client-Server and Peer-to-Peer systems.
2. What do you understand by process scheduling and scheduling queues? Explain in detail.
3. What is a Process Control Block? Explain the contents of a PCB.
4. What is Demand Paging and what is the major issue with it? Explain with the help of a neat diagram.
5. Explain File System, File Structure, Attributes of a file and Directory. Discuss different file access methods.



SCHOOL OF COMPUTING SKILLS
FIRST SEMESTER EXAMINATION – 2019
END SEMESTER, B. VOC. PROGRAM

**ITN 1105 Basics of Operating Systems
and Windows Client Administration**

Max. Marks: 100

Time: 3 Hours

Section-A Attempt ALL questions

(20x1) Marks

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- a) collection of programs that manages hardware resources
- b) system service provider to the application programs
- c) link to interface the hardware and application programs
- d) all of the mentioned

Ans: d)

2. Which one of the following is **NOT** true?

- a) kernel is the program that constitutes the central core of the operating system
- b) kernel is the first part of operating system to load into memory during booting
- c) kernel is made of various modules which can not be loaded in running operating system
- d) kernel remains in the memory during the entire computer session

Ans: c)

3. Which one of the following information is contained in Program Counter?

- a) The address of next instruction to be executed
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- c) Address of memory location
- d) None of the above

Ans: a)

4. Which one of the following is the main function of the command interpreter?

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Ans: a)

5. Which one of the following is another name for Threads?

- a) Process
- b) Program
- c) Light weight processes
- d) None of the above

Ans: c)

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- a) uniprogramming systems
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- a) each process is blocked and will remain so forever
- b) each process is terminated
- c) all processes are trying to kill each other
- d) none of the mentioned

Ans: a)

8. In which one of the following reasons a process can be terminated?

- a) normal exit
- b) fatal error
- c) killed by another process
- d) all of the mentioned

Ans: d)

9. Which one of the following is not the state of a process?

- a) New
- b) Old
- c) Waiting
- d) Running

Ans: b)

10. Which one of the following is a synchronization tool?

- a) thread
- b) pipe
- c) semaphore
- d) socket

Ans: c)

11. Which one of following modules gives control of the CPU to the process selected by the short-term scheduler?

- a) dispatcher
- b) interrupt
- c) scheduler
- d) none of the mentioned

Ans: a)

12. Which one of the following terms define the interval from the time of submission of a process to the time of completion?

- a) waiting time
- b) turnaround time
- c) response time
- d) throughput

Ans: b)

13. Which one of the following scheduling algorithm allocates the CPU first to the process that requests the CPU first?

- a) first-come, first-served scheduling
- b) shortest job scheduling
- c) priority scheduling
- d) none of the mentioned

Ans: a)

14. Which one of the following conditions must be satisfied to solve the critical section problem?

- a) Mutual Exclusion
- b) Progress
- c) Bounded Waiting
- d) All of the mentioned

Ans: d)

15. Which one of the following address is generated by CPU?

- a) physical address
- b) absolute address
- c) logical address
- d) none of the mentioned

Ans: c)

16. In which one of the following scheduling algorithms time quantum is defined?

- a) shortest job scheduling algorithm
- b) round robin scheduling algorithm
- c) priority scheduling algorithm
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Ans: b)

17. Which one of the following phenomena is allowed by using Virtual memory?

- a) execution of a process that may not be completely in memory
- b) a program to be smaller than the physical memory
- c) a program to be larger than the secondary storage
- d) execution of a process without being in physical memory

Ans: a)

18. In which one of the following conditions page fault occurs?

- a) a page gives inconsistent data
- b) a page cannot be accessed due to its absence from memory
- c) a page is invisible
- d) all of the mentioned

Ans: b)

19. In which one of the following conditions a process is thrashing?

- a) it spends a lot of time executing, rather than paging
- b) it spends a lot of time paging, than executing
- c) it has no memory allocated to it
- d) none of the mentioned

Ans: b)

20. What is the mounting of file system?

- a) crating of a filesystem
- b) deleting a filesystem
- c) attaching portion of the file system into a directory structure
- d) removing portion of the file system into a directory structure

Ans: c)

Section-B Answer any SIX questions

(6X5) Marks

1. What is a process? Explain giving an example.

Ans: A process is a program in execution. To understand this definition, let's imagine that there is a program called myprog.c in C. On execution, this program may read in some data and output some data. When a program is written and a file is prepared, it is still a script. It has no dynamics of its own i.e, it cannot cause any input processing or output to happen. Once it is compiled, and still later when this program is executed, the intended operations take place.

2. What is time-sharing system?

Ans: In a Time-sharing system, the CPU executes multiple jobs by switching among them, also known as multitasking. This process happens so fast that users can interact with each program while it is running.

3. How are server systems classified?

Ans: Server systems can be classified as either computer-server systems or file server systems. In the first case, an interface is made available for clients to send requests to perform an action. In the second case, provisions are available for clients to create, access and update files.

