Registration No: .....

SCHOOL OF COMPUTING SKILLS

END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1101 Introduction to Computers

Time: 3 Hours

Max. Marks: 100

Section-A Attempt ALL questions in this section **(20x1) Marks**

1. Which one of the following protocol provides e-mail facility among different hosts?
   A) FTP B) SMTP
   C) TELNET D) SNMP

2. From which one of the following generation, operating systems were developed?
   A) First B) Second
   C) Third D) Fourth

3. Which one of the following should be used to delete a file without allowing it to store in recycle bin?
   A) Press Delete key
   B) Press Shift + Delete key
   C) Press Ctrl + Delete key
   D) None of these

4. Which one of the following is the function of software in computer?
   A) Enhances the capabilities of the hardware machine
   B) Increase the speed of central processing unit
   C) Both of above
   D) None of above

5. Which one of the following language is directly understood by the computer without translation program?
   A) Machine language
   B) Assembly language
   C) High level language
   D) None of above

6. On which one of the following aspect the analog computers are better than digital?
   A) Speed B) Accuracy
   C) Reliability D) Automatic

7. The word length of a computer is measured in which one of the following?
   A) Bytes B) Millimeters
   C) Meters D) Bits

8. Which one of the following unit holds data permanently?
   A) Input unit B) Secondary storage unit
   C) Output Unit D) Primary Memory Unit

9. Which one of the following in the circuit is used to store one bit of data?
   A) Register B) Encoder
   C) Decoder D) Flip Flop

10. High level language is also called as which one of the following?
   A) Problem oriented language
   B) Business oriented language
   C) Mathematically oriented language
   D) All of the above

11. The internal components of the processor are connected by which one of the following?
   A) Memory Bus B) Processor Bus
   C) RAM Bus D) None of these

12. Which one of the following memory is non-volatile?
   A) SRAM B) ROM
   C) DRAM D) None of these

13. Which one of the following is responsibility of the logical unit in the CPU of a computer?
A) To produce result
B) To compare numbers
C) To control flow of information
D) None of these

14. Which one of the following unit converts user data into machine readable form?
A) Input Unit B) Output Unit
C) ALU D) Control Unit

15. Integrated Circuits (ICs) are related to which one of the following generation of computers?
A) First B) Second
C) Third D) Fourth

16. Floppy Disk is an example of which one of the following?
A) Primary Storage Device
B) Secondary Storage Device
C) Basic Storage Device
D) Secondary Software Device

17. Which one of the following is a valid statement?
A) 1KB =1024 Bytes
B) 1 MB = 1024 Bytes
C) 1KB = 1000 Bytes
D) 1 MB = 1000 Bytes

18. Which one of the following is typically the longest: bit, byte, nibble, word?
A) Bit B) Byte
C) Nibble D) Word

19. Which one of the following operation is carried out by a NOT gate?
A) Inverting B) Converting
C) Reverting D) Reversing

20. Which one of the following is not an input unit device?
A) scanner B) camera
C) plotter D) digitizer

Section-B Attempt any SIX questions in this section **(6x5) Marks**

1. Convert the following:
   A) $(1011.101)_2 = (\ldots\ldots\ldots\ldots)_8$
   B) $(45AB2)_{16} = (\ldots\ldots\ldots\ldots)_{10}$

2. Complete the following Operation and give results in the same base:
   A) $(621451)_8 + (44162)_8$
   B) $(1101.1101)_2 - (1011.101)_2$

3. Explain the working of D Flip Flop with block diagram & Truth Table.

4. What are Universal gates? Implement AND & OR gates using universal gates.

5. Explain the function of system software and Application software with examples. Write their advantages and disadvantages.

6. Discuss the Ex-NOR gate with logic diagram and truth table.

7. Expand the following:

I) TCP/IP II) EEPROM III) USB IV) DBMS V) PDF

8. Define the following:
   I) Protocol Stack II) Register III) Operating System IV) Byte V) Database

Section-C Attempt ALL questions in this section **(5x10) Marks**

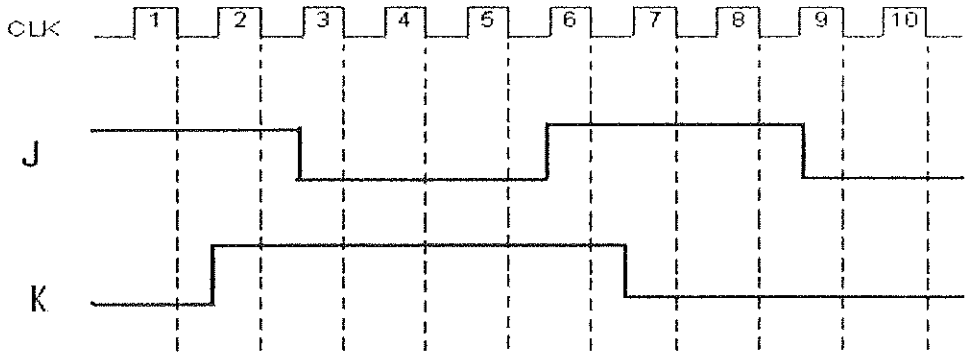
1. Discuss the second and fourth generations of computers. Write about their technical advancements.

2. Discuss the difference between Microprocessor (8085) and Microcontroller (8051) with block diagrams.

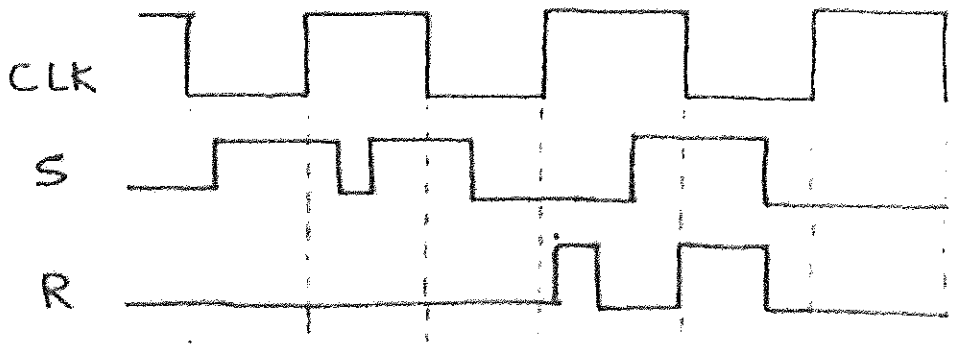
3. Explain the working of a full-adder logic circuit with truth table.

4. Explain the main purpose of an operating system. Also, write about the technical advancement of different versions of Windows OS.

5. (i) The wave shapes for J, K & clock of JK flip flop are depicted below. Sketch the output at Q, which is initially low.



(ii) The wave shapes for S, R & clock of clocked SR flip flop are depicted below. Sketch the output at Q, which is initially high.



Registration No: .....

SCHOOL OF ITN & MLAI

END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

Course Code: ITN1101 **Time: 3 Hours**

Course Name: Introduction to Computers **Max. Marks: 100**

Section-A Attempt all questions in this section **(20x1) Marks**

1. Which one of the following protocol provides e-mail facility among different hosts?
   A) FTP B) SMTP C) TELNET D) SNMP
   Answer: B
2. From which one of the following generation, operating systems were developed?
   A) First B) Second C) Third D) Fourth
   Answer: C
3. Which one of the following should be used to delete a file without allowing it to store in recycle bin?
   A) Press Delete key B) Press Shift + Delete key
   C) Press Ctrl + Delete key D) None of these
   Answer: B
4. Which one of the following is the function of software in computer?
   A) Enhances the capabilities of the hardware machine
   B) Increase the speed of central processing unit
   C) Both of above D) None of above
   Answer: A
5. Which one of the following language is directly understood by the computer without translation program?
   A) Machine language B) Assembly language
   C) High level language D) None of above
   Answer: A
6. On which one of the following aspect the analog computers are better than digital?
   A) Speed B) Accuracy C) Reliability D) Automatic
   Answer: B
7. The word length of a computer is measured in which one of the following?
   A) Bytes B) Millimeters C) Meters D) Bits
   Answer: D
8. Which one of the following unit holds data permanently?
   A) Input unit B) Secondary storage unit C) Output Unit D) Primary Memory Unit
   Answer: B
9. Which one of the following in the circuit is used to store one bit of data?
   A) Register B) Encoder C) Decoder D) Flip Flop
   Answer: D
10. High level language is also called as which one of the following?
    A) Problem oriented language B) Business oriented language
    C) Mathematically oriented language D) All of the above
    Answer: D
11. The internal components of the processor are connected by which one of the following?

A) Memory Bus B) Processor Bus C) RAM Bus D) None of these

Answer: B

12. Which one of the following memory is non-volatile?

A) SRAM B) ROM C) DRAM D) None of these

Answer: B

13. Which one of the following is responsibility of the logical unit in the CPU of a computer?

A) To produce result B) To compare numbers

C) To control flow of information D) None of these

Answer: B

14. Which one of the following unit converts user data into machine readable form?

A) Input Unit B) Output Unit C) ALU D) Control Unit

Answer: A

15. Integrated Circuits (ICs) are related to which one of the following generation of computers?

A) First B) Second C) Third D) Fourth

Answer: C

16. Floppy Disk is an example of which one of the following?

A) Primary Storage Device B) Secondary Storage Device

C) Basic Storage Device D) Secondary Software Device

Answer: B

17. Which one of the following is valid statement?

A) 1 KB = 1024 Bytes B) 1 MB = 1024 Bytes

C) 1 KB = 1000 Bytes D) 1 MB = 1000 Bytes

Answer: A

18. Which one of the following is typically the longest: bit, byte, nibble, word?

A) Bit B) Byte C) Nibble D) Word

Answer: D

19. Which one of the following operation is carried out by a NOT gate?

A) Inverting B) Converting C) Reverting D) Reversing

Answer: A

20. Which one of the following is not an input unit device?

A) scanner B) camera C) plotter D) digitizer

Answer: C

Section-B Attempt any six questions in this section **(6x5) Marks**

1. Convert the following:

   A) $(1011.101)_2 = (\ldots\ldots\ldots\ldots)_8 = \mathbf{(13.5)_8}$

   B) $(45AB2)_{16} = (\ldots\ldots\ldots\ldots)_{10} = \mathbf{(69)_{10}}$

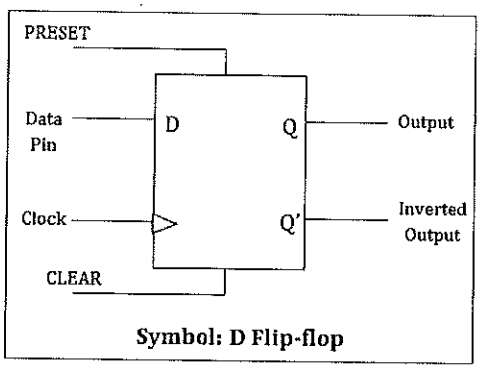
2. Complete the following Operation and give results in same base:

   A) $(621451)_8 + (44162)_8 = \mathbf{(665633)_8}$

   B) $(1101.1101)_2 - (1011.101)_2 = \mathbf{(1101.1101)_2}$

3. Explain the working of D Flip Flop with block diagram &Truth Table.

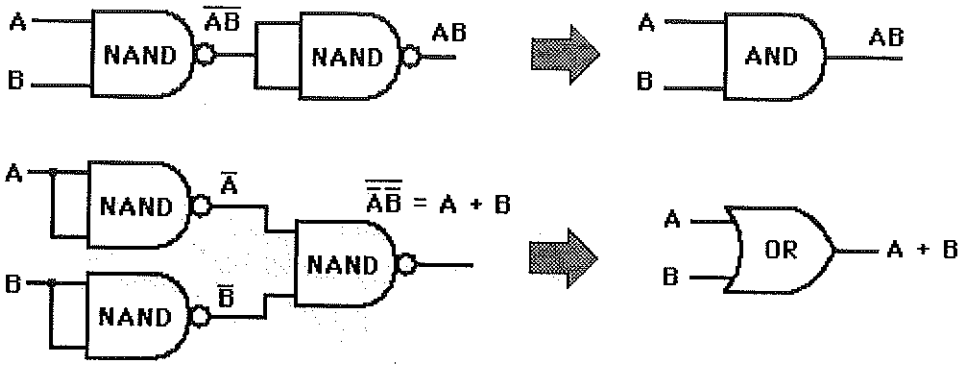
   Answer:



Symbol: D Flip-flop

4. What are Universal gates? Implement AND & OR gates using universal gates.
Answer:
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.

Implementation Using NAND Gate:

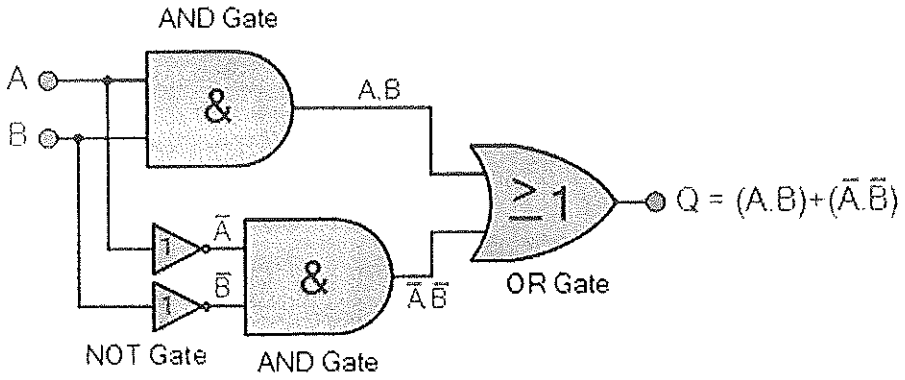


5. Explain the function of system software and Application software with examples. Write their advantages and disadvantages.
Answer:

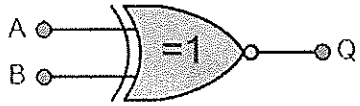
System Software: (Operating System) It is the background software that enables the application software to interact with each other.
Function:
Control the hardware, the memory and the application software
Manages the information on the disk
Runs computer programs
Manages the startup process

Application Software: It is a group of programs designed to accomplish a single task or a group of related tasks
Function:
Also known as Bespoke Software or Tailor-Made Software

6. Discuss the Ex-NOR gate with logic diagram and truth table.



2-input Ex-NOR Gate

Symbol	Truth Table		
 2-input Ex-NOR Gate	B	A	Q
	0	0	1
	0	1	0
	1	0	0
	1	1	1
Boolean Expression $Q = \overline{A \oplus B}$	Read if A AND B the SAME gives Q		

7. Expand:
   I) TCP/IP II) EEPROM III) USB IV) DBMS V) PDF
8. Define:
   I) Protocol Stack II) Register III) Operating System IV) Byte V) Database

Section-C Attempt all questions in this section **(5x10) Marks**

1. Discuss the second and fourth generations of computers. Write about their technical advancements.

Answer:

There are five generations of Computer.

1) 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.
2) Fourth Generation (1978 - Present):
   - Large Scale Integration (LSI) and Very Large-Scale Integration (VLSI) Technology are used for internal operations.

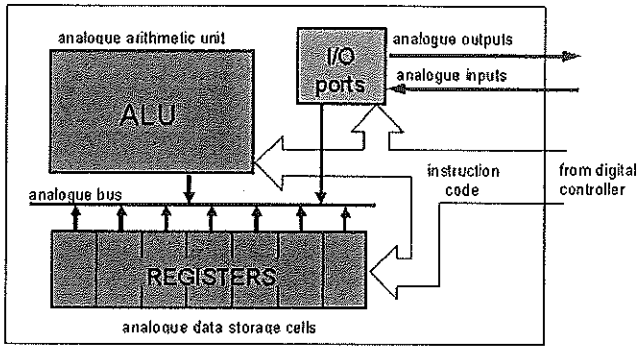
- All the higher-level language like C and C++, DBASE etc. are used in this generation.
- Some Computer of this generation are: STAR 1000, CRAY -I (Super Computer).

2. Discuss the difference between Microprocessor (8085) and Microcontroller (8051) with block diagrams.

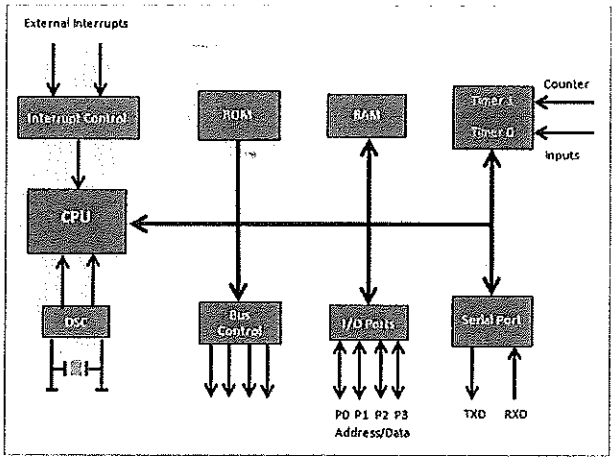
Answer:

Key difference in both of them is presence of external peripheral, where microcontrollers have RAM, ROM, EEPROM embedded in it while we have to use external circuits in case of microprocessors.

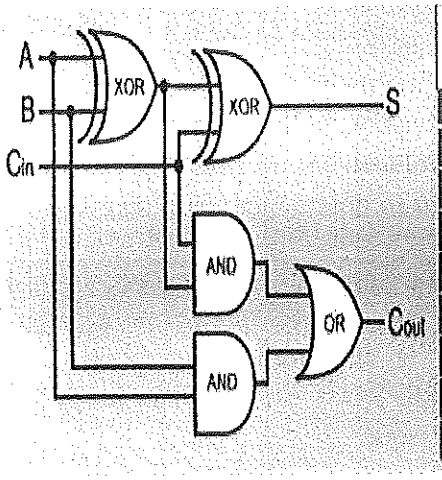
Microprocessor



Microcontroller



3. Explain the working of full-adder logic circuit with truth table.



INPUT		CARRY IN	OUTPUT	
x	y	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

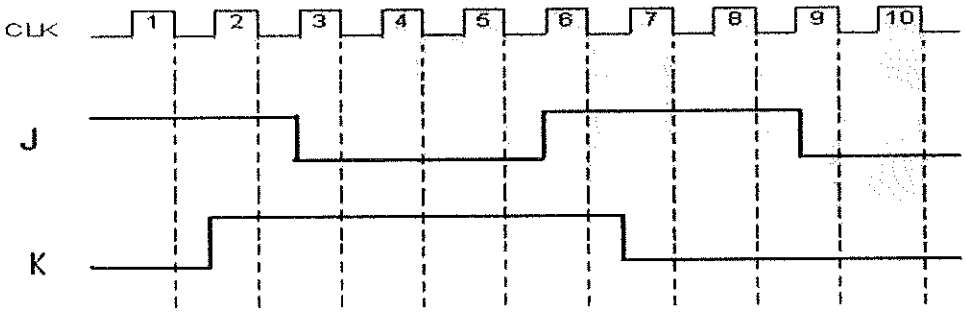
4. Explain the main purpose of an operating system? Also, Write about the technical advancement of different versions of windows.