4. What is asymmetric clustering?

Ans: In asymmetric clustering, a machine is in a state known as hot standby mode where it does nothing but to monitor the active server. That machine takes the active server's role should the server fails.

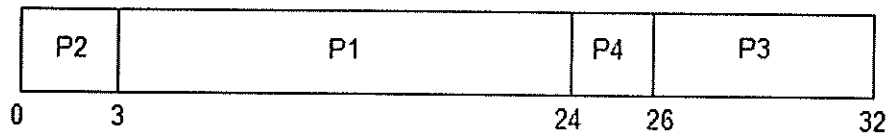
5. What is Round Robin scheduling algorithm?

Ans: RR (round-robin) scheduling algorithm is primarily aimed for time-sharing systems. A circular queue is a set up in such a way that the CPU scheduler goes around that queue, allocating CPU to each process for a time interval of up to around 10 to 100 milliseconds.

6. Which scheduling algorithm the following table refers to? Draw a Gantt Chart and calculate the average waiting time for the following table showing number of processes, burst time and their priority:

PROCESS	BURST TIME	PRIORITY
P1	21	2
P2	3	1
P3	6	4
P4	2	3

Ans: The above table refers to Priority Scheduling Algorithm. The Gantt Chart and



The average waiting time will be, $(0 + 3 + 24 + 26) / 4 = 13.25$ ms
average waiting time is given below:

7. State the main difference between logical from physical address space.

Ans: Logical address refers to the address that is generated by the CPU. On the other hand, physical address refers to the address that is seen by the memory unit.

8. What is Direct Access Method?

Ans: Direct Access method is based on a disk model of a file, such that it is viewed as a numbered sequence of blocks or records. It allows arbitrary blocks to be read or written randomly. Direct access is advantageous when accessing large amounts of information.

Section-C

Attempt ALL questions

(5X10) Marks

1. Explain in details Distributed Operating Systems with specific reference to Client-Server and Peer-to-Peer systems.

Ans: Availability of powerful and inexpensive microprocessors and advances in communication technology led to the development of Distributed Operating Systems.

These advancements in technology have made it possible to design and develop distributed systems comprising of many computers that are inter connected by communication networks. The main benefit of distributed systems is its low price/performance ratio.

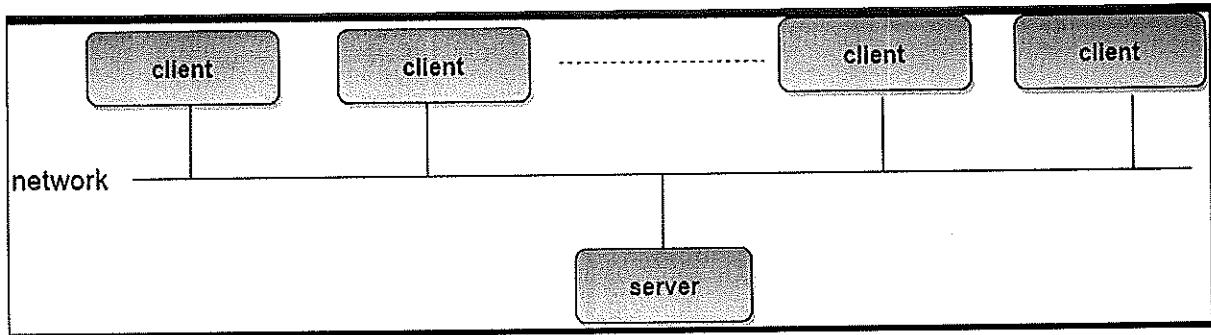
Following are some advantages of this type of system.

- As there are multiple systems involved, user at one site can utilize the resources of systems at other sites for resource-intensive tasks.
- Fast processing.
- Less load on the Host Machine.

The two types of Distributed Operating Systems are: **Client-Server Systems** and **Peer-to-Peer Systems**.

Client-Server Systems

Centralized systems today act as **server systems** to satisfy requests generated by **client systems**. The general structure of a client-server system is depicted in the figure below:



Server Systems can be broadly categorized as **compute servers** and **file servers**.

Compute-server systems provide an interface to which clients can send requests to perform an action, in response to which they execute the action and send back results to the client.

File-server systems provide a file-system interface where clients can create, update, read, and delete files.

Peer-to-Peer Systems

The growth of computer networks - especially the Internet and World Wide Web (WWW) – has had a profound influence on the recent development of operating systems. When PCs were introduced in the 1970s, they were designed for **personal** use and were generally considered standalone computers. With the beginning of widespread public use of the Internet in the 1980s for electronic mail and ftp many PCs became connected to computer networks.

In contrast to the **tightly coupled** systems, the computer networks used in these applications consist of a collection of processors that do not share memory or a clock. Instead, each processor has its own local memory. The processors communicate with one another through various communication lines, such as high-speed buses or telephone lines. These systems are usually referred to as loosely coupled systems (or distributed systems).

2. What do you understand by process scheduling and scheduling queues? Explain in details.

Ans: The act of determining which process in the ready state should be moved to the running state is known as Process Scheduling.

The prime aim of the process scheduling system is to keep the CPU busy all the time and to deliver minimum response time for all programs. For achieving this, the scheduler must apply appropriate rules for swapping processes IN and OUT of CPU.

Schedulers fall into one of the two general categories:

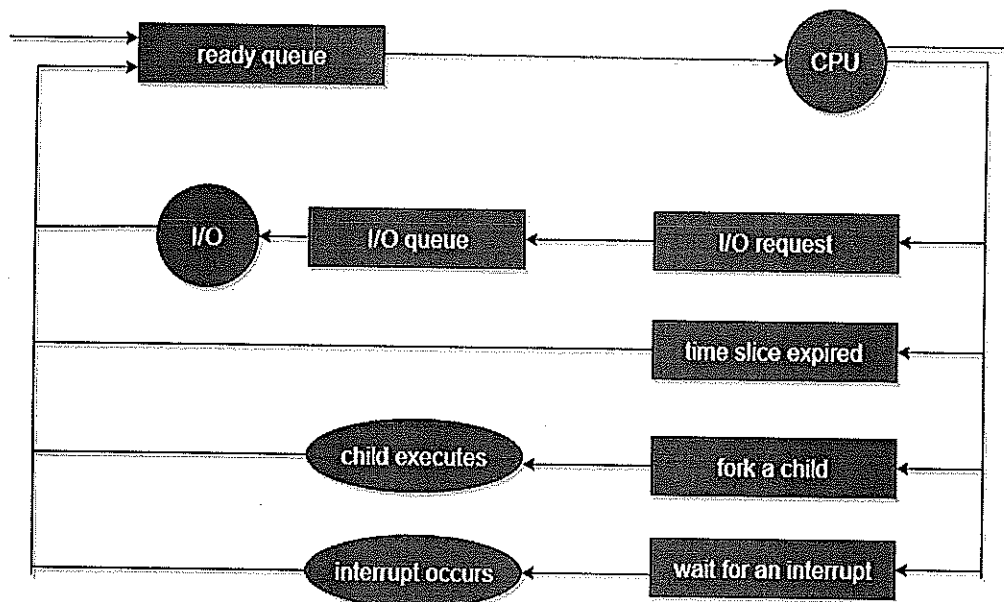
- i. **Non pre-emptive scheduling.** When the currently executing process gives up the CPU voluntarily.
- ii. **Pre-emptive scheduling.** When the operating system decides to favour another process, pre-empting the currently executing process.

Scheduling Queues

- All processes when enters into the system are stored in the **job queue**.
- Processes in the Ready state are placed in the **ready queue**.
- Processes waiting for a device to become available are placed in **device queues**. There are unique device queues for each I/O device available.

A new process is initially put in the ready queue. It waits in the ready queue until it is selected for execution (or dispatched). Once the process is assigned to the CPU and is executing, once of several events could occur.

- The process could issue an I/O request, and then be placed in an I/O queue.
- The process could create a new sub process and wait for its termination.
- The process could be removed forcibly from the CPU, as a result of an interrupt, and be put back in the ready queue.



In the first two cases, the process eventually switches from the waiting state to the ready state, and is then put back in the ready queue. A process continues this cycle until it terminates, at which time it is removed from all queues and has its PCB and resources deallocated.

3. What is a Process Control Block? Explain the contents of PCB.

Ans: A Process Control Block is a data structure maintained by the Operating System for every process. The PCB is identified by an integer process ID (PID). A PCB keeps all the information needed to keep track of a process as listed below in the table –

S.N.	Information & Description
1	Process State

The current state of the process i.e., whether it is ready, running, waiting, or whatever.

2

Process privileges

This is required to allow/disallow access to system resources.

3

Process ID

Unique identification for each of the process in the operating system.

4

Pointer

A pointer to parent process.

5

Program Counter

Program Counter is a pointer to the address of the next instruction to be executed for this process.

6

CPU registers

Various CPU registers where process need to be stored for execution for running state.

7

CPU Scheduling Information

Process priority and other scheduling information which is required to schedule the process.

8

Memory management information

This includes the information of page table, memory limits, Segment table depending on memory used by the operating system.