   Answer:

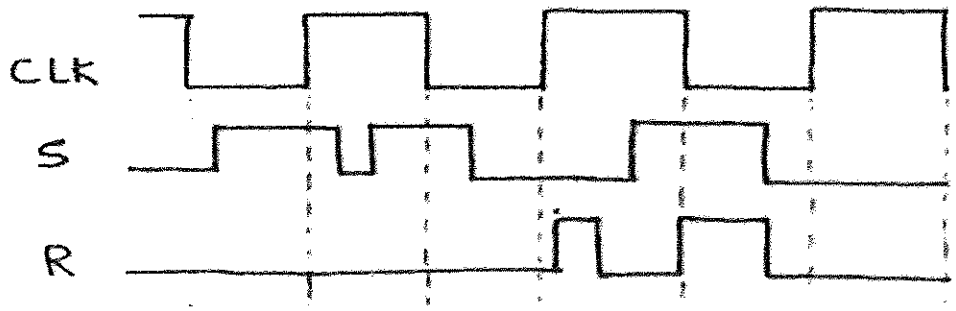
   Operating systems exist for two main purposes. One is that it is designed to make sure a computer system performs well by managing its computational activities. Another is that it provides an environment for the development and execution of programs.

   Difference between different version of windows.

5. (i) The wave shapes for J, K & clock of JK flip flop are depicted below. Sketch the output at Q, which is initially low.



(ii) The wave shapes for S, R & clock of clocked SR flip flop are depicted below. Sketch the output at Q, which is initially high.



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Registration No: .....

BSDU

SCHOOL OF COMPUTING SKILLS

Session: 2018-19 (Winter Semester)

B. Voc. Program, I-Semester

End-Sem. Examination

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 forms does the CPU provide output:
   a. Computer signals
   b. Digital signals
   c. Metal signals
   d. None of these
2. Which one of the following bus carries timing signals?
   a. System bus
   b. Control bus
   c. Address bus
   d. Data bus
3. 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
4. Which one of the following is a secondary memory device?
   a. Keyboard
   b. Disk
   c. ALU
   d. All of the above
5. Approximately how many bytes make one Megabyte?
   a. One thousand
   b. Ten thousand
   c. One Million
   d. One hundred
6. The capacity of your hard drive is measured in which one of the following? ?
   a. MHz
   b. Mbps
   c. Gigabytes
   d. 52X
7. Which one of the following is a temporary primary memory?
   a. PROM
   b. RAM
   c. EPROM
   d. ROM
8. CD-ROM stands for which one of the following?
   a. Compactable Read Only Memory
   b. Compact Data Read Only Memory
   c. Compactable Disk Read Only Memory
   d. Compact Disk Read Only Memory
   e. None of these
9. Which one of the following chips acts as a clock to keep the current date and the time?
   a. CMOS
   b. DVRAM
   c. RAM
   d. ROM
10. Which one of the following is not a peripheral hardware device in a computer system?
    a. Keyboard
    b. Optical Drive
    c. HDD
    d. Printer
11. Which one of the following is also called computer monitor?
    a. VDT
    b. VDU
    c. CRT
    d. None of the above
12. Which one of the following is a scanning technology?
    a. OCR
    b. OMR
    c. BCR
13. 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

14. What one of the following units holds a microprocessor chip, memory chip and expansion slots?
    a. Slots
    b. Ports
    c. Mother Board
    d. Daughter Board
15. Which one of the following port is used to connect DB-25 pin Modems or scanners?
    a. Serial Port
    b. Parallel Port
    c. PS/2 Port
    d. USB Port
16. 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
17. Which one of the following type of storage devices is a BIOS?
    a. Primary
    b. Secondary
    c. Tertiary
    d. Not a storage device
18. In computer which one of the following converts AC to DC?
    a. POST
    b. Adapter
    c. RAM
    d. SMPS
19. Which one of the following is responsible for finding and loading the operating system into RAM?
    a. Bootstrap Loader
    b. CMOS
    c. BIOS
    d. DMOS
20. Which one of the following retains the information it's storing when the power to the system is turned off?
    a. CPU
    b. ROM
    c. RAM
    d. DRAM

Section-B Attempt any SIX Questions in this Section 6x5 Marks

Q 1. Differentiate between Input and Output Devices.

Q 2. Differentiate between serial and parallel ports.

Q 3. What is a microprocessor? Explain.

Q 4. What is a heat sink? What is its use? If it is not in the system, what will happen?

Q 5. What is the difference between RAM and ROM?

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

Q 7. What is multitasking? Explain.

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. What is a mother Board? Write down its components.

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

Q 3. What is memory? Explain different types of RAM

Q 4. Write short notes on the following:
a) CPU b) Optical Mouse c) UPS

Q 5. Explain the difference between BIOS and CMOS.

Registration No: .....

SCHOOL OF COMPUTING SKILLS

Session: 2018-19 (Winter Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: ITN1102 **Time: 3 Hours**

Course Name: Computer Assembling & Peripheral Installation **Max. Marks: 100**

Section-A **20x1 Marks**

Note: Attempt all Questions in this Section

Section-A **20x1 Marks**

1. Who is the brain of computer:
   a. ALU
   b. CPU
   c. MU
   d. None of these

Ans : a

2. In which form CPU provide output:
   a. Computer signals
   b. Digital signals
   c. Metal signals
   d. None of these

Ans : b

3. Which bus carry addresses:
   a. System bus
   b. Address bus
   c. Control bus
   d. Data bus

Ans : b

4. 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

5. Which of the following is a secondary memory device?
   a. Keyboard
   b. Disk
   c. ALU
   d. All of the above

Ans : b

6. The difference between memory and storage is that memory is .... and storage is ...
   a. Temporary, permanent
   b. Permanent, temporary
   c. Slow, fast
   d. All of above

Ans : a

7. Microprocessors can be used to make
   a. Computer
   b. Digital systems
   c. Calculators

d. All of the above

Ans : d

8. Which of the following is a temporary primary memory?
   a. PROM
   b. RAM
   c. EPROM
   d. ROM

Ans : b

9. 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
   e. None of these

Ans : d

10. Which chip acts as a clock to keep the current date and the time?
   a. CMOS
   b. DVRAM
   c. RAM
   d. ROM

Ans : a

11. Which of the following is not a peripheral hardware device in a computer system?
   a. Keyboard
   b. Optical Drive
   c. HDD
   d. Printer

Ans : c

12. A computer monitor is also called a
   a. VDT
   b. VDU
   c. CRT
   d. None of the above

Ans : c

13. Which of the following is a scanning technology?
   a. OCR
   b. OMR
   c. BCR
   d. All the above

Ans : d

14. 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

15. 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

16. Which of the following port is used to connect DB-25 pin Modems or scanners?
   a. Serial Port

b. Parallel Port
c. PS/2 Port
d. USB Port

Ans : b

17. 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

18. Which type of storage device is a BIOS?
    a. Primary
    b. Secondary
    c. Tertiary
    d. Not a storage device

Ans : a

19. In computer what converts AC to DC?
    a. POST
    b. Adapter
    c. RAM
    d. SMPS

Ans : d

20. Which of the following retains the information it's storing when the power to the system is turned off?
    a. CPU
    b. ROM
    c. RAM
    d. DRAM

Ans: b

Section-B **6x5 Marks**

(Answer any Six Questions)

Q 1. What is a computer?

Ans : . Computer Is an electronic machine/device which can input data,process them according to the instruction given and then give out the meaningful information.

- The data consists of numbers, text, sound, images, animations, and video.
- The process converts numbers, text, sound, images, animations, and video (data) into usable data, which is called information.
- The information consists of numbers, text, sound, images, animations, and video that has been converted by the process.
- The data is inserted using an input device.
- The central processing unit (CPU) converts data to information.
- The information is put on an output device.

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 is a microprocessor?
Ans : : A microprocessor incorporates the functions of a CPU on a single integrated circuit or a few integrated circuits. It is a computer processor on a microchip and is a multipurpose, programmable device that uses digital data as input and provides results as an output once it processes the input according to instructions stored in its memory. Microprocessors use sequential digital logic as they have internal memory and operate on numbers and symbols represented in the binary numeral system. They are designed to perform arithmetic and logic operations that make use of data on the chip. General purpose microprocessors in PCs are used for multimedia display, computation, text editing and communication. Several microprocessors are part of embedded systems. These embedded microprocessors provide digital control to several objects including appliances, automobiles, mobile phones and industrial process control.