9

Accounting information

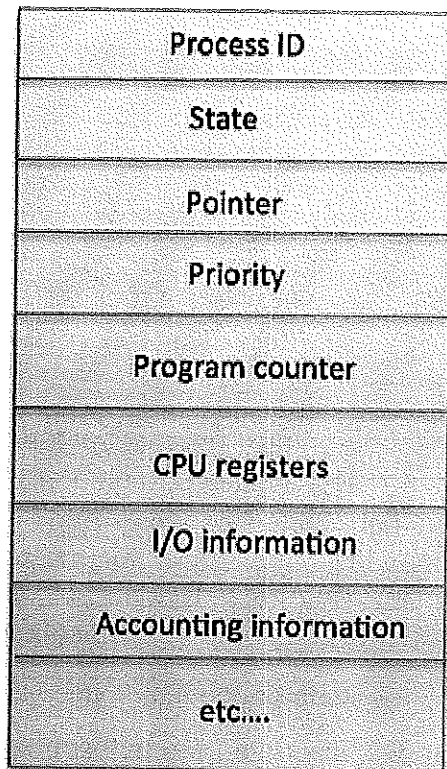
This includes the amount of CPU used for process execution, time limits, execution ID etc.

10

IO status information

This includes a list of I/O devices allocated to the process.

The architecture of a PCB is completely dependent on Operating System and may contain different information in different operating systems. Here is a simplified diagram of a PCB



The PCB is maintained for a process throughout its lifetime, and is deleted once the process terminates.

4. What is Demand Paging and what is the major issue with Demand Paging? Explain with the help of a neat diagram.

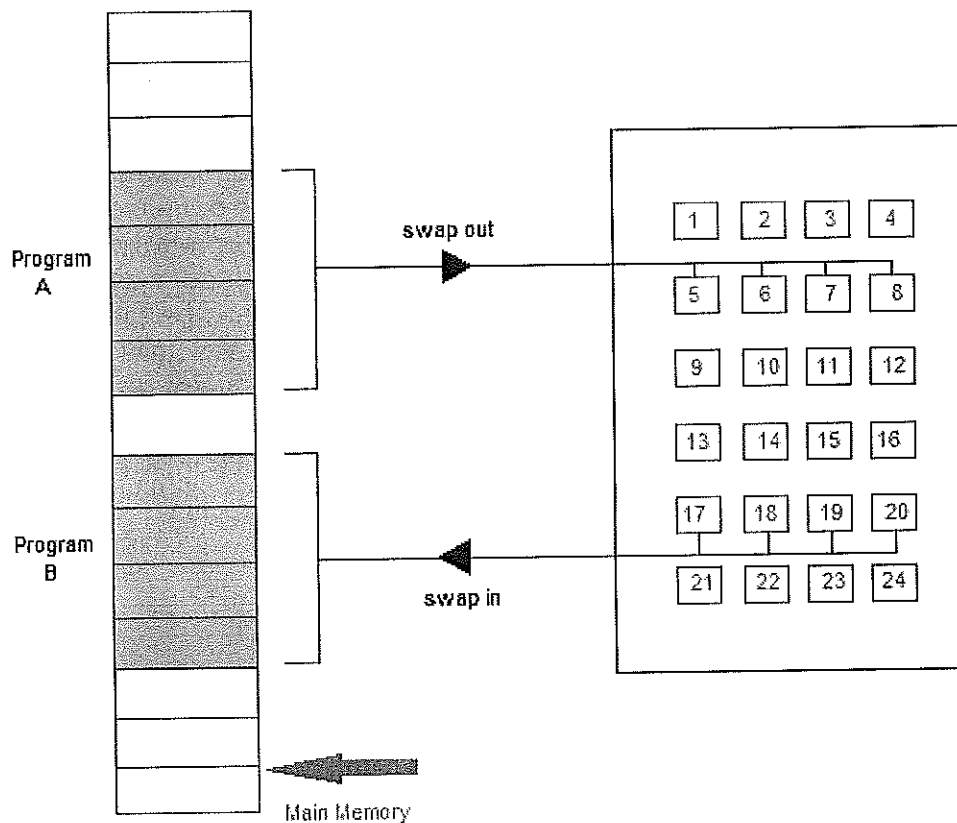
Ans: The basic idea behind demand paging is that when a process is swapped in, its pages are not swapped in all at once. Rather they are swapped in only when the process needs them (On demand). This is termed as lazy swapper, although a pager is a more accurate term.

Initially only those pages are loaded which will be required by the process immediately.

The pages that are not moved into the memory, are marked as **invalid** in the page table. For an invalid entry the rest of the table is empty. In case of pages that are loaded in the memory, they are marked as valid along with the information about where to find the swapped out page.

When the process requires any of the page that is not loaded into the memory, a page fault trap is triggered and following steps are followed,

- The memory address which is requested by the process is first checked, to verify the request made by the process.
- If its found to be invalid, the process is terminated.
- In case the request by the process is valid, a free frame is located, possibly from a free-frame list, where the required page will be moved.
- A new operation is scheduled to move the necessary page from disk to the specified memory location. (This will usually block the process on an I/O wait, allowing some other process to use the CPU in the meantime.)
- When the I/O operation is complete, the process's page table is updated with the new frame number, and the invalid bit is changed to valid.
- The instruction that caused the page fault must now be restarted from the beginning.