Q 4. What is heat sink? What is its use? If it is not in the system what will happen?
Ans : A heat sink is a component used to lower the temperature of a device.it is most commonly there on the microprocessor. If it is not properly fixed the system, the system will shutdown automatically to prevent further damage to the processor.
Q 5. What is the difference 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 ROM can be modified.	Data in ROM can not be modified.

BASIS FOR COMPARISON	RAM	ROM
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 **5x10 Marks**

Q 1. What is mother Board? Write down its components, draw block diagram ?
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.

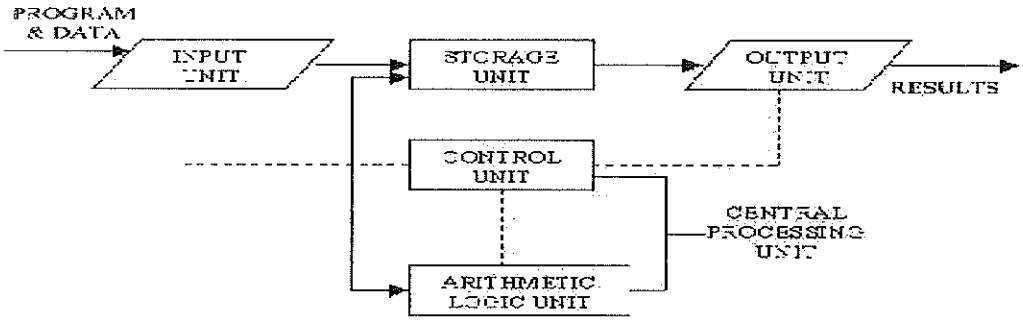
5. Control: The manner how instructions are executed and the above operations are performed. Controlling of all operations like input, processing and output are performed by control unit. It takes care of step by step processing of all operations inside the computer.

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. What is memory? Explain different types of RAM

Ans : A memory is just like a human brain. It is used to store data and instructions. Computer memory is the storage space in the computer, where data is to be processed and instructions required for processing are stored. The memory is divided into large number of small parts called cells. Each location or cell has a unique address, which varies from zero to memory size minus one.

Memory is primarily of three types –

i. Cache Memory
ii. Primary Memory/Main Memory
iii. Secondary Memory

Cache Memory : Cache memory is a very high speed semiconductor memory which can speed up the CPU. It acts as a buffer between the CPU and the main memory.

Primary Memory/Main Memory : Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity and data is lost when power is switched off. It is divided into two subcategories RAM and ROM.

Secondary Memory : This type of memory is also known as external memory or non-volatile. It is slower than the main memory. These are used for storing data/information permanently.

Types of RAM :

RAM is of two types –

i. Static RAM (SRAM)
ii. Dynamic RAM (DRAM)

Static RAM (SRAM)

The word static indicates that the memory retains its contents as long as power is being supplied. However, data is lost when the power gets down due to volatile nature. SRAM chips use a matrix of 6-transistors and no capacitors. Transistors do not require power to prevent leakage, so SRAM need not be refreshed on a regular basis.

Characteristic of Static RAM

- Long life
- No need to refresh
- Faster
- Used as cache memory
- Large size
- Expensive
- High power consumption
- Dynamic RAM (DRAM)

DRAM, unlike SRAM, must be continually refreshed in order to maintain the data. This is done by placing the memory on a refresh circuit that rewrites the data several hundred times per second. All DRAMs are made up of memory cells, which are composed of one capacitor and one transistor.

- Characteristics of Dynamic RAM
- Short data lifetime
- Needs to be refreshed continuously
- Slower as compared to SRAM
- Used as RAM
- Smaller in size
- Less expensive
- Less power consumption

Q 4. Write note on the following of any two
a) BIOS b) Optical Mouse c) Expansion cards

Ans : a) **BIOS :** The BIOS is built-in software that contains generic code required to control the keyboard, display screens, disk drives and other functions. The primary purpose of the BIOS is to set up hardware and further load and start an operating system. BIOS is placed in a nonvolatile ROM chip inside the computer, ensuring the availability of BIOS at all times and preventing accidental disk failure. The BIOS checks every hardware connection and locates the devices, after which the operating system is loaded into computer memory.

b) **Optical Mouse :** Optical mouse is a computer pointing device that uses a light-emitting diode (LED), optoelectronic sensor and digital signal processor (DSP) to detect changes in reflected light from image to image. An optical mouse uses special-purpose image processing chips, as the mouse takes over 1,000 images/ps below the surface level to detect movement through reflected light changes. This allows usable movement data to be generated by the DSP and sensor.

c) **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.

Q 5. What is the difference between BIOS and CMOS?

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.

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SCHOOL OF COMPUTING SKILLS

END-SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1104 Basic Computer Networking

Max. Marks: 100

Time: 3 Hours

Section-A **20x1 Marks**

Note: Attempt all Questions in this Section

Q1. Which one of the following is called the Physical or logical arrangement of network? a) Topology b) Routing c) Networking d) None of the mentioned	Q2. Which one of the following is the topology in which there is a central controller or hub? a) Star b) Mesh c) Ring d) Bus
Q3. Which one of the following represents Data communication system spanning states, countries, or the whole world? a) LAN b) WAN c) MAN d) None of the mentioned	Q4. Which one of the following transmission media has the highest transmission speed in a network? a) coaxial cable b) twisted pair cable c) optical fiber d) electrical cable
Q5. Which one of the following represents A single channel shared by multiple signals? a) analog modulation b) digital modulation c) multiplexing d) none of the mentioned	Q6. Which one of the following layer the data link layer takes the packets from, and encapsulates them into frames for transmission? a) network layer b) physical layer c) transport layer d) application layer
Q7. Which one of the following task is **not** done by data link layer? a) framing b) error control c) flow control d) channel coding	Q8. Which one of the following is the multiple access protocol for channel access control? a) CSMA/CD b) CSMA/CA c) Both CSMA/CD & CSMA/CA d) None of the mentioned
Q9. Which one of the following does the network layer deal with? a) bits b) frames c) packets d) none of the mentioned	Q10. Which one of the following does the 4 byte IP address consist of? a) network address b) host address c) both network address & host address d) none of the mentioned

Q11. Which one of the following routing algorithm can be used for network layer design? a) shortest path algorithm b) distance vector routing c) link state routing d) all of the mentioned	Q12. Which one of the following layer the transport layer passes data to, which is aggregated from different applications into a single stream? a) network layer b) data link layer c) application layer d) physical layer
Q13. Which one of the following is a transport layer protocol used in networking? a) TCP b) UDP c) Both TCP and UDP d) None of the mentioned	Q14. Which one of the following the transport layer protocols deals with? a) application to application communication b) process to process communication c) node to node communication d) none of the mentioned
Q15. Which one of the following extends a private network across public networks? a) local area network b) virtual private network c) enterprise private network d) storage area network	Q16. Which of the following service is offered by Application layer? a) End to end b) Process to process c) Both End to end and Process to process d) None of the mentioned
Q17. Which of the following is a time-sensitive service? a) File transfer b) File download c) E-mail d) Internet telephony	Q18. Which of the following is true? In the layer hierarchy as the data packet moves from the upper to the lower layers, headers are a) Added b) Removed c) Rearranged d) Modified
Q19. Which one of the following is the first Network created? a) CNNET b) NSFNET c) ASAPNET d) ARPANET	Q20. Which one of the following type of network Bluetooth is? a) personal area network b) local area network c) virtual private network d) none of the mentioned

Section-B Attempt any SIX Questions in this Section 6x5 Marks

Q 1. What is a Network? What are the benefits of networks?

Q 2. What do you mean by topology? What are the most popular topologies?

Q 3. What are the responsibilities of Data Link Layer?

Q 4. What do you mean by TCP? Explain in brief.

Q 5. Define Socket address. Which layer uses this address?

Q 6. What is Simplex, Half Duplex and Duplex communication. Give one example of each.

Q 7. Describe about the different Guided Medias.

Q 8. Name five protocols of application layer? Write one line for each one of them.

Section-C Attempt all Questions in this Section 5x10 Marks

Q 1. What are the applications of Computer Networks?

Q 2. Write down the differences between TCP and UDP protocol.

Q 3. Explain the TCP/IP Model.

Q 4. Calculate Subnets, Valid Hosts, Broadcast ID, Network ID for IP address 192.168.10.44/29

Q 5. Answer the following:
a. What is a private IP address?
b. What is the maximum length allowed for a UTP cable?
c. What are routers?
d. What is VPN?
e. What are MAC addresses?

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SCHOOL OF COMPUTING SKILLS

END-SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

Course Code: ITN004 **Time: 3 Hour**

Course Name: Basic Computer Networking **Max. Marks: 100**

Section-A **20x1 Marks**

Note: Attempt all Questions in this Section

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

Section-B Short-Answer Type Questions **6x5 Marks**

Note: Attempt any Six Questions in this Section

A1. A network or communications network, is a system of interconnected computers, telephones
or other communications devices that can communicate with one another and share applications and data.
The benefit of networks are given below:
(i) Sharing of peripheral devices.
(ii) Sharing of programs and data
(iii) Better communications
(iv) Security of information
(v) Access to databases

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

- Framing
- Physical Addressing

- Flow Control
- Error Control
- Access Control

A4. It is Transport Control Protocol used in Transport layer. TCP guarantees the reliable, in order delivery of a stream of bytes. It is a full-duplex protocol, meaning that each TCP connection supports a pair of byte streams, one flowing in each direction.