There are cases when no pages are loaded into the memory initially, pages are only loaded when demanded by the process by generating page faults. This is called **Pure Demand Paging**.

The only major issue with Demand Paging is, after a new page is loaded, the process starts execution from the beginning. It is not a big issue for small programs, but for larger programs it affects performance drastically.

5. Explain File System, File Structure, Attributes of a file and Directory. Discuss different file access methods.

Ans: A file can be "free formed", indexed or structured collection of related bytes having meaning only to the one who created it. Or in other words an entry in a directory is the file. The file may have attributes like name, creator, date, type, permissions etc.

File Structure

A file has various kinds of structure. Some of them can be:

- **Simple Record Structure** with lines of fixed or variable lengths.
- **Complex Structures** like formatted document or reloadable load files.
- **No Definite Structure** like sequence of words and bytes etc.

Attributes of a File

Following are some of the attributes of a file:

- **Name.** It is the only information which is in human-readable form.
- **Identifier.** The file is identified by a unique tag(number) within file system.
- **Type.** It is needed for systems that support different types of files.
- **Location.** Pointer to file location on device.
- **Size.** The current size of the file.
- **Protection.** This controls and assigns the power of reading, writing, executing.
- **Time, date, and user identification.** This is the data for protection, security, and usage monitoring.

File Access Methods

The way that files are accessed and read into memory is determined by Access methods. Usually a single access method is supported by systems while there are OS's that support multiple access methods.

Sequential Access

- Data is accessed one record right after another in an order.
- Read command cause a pointer to be moved ahead by one.
- Write command allocate space for the record and move the pointer to the new End of File.
- Such a method is reasonable for tape.

Direct Access

- This method is useful for disks.
- The file is viewed as a numbered sequence of blocks or records.
- There are no restrictions on which blocks are read/written, it can be done in any order.
- User now says "read n" rather than "read next".
- "n" is a number relative to the beginning of file, not relative to an absolute physical disk location.

Indexed Sequential Access

- It is built on top of Sequential access.
- It uses an Index to control the pointer while accessing files.

Directory

Information about files is maintained by Directories. A directory can contain multiple files. It can even have directories inside of them. In Windows we also call these directories as folders.

Following is the information maintained in a directory:

- **Name:** The name visible to user.
- **Type:** Type of the directory.
- **Location:** Device and location on the device where the file header is located.
- **Size:** Number of bytes/words/blocks in the file.
- **Position:** Current next-read/next-write pointers.
- **Protection:** Access control on read/write/execute/delete.
- **Usage:** Time of creation, access, modification etc.

Mounting: When the root of one file system is "grafted" into the existing tree of another file system its called Mounting.



6. Which one of the following containers contain registry based group policy setting including windows components, system & network?

- a) Administrative Templates
- b) Software Templates
- c) Windows Templates
- d) Logon Settings

Answer C

7. Which one of the following is the APIPA address in IPV4?

- a) 169.254.11.22
- b) 128.0.0.1
- c) 172.254.0.1
- d) 127.0.0.1

Answer A

8. Which one of the following statements is true regarding Discover option from DHCP service?

- a) Discover the IP by Client machine
- b) Its Broadcast process
- c) Both a & b are correct
- d) None of them

Answer C

9. Which one of the following permissions can be provided while sharing folders in a System?

- a) Read
- b) Change
- c) Full Control
- d) All of the Above

Answer D

10. The command "ifconfig /all" is used to find the "updated ip address" in windows operating system.

- a) True
- b) False

Answer B

11. The command "net computer" is used to show the users in a system.

- a) True
- b) False

Answer B

12. The "Format" command is used for the interaction of the user with operating System.

- a) True
- b) False

Answer A

ii) The command **dsmod user** "cn=student,cn=users,dc=bsdu,dc=com" -pwd 123 is used to modify the student password.

- a) True
- b) False

Answer B

10.i) The command "convert" used for conversion of NTFS to FAT partition.

- a) True
- b) False

Answer B

ii) The command "gpupdate/force" is used to enforce the policy at client machines.

- a) True
- b) False

Section-B

Attempt any Six Questions in this Section (6x5) Marks

1. Define DHCP & its principal. What are the ports used for it? Who will provide address if server fails?

Dynamic Host Configuration Protocol (DHCP) is used to provide the following:

IP address, Subnet mask, Gateway, DNS

On lease as per configuration at the Server.

=> **Work on the principle of**

Discover, Offer, Request, Acknowledge or

Request, Offer, Select, Acknowledge

DHCP uses Port 67/68 (total ports for services 1 to 65535)

APIPA provides IP address if dhcp fails. Its in the range of 169.254.xx.xx

2. What are the Steps required in order to assign driver letter to user login remotely?

Steps required in order to assign driver letter to user login remotely are :-

- a. Create a folder other than operating system partition.
- b. Hidden Share it with everyone with full rights.
- c. Open Active directory & user computers, under Profile, assign UNC path like //Computername/Sharename/%username% with any home drive chosen.
- d. Automatically user created under shared folder.

3. Define Virtualization & services used in Windows Server. Name at least three vendors concerned to it. Write the extensions of file associated with it.

virtualization refers to the act of creating a virtual (rather than actual) version of something, including virtual computer hardware platforms, storage devices, and computer network resources. Hyper-V is the service used in windows server 2008 onwards.

Vendors providing virtualization are:-

- a) Microsoft Virtual PC
- b) VMware
- c) Oracle Virtual Box

Normally File extension for virtual disk are Vhd or Vhdx. while with oracle virtual box extension is vdi.

4. Can we convert FAT to NTFS File system & vice versa? Comment with command. Yes, it's possible to convert FAT to NTFS without data loss. Command used is Convert drive: FS: NTFS

Microsoft doesn't allow NTFS to FAT though possible with third party tools like partition magic etc.

5. Describe VPN & its protocols.

VPN (Virtual Private Network) grant complete preservation on this action, moreover it takes the distributed network over a public connection. VPN Protocols makes the connection encrypted by converting the network securely into private through the concept of tunnelling. It is an approach that shields up the network connection between two parties over the internet.

6. Types of Protocol are :-

7. **A point-to-point Tunneling protocol(PPTP)** is a duet combination of Point-To-Point Protocol (PPP) and it's interrelation with Tunneling Protocol. It was the product of Microsoft. PPTP has become a most usable VPN protocol nowadays because it ensures the security of Virtual Network through other versatile conventions. It doesn't depend on encryption or authentication directly. It commences the network path beneficial from the Point-To-Point protocol.
8. **Layer 2 Tunneling Protocol (L2TP)** is a tunneling protocol that provides shelter to an entire network. L2TP doesn't heel the encryption and authentication for data confidentiality, but it works with other VPN protocols like IPsec, the IPsec takes out the encrypted and authenticated data then L2TP develops a safe and secure channel between two networks. Therefore this secure connection makes the data highly protected and guarded between source and destination.

6. Describe Telnet & steps for its configuration

Telnet is a network protocol that allows a user to communicate with a remote device. It is a virtual terminal protocol used mostly by network administrators to remotely access and manage devices. Administrator can access the device by *telnetting* to the IP address or hostname of a remote device.

To use telnet, you must have a software (Telnet client) installed. On a remote device, a Telnet server must be installed and running. Telnet uses the TCP port 23 by default.

One of the greatest disadvantages of this protocol is that all data, including usernames and passwords, is sent in clear text, which is a potential security risk. This is the main reason why Telnet is rarely used today and is being replaced by a much secure protocol called SSH.

Enable Telnet feature in Windows Server & start the Telnet service.

7. Describe the Delegate Control advantages in ADDS.

With the help of delegate control, we can assign authority to particular user in Organization unit instead of providing rights to administrator or else.

We can provide rights like Password change only, User creation, modification etc.

We can do all activities with Active Directory users & computers by assigning right click the Organization unit as per our requirements.

9. Differentiate Local & Network Printer?

A local printer is one which is directly connected to a specific computer via USB cable. This printer is only accessible from that particular workstation and therefore, can only service one computer at a time. Most printers these days will automatically install the printers' software onto your computer the first time it is connected via USB. This makes it very easy to setup and start using right away out of the box.

A network printer, on the other hand, is part of a workgroup or network of computers that can all access the same printers at the same time. These printers or copiers are connected to the networks server via ethernet cable. Wireless printers and copiers do not have to have a physical connection with an ethernet cable to the network. They can also be connected to the network wirelessly and accessed by the workstations.

Section-C Attempt all Questions in this Section

(5X10) Marks

1. Describe the requirements for conversion of workgroup to domain in Windows Server. What are the advantage of it?

Steps required for conversion of workgroup to domain are: -

- a) Must be administrative privilege
- b) Must have NTFS partition
- c) Static IP required
- d) Must be in network

Advantage of converting to domain are: -

- a) Centralized administration
- b) Backup can be taken from central location instead of multiple PC's.
- c) Group policies can be applied for restriction on desktops wallpaper, screensaver etc.
- d) Services like DHCP, DNS, FTP, WDS, IIS etc. can be configured as per our requirements.
- e) Security is enhanced in comparison to workgroup.

2. Describe DNS & it's working.

DNS Working

The **Domain Name System (DNS)** is used to resolve human-readable hostnames like www.Dyn.com into machine-readable IP addresses like 204.13.248.115. DNS also provides other information about domain names, such as mail services.

But why is DNS important? How does it work? What else should you know?

Why is DNS important?

DNS is like a phone book for the Internet. If you know a person's name but don't know their telephone number, you can simply look it up in a phone book. DNS provides this same service to the Internet.