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

A6. Simplex – In this mode the communication is possible only in one direction. For example, communication between key board and computer.
Half Duplex – In this mode of communication the data transmission is possible in both directions but in one direction at a time. walkie-talkies are half-duplex system.
Duplex – In this mode the communication is possible in both directions simultaneously. Telephone communication is one example of duplex communication.

A7. Twisted pair cable consists of two insulated cupper 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 nerworks, and fast Ethernet networks.

A8. The protocols defined in application layer are:
- HTTP – Hypertext transfer protocol. Used for browsing the Web.
- DNS – Domain name service. Used to get the IP address for a URL
- FTP – File transfer protocol. Used for down loading a file from a site.
- DHCP – Dynamic Host Configuration Protocol. Used for providing the IP address to a host.
- Telnet – Used for logging into a remote computer using a telnet program.

Section-C Essay Type Questions **5x10 Marks**

Note: Attempt all Questions in this Section.

A1. 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 catalogs 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. DIFFERENCE BETWEEN TCP AND UDP

TCP (Transmission Control Protocol) is connection oriented, whereas UDP (User Datagram Protocol) is connection-less. This means that TCP tracks all data sent, requiring acknowledgment for each octet (generally). UDP does not use acknowledgments at all, and is usually used for protocols where a few lost datagrams do not matter.

Because of acknowledgments, TCP is considered a reliable data transfer protocol. It ensures that no data is sent to the upper layer application that is out of order, duplicated, or has missing pieces. It can even manage transmissions to attempt to reduce congestion.

UDP is a very lightweight protocol. The primary uses for UDP include service advertisements, such as routing protocol updates and server availability, one-to-many multicast applications, and streaming applications, such as voice and video, where a lost datagram is far less important than an out-of-order datagram.

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:

1. Application layer
2. Transport layer
3. Network layer
4. Data link layer

1. 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

2. 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.

TCP is used where a reliable connection is required while UDP is used in case of unreliable connections.

UDP does not take any extra measures to ensure that the data sent is received by the target host or not. The term 'unreliable connection' are used where loss of some information does not hamper the task being fulfilled through this connection. For example, while streaming a video, loss of few bytes of information due to some reason is acceptable as this does not harm the user experience much.

3. 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. The main protocol used at this layer is IP. While ICMP(used by popular 'ping' command) and IGMP are also used at this layer.

4. 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. In most of the cases, this media is in the form of cables. Some of the famous protocols that are used at this layer include ARP(Address resolution protocol), PPP(Point to point protocol) etc.

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

1. 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.

2. 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.

3. 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.

a. 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.

b. A single segment of UTP cable has an allowable length of 90 to 100 meters. This limitation can be overcome by using repeaters and switches.

c. Routers can connect two or more network segments. These are intelligent network devices that store information in its routing table such as paths, hops and bottlenecks. With this info, they are able to determine the best path for data transfer. Routers operate at the OSI Network Layer.

d. VPN means Virtual Private Network, a technology that allows a secure tunnel to be created across a network such as the Internet. For example, VPNs allow you to establish a secure dial-up connection to a remote server.

e. MAC, or Media Access Control, uniquely identifies a device on the network. It is also known as physical address or Ethernet address. A MAC address is made up of 6-byte parts.

Q 1. Explain laser printer, its working, advantages & disadvantages.

Q 2. What is memory? Explain different types of RAM

Q 3. Write short note on the following (Any Two)

a) CPU b) Optical Mouse c) UPS

Q 4. Explain the difference between BIOS and CMOS.

Registration No: .....

SCHOOL OF COMPUTING SKILLS

FIRST SEMESTER EXAMINATION – 2018

END SEMESTER, B. VOC. PROGRAM

ITN 1105 Basics of Operating Systems **Max. Marks: 100**

Time: 3 Hours

Section-A **Attempt ALL questions** **(20x1) Marks**

1. Which one of the following is management task of an Operating System?
   a) Memory management
   b) Processor management
   c) Storage management
   d) All of the above

2. Which one of the following is correct
   a) The Application Programs control execution of programs
   b) An operating system controls the execution of programs
   c) All of the above
   d) None of the above

3. Which one of the following information is contained in 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 view of an operating system?
   a) User View
   b) System View
   c) All of the above
   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 is **NOT** a function of an operating system?
   a) It boots the computer
   b) It provides a user interface
   c) It handles system resources
   d) It debugs user programs

7. Which one of the following is a multi-processing, multitasking operating system?
   a) Disk Operating System (DOS)
   b) Windows 3.1
   c) Windows 10
   d) None of the above

8. Which one the following is **NOT** an example of Distributed Operating System?
   a) Client-Server system
   b) Peer-to-Peer system
   c) Clustered System
   d) None of the above

9. Which one of the following is **NOT** a type of Clustering?
   a) Asymmetric Clustering
   b) Symmetric Clustering
   c) Parallel Clustering
   d) Serial Clustering

10. Which one of the following is correct for **Pure Demand Paging**?
   a) Initially required pages are loaded
   b) All the pages are loaded
   c) No pages are loaded
   d) Fixed number of pages are loaded

11.Which one of the following software associated with .xls files?

a) MS Excel
b) MS Powerpoint
c) MS Word
d) Notepad

12.Which one of the following device is suitable for **direct file access**?

a) Magnetic tape
b) Hard Disk
c) Punched cards
d) None of the above

13.Which one of the following is an example of **Hard Real-Time Operating Systems**?

a) Video streaming over internet.
b) Live telecast of sports.
c) All of the above
d) None of the above

14.Which one of the following is is **NOT** a **Handheld** system?

a) Personal Digital Assistants
b) Cellular telephones with connectivity to the Internet
c) All of the above
d) None of the above

15.Which one of the following is true for **FCFS Scheduling**?

a) Jobs are executed on first come, first serve basis.
b) Average wait time is high.
c) All of the above.
d) None of the above.

16.Which one of the following is **NOT** a **criteria** for selecting a scheduling algorithm?

a) CPU utilization.
b) Response Time.
c) All of the above.
d) None of the above.

17.Which one of the following is **NOT** a function of Dispatcher?

a) Switching context.
b) Switching to user mode.
c) All of the above.
d) None of the above.

18.Which one of the following information is contained in the Process Control Block?

a) Process State.
b) Process ID.
c) Parent process ID.
d) All of the above.

19.Which one of the following is correct for Round Robin Scheduling?

a) A fixed time is allotted to each process.
b) Context switching is used.
c) All of the above
d) None of the above.

20.Which one of the following methods is used to handle a Deadlock?

a) Preemption.
b) Rollback.
c) Kill one or more processes.
d) All of the above.

Section-B Answer any SIX questions (6X5) Marks

1. Describe management tasks of an Operating Systems.
2. What are Multiprocessor Systems? Discuss their advantages.
3. Write a note on Handheld Systems. Give a few examples of such systems.
4. Explain FCFS scheduling for 4 processes and draw a Gantt Chart for it showing average waiting time.
5. What is a Livelock? Discuss.
6. 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. What are Mutex Locks? Explain.
8. Draw a Gantt Chart and calculate the average waiting time using Shortest Job First Scheduling of the following table:

PROCESS	BURST TIME
P1	10
P2	3
P3	8
P4	2

Section-C **Attempt ALL questions** **(5X10) Marks**

1. Explain Distributed Operating Systems.
2. What are Clustered Systems? Explain different types of clustering.
3. What is a Process and what are the contents of the Process Control Block?
4. What are scheduling queues? Explain with the help of a state transition diagram.
5. Explain File System, File Structure and Attributes of a file. Discuss different file access methods.

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SCHOOL OF COMPUTING SKILLS

FIRST SEMESTER EXAMINATION – 2018

END SEMESTER, B. VOC. PROGRAM

ITN 1105 Basics of Operating Systems **Max. Marks: 100**

Time: 3 Hours

Section-A **Attempt ALL questions** **(20x1) Marks**

1. Which one of the following is management task of an Operating System?
a) Memory management
b) Processor management
c) Storage management
d) All of the above
Ans: d

2. Which one of the following is correct
a) The Application Programs control execution of programs
b) An operating system controls the execution of programs
c) All of the above
d) None of the above
Ans: b

3. Which one of the following information is contained in 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
Ans: a

4. Which one of the following are the views of an operating system?
a) User View
b) System View
c) All of the above
d) None of the above
Ans: c

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

6. Which one of the following is **NOT** a function of an operating system?
a) It boots the computer
b) It provides a user interface
c) It handles system resources
d) It debugs user programs
Ans: d

7. Which one of the following is a multi-processing, multitasking operating system?
a) Disk Operating System (DOS)
b) Windows 3.1
c) Windows 10
d) None of the above
Ans: c

8. Which one the following is **NOT** an example of Distributed Operating System?
a) Client-Server system
b) Peer-to-Peer system
c) Clustered System
d) None of the above
Ans: c

9. Which one of the following is **NOT** a type of Clustering?
a) Asymmetric Clustering
b) Symmetric Clustering
c) Parallel Clustering
d) Serial Clustering
Ans: d

10. Which one of the following is correct for **Pure Demand Paging**?
    a) Initially required pages are loaded
    b) All the pages are loaded
    c) No pages are loaded
    d) Fixed number of pages are loaded
    Ans: c

11. Which one of the following software associated with .xls files?
    a) MS Excel
    b) MS Powerpoint
    c) MS Word
    d) Notepad
    Ans: a

12. Which one of the following device is suitable for **direct file access**?
    a) Magnetic tape
    b) Hard Disk
    c) Punched cards
    d) None of the above
    Ans: b

13. Which one of the following is an example of **Hard Real-Time Operating Systems**?
    a) Video streaming over internet.
    b) Live telecast of sports.
    c) All of the above
    d) None of the above
    Ans: d

14. Which one of the following is **NOT** a **Handheld** system?
    a) Personal Digital Assistants
    b) Cellular telephones with connectivity to the Internet
    c) All of the above
    d) None of the above
    Ans: d

15. Which one of the following is true for **FCFS Scheduling**?
    a) Jobs are executed on first come, first serve basis.
    b) Average wait time is high.
    c) All of the above.
    d) None of the above.
    Ans: c

16. Which one of the following is **NOT** a **criteria** for selecting a scheduling algorithm?
    a) CPU utilization.
    b) Response Time.
    c) All of the above.
    d) None of the above.
    Ans: d

17. Which one of the following is **NOT** a function of Dispatcher?
    a) Switching context.
    b) Switching to user mode.
    c) All of the above.
    d) None of the above.
    Ans: d

18. Which one of the following information is contained in the Process Control Block?
    a) Process State.
    b) Process ID.
    c) Parent process ID.
    d) All of the above.
    Ans: d

19. Which one of the following is correct for Round Robin Scheduling?
    a) A fixed time is allotted to each process.
    b) Context switching is used.
    c) All of the above
    d) None of the above.
    Ans: c

20. Which one of the following methods is used to handle a Deadlock?
    a) Preemption.
    b) Rollback.
    c) Kill one or more processes.
    d) All of the above.
    Ans: d

Section-B Answer any SIX questions (6X5) Marks

1. Describe management tasks of an Operating Systems.
   Answer: The management tasks of an operating system are listed below:
   Processor management which involves putting the tasks into order and pairing them into manageable size before they go to the CPU.
   Memory management which coordinates data to and from RAM (random-access memory) and determines the necessity for virtual memory.
   Device management which provides interface between connected devices.
   Storage management which directs permanent data storage.
   Application management which allows standard communication between software and your computer.
   User interface which allows a user to communicate with the computer.
   In general an operating system acts as a resource manager.

2. What are Multiprocessor Systems? Discuss their advantages.
   Answer: A multiprocessor system consists of several processors that share a common physical memory. Multiprocessor system provides higher computing power and speed. In multiprocessor system all processors operate under single operating system. Multiplicity of the processors and how they do act together are transparent to the others.

   Following are some advantages of this type of system.
   1. Enhanced performance
   2. Execution of several tasks by different processors concurrently, increases the system's throughput without speeding up the execution of a single task.
   3. If possible, system divides task into many subtasks and then these subtasks can be executed in parallel in different processors. Thereby speeding up the execution of single tasks.

3. Write a note on Handheld Systems. Give few examples of such systems.
   Answer: Handheld systems are usually of limited size due to which most handheld devices have a small amount of memory, include slow processors, and feature small display screens.
   Many handheld devices have between 512 KB and 8 MB of memory. As a result, the operating system and applications must manage memory efficiently. This includes returning all allocated memory back to the memory manager once the memory is no longer being used.
   Currently, many handheld devices do not use virtual memory techniques, thus forcing program developers to work within the confines of limited physical memory.
   Processors for most handheld devices often run at a fraction of the speed of a processor in a PC. Faster processors require more power. To include a faster processor in a handheld device would require a larger battery that would have to be replaced more frequently.

The last issue confronting program designers for handheld devices is the small display screens typically available. One approach for displaying the content in web pages is web clipping, where only a small subset of a web page is delivered and displayed on the handheld device.
Some handheld devices may use wireless technology such as BlueTooth, allowing remote access to e-mail and web browsing. Cellular telephones with connectivity to the Internet fall into this category. Their use continues to expand as network connections become more available and other options such as cameras and MP3 players, expand their utility.

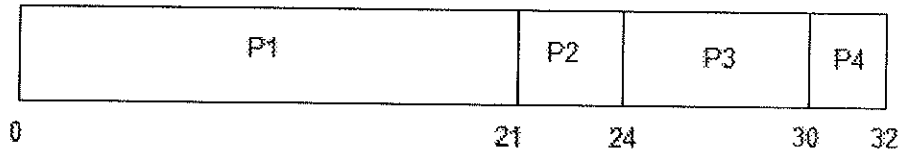
Personal Digital Assistants(PDAs), such as Palm-Pilots or Cellular Telephones, iPAD are some of the examples of handheld systems.

4. Explain FCFS scheduling for 4 processes and draw a Gantt Chart for it showing average waiting time.
Answer: In First Come First Serve scheduling jobs are executed on first come, first serve basis without any preference or priority. Once the process is allocated the CPU, it will release CPU only after completion of the process, till then the next process has to wait. It is easy to understand and implement. However, it is poor in performance as average wait time is high.

The Gantt Chart for FCFS scheduling is given below:

PROCESS	BURST TIME
P1	21
P2	3
P3	6
P4	2

The average waiting time will be = (0 + 21 + 24 + 30)/4 = 18.75 ms



This is the GANTT chart for the above processes

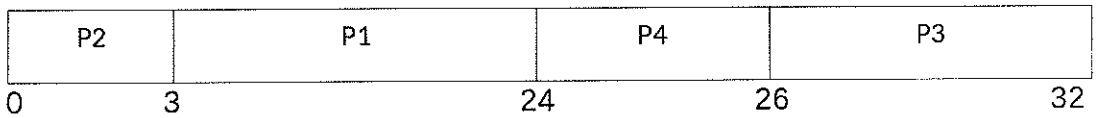
5. What is a Livelock?
   Answer: There is a variant of deadlock called livelock. This is a situation in which two or more processes continuously change their state in response to changes in the other process(es) without doing any useful work. This is similar to deadlock in that no progress is made but differs in that neither process is blocked or waiting for anything.

   A human example of livelock would be two people who meet face-to-face in a corridor and each moves aside to let the other pass, but they end up swaying from side to side without making any progress because they always move the same way at the same time.

6. 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

   Answer: The Gantt Chart for the above is given below:



   Average waiting time = 0+3+24+26/4 = 13.25 time units.

7. What are Mutex Locks?
   Answer: The synchronization hardware solution is not easy to implement a strict software approach called Mutex Locks was introduced. In this approach, in the entry section of code, a LOCK is acquired over the critical resources modified and used inside critical section, and in the exit section that LOCK is released.
   As the resource is locked while a process executes its critical section hence no other process can access it.

8. Draw a Gantt Chart and calculate the average waiting time using Shortest Job First Scheduling of the following table:

PROCESS	BURST TIME
P1	10

P2	3
P3	8
P4	2

Answer: The Gantt Chart for the SJF is given below:

Average waiting time = (0+2+5+13)/4 = 5 time units.

Section-C **Attempt ALL questions** **(5X10) Marks**

1. Explain Distributed Operating Systems.

   Answer: The motivation behind developing distributed operating systems is the availability of powerful and inexpensive microprocessors and advances in communication technology.

   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.

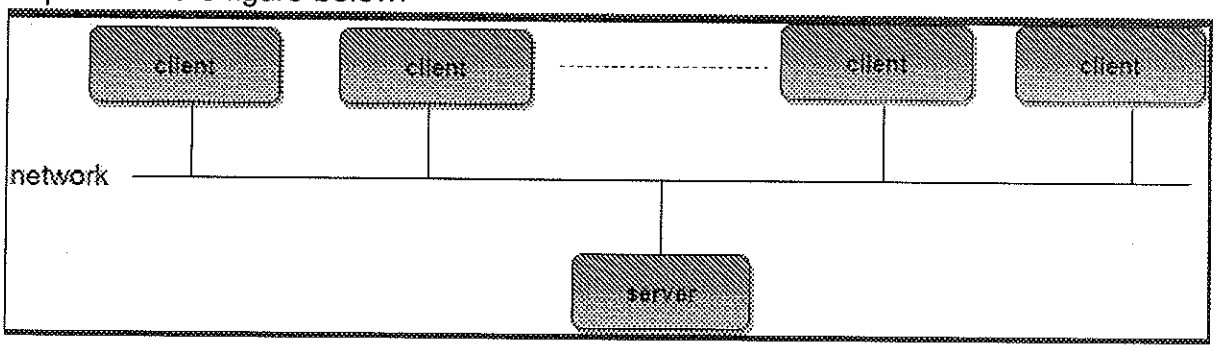
   1. As there are multiple systems involved, user at one site can utilize the resources of systems at other sites for resource-intensive tasks.
   2. Fast processing.
   3. Less load on the Host Machine.