When you visit <http://dyn.com> in a browser, your computer uses DNS to retrieve the website's IP address of 204.13.248.115. Without DNS, you would only be able to visit our website (or any website) by visiting its IP address directly, such as <http://204.13.248.115>.

How does DNS work?

When you visit a domain such as dyn.com, your computer follows a series of steps to turn the human-readable web address into a machine-readable IP address. This happens every time you use a domain name, whether you are viewing websites, sending email or listening to Internet radio stations like Pandora.

Step 1: Request information

The process begins when you ask your computer to resolve a hostname, such as visiting *http://dyn.com*. The first place your computer looks is its local DNS cache, which stores information that your computer has recently retrieved.

If your computer doesn't already know the answer, it needs to perform a **DNS query** to find out.

Step 2: Ask the recursive DNS servers

If the information is not stored locally, your computer queries (contacts) your ISP's **recursive DNS servers**. These specialized computers perform the legwork of a DNS query on your behalf. Recursive servers have their own caches, so the process usually ends here and the information is returned to the user.

Step 3: Ask the root nameservers

If the recursive servers don't have the answer, they query the **root nameservers**. A **nameserver** is a computer that answers questions about domain names, such as IP addresses. The thirteen root nameservers act as a kind of telephone switchboard for DNS. They don't know the answer, but they can direct our query to someone that knows where to find it.

Step 4: Ask the TLD nameservers

The root nameservers will look at the first part of our request, reading from right to left — *www.dyn.com* — and direct our query to the **Top-Level Domain (TLD) nameservers** for *.com*. Each TLD, such as *.com*, *.org*, and *.us*, have their own set of nameservers, which act like a receptionist for each TLD. These servers don't have the information we need, but they can refer us directly to the servers that *do* have the information.

Step 5: Ask the authoritative DNS servers

The TLD nameservers review the next part of our request — *www.dyn.com* — and direct our query to the nameservers responsible for this *specific* domain. These **authoritative nameservers** are responsible for knowing all the information about a specific domain, which are stored in **DNS records**. There are many types of records, which each contain a different kind of information. In this example, we want to know the IP address for *www.dyndns.com*, so we ask the authoritative nameserver for the **Address Record (A)**.

Step 6: Retrieve the record

The recursive server retrieves the A record for *dyn.com* from the authoritative nameservers and stores the record in its local cache. If anyone else requests the host record for *dyn.com*, the recursive servers will already have the answer and will not need to go through the lookup process again. All records have a **time-to-live** value, which is like an expiration date. After a while, the recursive server will need to ask for a new copy of the record to make sure the information doesn't become out-of-date.

Step 7: Receive the answer

Armed with the answer, recursive server returns the A record back to your computer. Your computer stores the record in its cache, reads the IP address from the record, then passes this information to your browser. The browser then opens a connection to the webserver and receives the website.

This entire process, from start to finish, takes only milliseconds to complete.

3. Describe WDS & its requirements for implementation. Give its advantages.

Benefits of Windows Deployment Services

1. Allows network-based installation of Windows operating systems, which reduces the complexity and cost when compared to manual installations.
2. Supports deploying images for mixed environments including Windows 7 and Windows Server 2008 R2 through Windows 8.1 and Windows Server 2012 R2.
3. Uses standard Windows Setup technologies including Windows Preinstallation Environment (Windows PE), .wim files, and image-based setup.
4. Transmits data and images by using multicast functionality.
5. Allows you to create images of a reference computer using the Image Capture Wizard, which is an alternative to the ImageX tool.
6. Allows you to add driver packages to the server and configure them to be deployed to client computers along with the install image.

The following are requirements for installing this role, depending on whether you choose the default installation (both Deployment Server and Transport Server), or only the Transport Server role service.

Deployment Server and Transport Server

Active Directory Domain Services (AD DS). A Windows Deployment Services server must be a member of an Active Directory Domain Services (AD DS) domain or a domain controller for an AD DS domain.

The AD DS domain and forest versions are irrelevant; all domain and forest configurations support Windows Deployment Services.

AD DS is not required if the WDS server is configured in Standalone mode.

- **DHCP.** You must have a working Dynamic Host Configuration Protocol (DHCP) server with an active scope on the network because Windows Deployment Services uses PXE, which relies on DHCP for IP addressing.
- **DNS.** You must have a working Domain Name System (DNS) server on the network before you can run Windows Deployment Services.
- **NTFS volume.** The server running Windows Deployment Services requires an NTFS file system volume for the image store.
- **Credentials.** To install the role, you must be a member of the Local Administrators group on the server.

To initialize the server, you must be a member of the Domain Admins group.

To initialize the WDS server in Standalone mode, you need not be a member of the Domain Users group.

4. Describe RAID & its types with Figure.

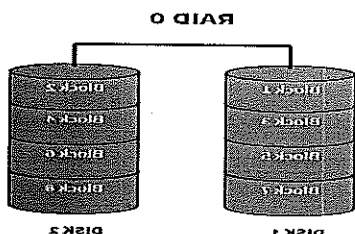
What is RAID?