   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 are Clustered Systems? Explain different types of clustering.

Answer: Like parallel systems, clustered systems gather together multiple CPUs to accomplish computational work.

Clustered systems differ from parallel systems, however, in that they are composed of two or more individual systems coupled together.

The definition of the term clustered is not concrete; the general accepted definition is that clustered computers share storage and are closely linked via LAN networking.

Clustering is usually performed to provide high availability.

A layer of cluster software runs on the cluster nodes. Each node can monitor one or more of the others. If the monitored machine fails, the monitoring machine can take ownership of its storage, and restart the application(s) that were running on the failed machine. The failed machine can remain down, but the users and clients of the application would only see a brief interruption of service.

Asymmetric Clustering - In this, one machine is in hot standby mode while the other is running the applications. The hot standby host (machine) does nothing but monitor the active server. If that server fails, the hot standby host becomes the active server.

Symmetric Clustering - In this, two or more hosts are running applications, and they are monitoring each other. This mode is obviously more efficient, as it uses all of the available hardware.

Parallel Clustering - Parallel clusters allow multiple hosts to access the same data on the shared storage. Because most operating systems lack support for this simultaneous data access by multiple hosts, parallel clusters are usually accomplished by special versions of software and special releases of applications.

Clustered technology is rapidly changing. Clustered system use and features should expand greatly as Storage Area Networks(SANs). SANs allow easy attachment of multiple hosts to multiple storage units. Current clusters are usually limited to two or four hosts due to the complexity of connecting the hosts to shared storage.

3. What is a Process and what are the contents of Process Control Block?

Answer: A process is a program in execution. To understand the importance of this definition, let's imagine that we have written a program called myprog.c in C. On execution, this program may read in some data and output some data. Note that 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 we compile, and still later when we run this program, the intended operations take place. In other words, a program is a text script with no dynamic behaviour. When a program is in execution, the script is acted upon. It can result in engaging a processor for some processing and it can also engage in I/O operations. It is for this reason a process is differentiated from program. While the program is a text script, a program in execution is a process.

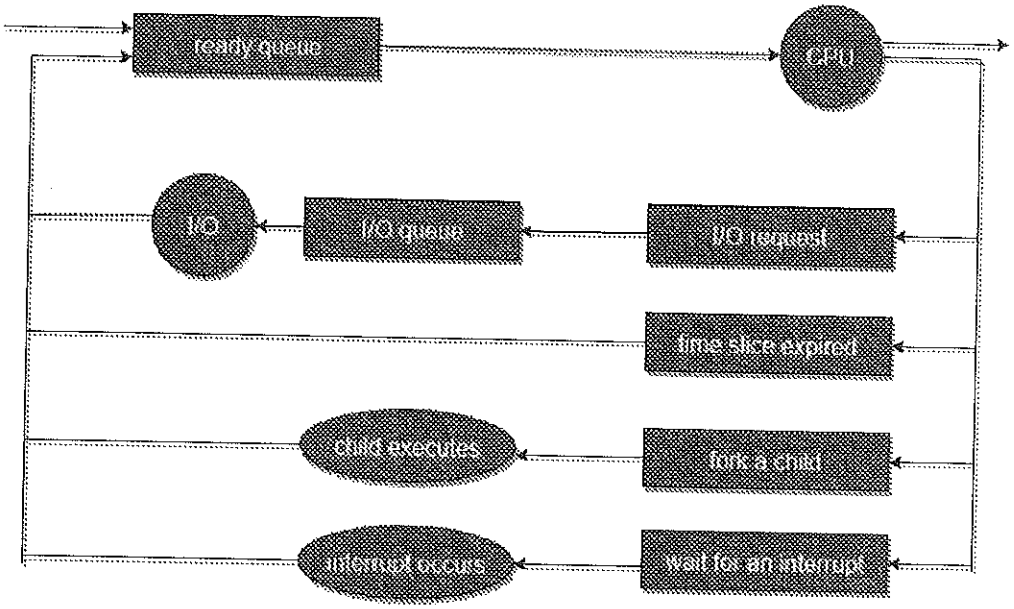
A program counter determines helps to identify the next instruction in the sequence. So process must have an inherent program counter. Referring back to the C language program – it's a text file. A program by itself is a passive entity and has no dynamic behaviour of its own till we create the corresponding process. On the other hand, a process has a dynamic behaviour and is an active entity. Processes get created, may have to be suspended awaiting an event like completing a certain I/O. A process terminates when the task it is defined for is completed. During the life time of a process it may seek memory dynamically. A process should be memory resident and, therefore, needs to be stored in specific area within the main memory. Processes during their life time may also seek to use I/O devices. For instance, an output may have to appear on a monitor or a printed output may be needed. In other words, process management requires not only making the processor available for execution but, in addition, allocate main memory, files and IO. The process management component then requires coordination with the main memory management, secondary memory management, as well as, files and I/O.

PROCESS CONTROL BLOCK

There is a Process Control Block for each process, enclosing all the information about the process. It is a data structure, which contains the following:

Process State - It can be running, waiting etc.
Process ID and parent process ID.
CPU registers and Program Counter. Program Counter holds the address of the next instruction to be executed for that process.
CPU Scheduling information - Such as priority information and pointers to scheduling queues.
Memory Management information - Eg. page tables or segment tables.
Accounting information - user and kernel CPU time consumed, account numbers, limits, etc.
I/O Status information - Devices allocated, open file tables, etc.

4. What are scheduling queues? Explain with the help of state transition diagram.
Answer: 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 fell into one of the two general categories:
Non pre-emptive scheduling. When the currently executing process gives up the CPU voluntarily.
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.

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

Answer: 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 is 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.

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END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1106 Network Server Management **Time: 3 Hours**

Max. Marks: 100

Section-A Attempt all Questions in this Section **(20x1) Marks**

1.i) Which one of the following port is associated with SSH Service?

a) 20 b) 21 c) 22 d) 23

ii) Which one of the following editions is associated with Windows 2012 Server?

a) Standard b) Enterprise

c) Foundation d) All of the above

2.i) Which one of the following is correct regarding minimum disk requirement for the RAID 1 implementation?

a) Ten b) Three c) Two d) Five

ii) Which one of the following commans is used to download a file with FTP Server?

a) get b) pwd c) put d) wget

3. i) Which one of the following services uses **nslookup** command?

a) DHCP b) DNS c) FTP d) TELNET

ii) Which one of the following is used to add the user credentials?

a) dsadd b) dsmod c) dsrm d) dsquery

4 i) Which one of the following file systems does not provides squota and security?

a) NTFS b) FST c) FAT d) REFS

ii) Which one of the following local groups is added on a file server to enable a user at a remote site to take manual backups of a file server?

a) Remote Desktop Users
b) Administrators
c) Backup Operators
d) Power Users

5. i) Which one of the following protocols is used to download operating system image in WDS services?

a) FTP b) TFTP c) TELNET d) NETBUI

ii) To which one of the following Active Directory containers can group policies be applied?

a) Sites b) OUs c) domains d) All of the above

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

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

a) 169.254.11.22
b 128.0.0.1
c) 169.254.0.1
d) 127.0.0.1

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

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

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

a) True b) False

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

a) True b) False

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

a) True b) False

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

a) True b) False

10.i) The command "**convert"** used for conversion of FAT to NTFS partition.
a) True b) False

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. What are the network features in order to establish peer to peer network? Write the

function of each.

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

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

4. What are the commands used for the user creation in Domain environment? Give complete syntax with example.

5. Describe VPN & its protocols.

6. Describe RAID & its levels.

7. Describe the Delegate Control advantages in ADDS.

8. What are the advantage Local & Network Printer?

Section-C Attempt all Questions in this Section (5X10) Marks

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

2.Describe DHCP working with principle.

3.Describe Client Server & peer to peer network.

4.What are the minimum requirements for implementation of Windows deployment service in a network? Give its advantages.

5.Explain the working of FTP in a network.

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END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1106 Network Server Management

Time: 3 Hours

Max. Marks: 100

Section-A Multiple Choice Questions **(20x1) Marks**

Note: Attempt all Questions in this Section

1.i) Which one of the following port is associated with SSH Service?

a) 20 b) 21 c) 22 d) 23 **Answer C**

ii) Which one of the following editions are associated with Windows 2012 Server?

a) Standard b) Enterprise

c) Foundation d) All of the above **Answer D**

2.i) Which one of the following is correct regarding minimum disk requirement for the RAID 1 implementation?

a) Ten b) Three c) Two d) Five **Answer C**

ii) Which one of the following command used to download a file with FTP Server?

a) get b) pwd c) put d) wget **Answer A**

3. i) Which one of the following service uses **nslookup** command?

a) DHCP b) DNS c) FTP d) TELNET **Answer B**

ii) Which one of the following is used to add the user credentials?

a) dsadd b) dsmod c) dsrm d) dsquery **Answer A**

4 i) Which one of the following file systems does not provides you quota and security?

a) NTFS b) FST c) FAT d) REFS **Answer C**

ii) Which one of the following local groups is added on a file server to enable a user at a remote site to take manual backups of a file server?

a) Remote Desktop Users
b) Administrators
c) Backup Operators
d) Power Users **Answer C**

5. i) Which one of the following protocol used to download operating system image in WDS services?

a) FTP b) TFTP c) TELNET d) NETBUI **Answer B**

ii) To which one of the following Active Directory containers can group policies be applied?

a) Sites b) OUs c) domains d) All of the above **Answer D**

6.i) 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 A**

ii) Which one of the following is the loopback address in IPV4?

a) 169.254.11.22
b 128.0.0.1
c) 169.254.0.1
d) 127.0.0.1 **Answer D**

7. i) Which one of the following statement 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**

ii) 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**

8. i) The command "**ifconfig /renew"** is used to find the "updated ip address " in windows operating system.

a) True b) False **Answer A**

ii) The command "**net share"** is used to show the users in a system.

a) True b) False **Answer B**

9. i) The "**Format"** command is used for the interaction of the user with operating System.

a) True b) False **Answer A**

ii)The command **dsadd 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 FAT to NTFS partition.

a) True b) False **Answer A**

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

a) True b) False **Answer A**

Section-B Short-Answer Type Questions **(6x5) Marks**

Note: Attempt any Six Questions in this Section

1. What are the network features in order to establish peer to peer network? Write the function of each.

Answer: Network features in order to establish peer to peer network are: -

a. Network Adapter required for basic connectivity.

b. Client provide access to computers files on the network you are connecting to.