Redundant Array of Independent (or Inexpensive) Disks.

RAID is a storage virtualization technology which is used to organize multiple drives into various arrangements to meet certain goals like redundancy, speed and capacity. RAID can be categorized into **Software RAID and Hardware RAID**. In software RAID, the memory architecture is managed by the operating system. In case of hardware RAID, there is a dedicated controller and processor present inside the disks that manage the memory. There are various raid levels as discussed below.

RAID 0

RAID 0 is based on data striping. A stream of data is divided into multiple segments or blocks and each of those blocks is stored on different disks. So, when the system wants to read that data, it can do so simultaneously from all the disks and join them together to reconstruct the entire data stream. The benefit of this is that the speed increases drastically for read and write operations. It is great for situations where performance is a priority over other aspects. Also, the total capacity of the entire volume is the sum of the capacities of the individual disks. The downside, as you may have already guessed it is that there is almost no redundancy. If one of the disks fails, the entire data becomes corrupt and worthless since it cannot be recreated anymore.



Advantages:

- Performance boost for read and write operations
- Space is not wasted as the entire volume of the individual disks are used up to store unique data

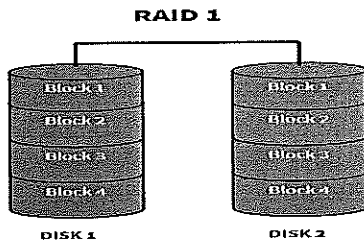
Disadvantages

- There is no redundancy/duplication of data. If one of the disks fails, the entire data is lost.

RAID 1

RAID 1 uses the concept of data mirroring. Data is mirrored or cloned to an identical set of disks so that if one of the disks fails, the other one can be used. It also improves read performance

since different blocks of data can be accessed from all the disks simultaneously. This can be explained in the diagram below. A multi-threaded process can access Block 1 from Disk 1 and Block 2 from Disk 2 at once thereby increasing the read speed just like RAID 0. **But unlike RAID 0, write performance is reduced since all the drives must be updated whenever new data is written. Another disadvantage is that space is wasted to duplicate the data thereby increasing the cost to storage ratio.**



Advantages

- Data can be recovered in case of disk failure
- Increased performance for read operation

Disadvantages

- Slow write performance
- Space is wasted by duplicating data which increases the cost per unit memory

5.Explain the Backup & its types with Figure.

Backing-up is a crucial process that everyone should do in order to have a fail-safe, for when the inevitable happens. The principle is to make copies of particular data in order to use those copies for restoring the information if a failure occurs (a data loss event due to deletion, corruption, theft, viruses etc.).

Full backup

Full backup is the starting point for all other types of backup and contains all the data in the folders and files that are selected to be backed up. Because full backup stores all files and folders, frequent full backups result in faster and simpler restore operations. Remember that when you choose other **backup types**, restore jobs may take longer. As an example, for a full backup job that runs four times the representation below is conclusive on how the backed up data will grow with every run:

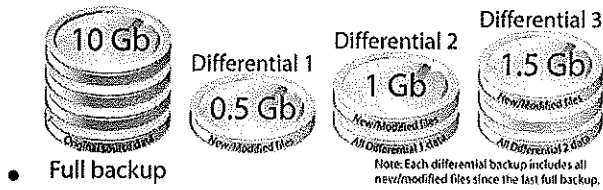


Since this is the foundation of all other backup types, a detailed article explains it thoroughly: [What is full backup?](#)

Differential backup

Differential backup contains all files that have changed since the last FULL backup. The advantage of a differential backup is that it shortens restore time compared to a full backup or an incremental backup. However, if you perform the differential backup too many times, the size of the differential

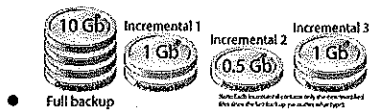
backup might grow to be larger than the baseline full backup. In the image below you can see an example on how a differential backup would look like for a backup job that runs four times:



Read the [differential backup](#) page for more details.

Incremental backup

Incremental backup stores all files that have changed since the last FULL, DIFFERENTIAL OR INCREMENTAL backup. The advantage of an incremental backup is that it takes the least time to complete. However, during a restore operation, each incremental backup must be processed, which could result in a lengthy restore job. The representation below shows how a backup job running four times would look like when using incremental:



This is one of the most popular backup types, you can find more about it and how to use incremental in a backup strategy here: [incremental backups](#).

Mirror backup

Mirror backup is identical to a full backup, with the exception that the files are not compressed in zip files and they can not be protected with a password. A mirror backup is most frequently used to create an exact copy of the source data. It has the benefit that the backup files can also be readily accessed using tools like Windows Explorer. The image below shows how a mirror backup job would look after four iterations (first mirror will back-up everything, subsequent fast mirror backups will back-up only new/modified files):