Example Microsoft

c. Protocol is rules & regulations used to communicate with other computers

Example TCP/IP

d. Service provide features such as file & printer sharing.

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

Answer : 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. What are the commands used for the user creation in Domain environment? Give complete syntax with example.

Commands used for the user creation in domain is dsadd .

Syntax is dsadd user "CN=Test ,CN=Users ,DC=Dom,DC=com" –pwd 123.com –disabled no

Where CN=Common name

DC=domain controller

User test is created under users tree with password 123.com in enabled State.

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.

Types of Protocol are :-

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.

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 RAID & its levels.

RAID is a technology that is used to increase the performance and/or reliability of data storage. The abbreviation stands for *Redundant Array of Inexpensive Disks*. A RAID system consists of two or more drives working in parallel. There are different RAID levels:-

- **RAID 0** – striping
- **RAID 1** – mirroring
- **RAID 5** – striping with parity
- **RAID 6** – striping with double parity
- **RAID 10** – combining mirroring and striping

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.

8. What are the advantage Local & Network Printer?

Local printer is accessible to local user only while network printer is accessible to all users connected in network. Major Advantage is cost saved. Instead of proving printer to individuals it can be shared so that cost, electricity, maintenance cost avoided.
We can share a printer in multiple ways: -

a) Network Printer
b) Share a Printer with the PC connected

Section-C Essay Type Questions **(5X10) Marks**

Note: Attempt all Questions in this Section

1.Describe the steps required for the 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 DHCP working with principle.

Dynamic Host Configuration Protocol (DHCP) is used to dynamically (automatically) assign TCP/IP configuration parameters to network devices (IP address, Subnet Mask, Default Gateway, DNS server etc) DHCP clients communicate with a DHCP server to obtain IP addresses and related TCP/IP configuration information. DHCP server should be configured properly by the DHCP ad The Dynamic Host Configuration Protocol (DHCP) client TCP/IP software is not configured with a static IP address and it is configured to obtain an IP address dynamically from a Dynamic Host Configuration Protocol (DHCP) Server. When a DHCP client device boots up, it not capable send and receive network traffic, because TCP/IP is not configured. But it can participate in broadcast traffic. DHCP Clients and DHCP Servers uses broadcast messages to communicate with each other. The scope of a broadcast message is only within the local broadcast domain. Broadcast messages will never cross the router to reach another network, because Routers drop Limited Broadcast IP Address.

DHCPDISCOVER and DHCPREQUEST messages are sent from DHCP Client to DHCP Server. DHCPOFFER and DHCPACK messages are sent from DHCP Server to DHCP Client.

Server **Client**

⇐==== Discover

Offer ====⇒

⇐=== Request

Acknowledge ====⇒

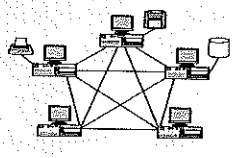
3.Describe Client Server & peer to peer network.

Peer-to-peer Networks

Nearly all Operating Systems come with the ability to act as some kind of a server to share resources. You can setup different computers to allow others to use its peripherals such as printers or CDROM drives, and other computers to allow others to read or write to its hard disk allowing sharing of files, while other computers may allow access to its Internet connection. When you allow workstation computers to become servers and share things in this manner, it is called a Peer-to-peer network.

Peer-to-peer networks are very cheap to implement because more than likely the Operating System software you have installed on your computers should have the ability to share items with other computers on the network, even though the feature may be limited. Nearly all of the most popular desktop Operating Systems have this feature, including Microsoft Windows and Apple's Mac OS, as well as Unix like OS es, such as Linux and the BSD s. So the only cost will be the networking hardware (cards, wiring, hubs or switches), and the labor to configure the workstations for this type of network sharing.

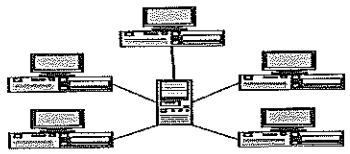
On a peer-to-peer network, it is also very difficult to implement a good backup system because important documents tend to be stored on different hard disks on different computers. If you do manage to implement a good backup policy, chances are great that after a while some very important documents will not get archived because someone "accidentally" saved them to the wrong location on the network.



Peer-to-peer networks can be implemented with very little investment costs, but in order for the network to work properly, the users must be very experienced with computers, and strict guidelines must be implemented and followed in order for the data to remain secure and archived properly. In my experience, peer-to-peer networks tend to become more of a headache instead of a help after about 6 computers, especially if your company has a moderate employee turnover.

The **Client-Server network model** usually consists of one or more server computers that provide services and information to a number of workstation computers. These services can consist of many different roles, including: file services, web services, email services, domain name lookup services, document version system services, Internet sharing services, etc. A great example of the Client-Server network model is actually the World Wide Internet. On the Internet clients, or computer with web browsers, access web sites that are hosted on servers.

With the Client-Server network model, each workstation only really needs to have one theoretical connection on the network, and that connection is to the main server as illustrated in the image below. Because of this, the maintenance cost for the network drops. Also, since all the important information of the network actually resides on the servers, the workstation maintenance also drops since the users can access any information they need through any workstation, and a faulty workstation computer will have very little effect on the usefulness of the network. I actually have setup networks where the workstation computers are backed up to an image on a central server, so if a workstation goes down, a technician can restore the image and have the workstation back up literally within minutes.



The Client-Server network model provides important services to the network safely and securely, it also allows the convenience of allowing the users to work on their own workstation machine. However, this network model can be very expensive, not only because the software can be expensive, but you also must provide adequate hardware for both the servers and the individual workstation machines, which can become very expensive with revolving hardware updates.

If you have the funds to implement this type of network, the return on the investment is great, and you will have the knowledge that your network is well secured and archived.

4.What are the minimum requirements for implementation of Windows deployment service in a network? 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 7and Windows Server 2008 R2 through Windows 8.1and 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.

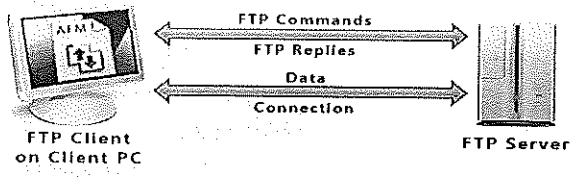
- **DHCP**. You must have a working Dynamic Host Configuration Protocol (DHCP) server with an active scope on the network because Windows Deployment Services uses PXE, which relies on DHCP for IP addressing.
- **DNS**. You must have a working Domain Name System (DNS) server on the network before you 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.

5.Explain the working of FTP in a network.

File Transfer Protocol (FTP) is used to transfer files between two computers over a network and Internet. Transferring files from a client computer to a server computer is called **"uploading"** and transferring from a server to a client is **"downloading".**



FTP uses one connection for commands and the other for sending and receiving data. FTP has a standard port number on which the FTP server "listens" for connections. A port is a "logical connection point" for communicating using the Internet Protocol (IP). The standard port number used by FTP servers is 21 and is used only for sending commands. Since port 21 is used exclusively for sending commands, this port is referred to as a **command port.** For example, to get a list of folders and files present on the FTP server, the FTP Client issues a "LIST" command. The FTP server then sends a list of all folders and files back to the FTP Client. So what about the internet connection used to send and receive data? The port that is used for transferring data is referred to as a **data port.** The number of the data port will vary depending on the "mode" of the connection. (See below for Active and Passive modes.)

Active and Passive Connection Mode

The FTP server may support Active or Passive connections, or both. In an Active FTP connection, the client opens a port and listens and the server actively connects to it. In a Passive FTP connection, the server opens a port and listens (passively) and the client connects to it. Most FTP client programs select passive connection mode by default because server administrators prefer it as a safety measure.

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END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1301 Network Server Management **Time: 3 Hours**

Max. Marks: 100

Section-A Attempt all Questions in this Section **(20x1) Marks**

1.Which one of the following protocol provides connectionless Service at Transport Layer?

a) TCP b) UDP c) IP d) ARP

2. Which one of the following protocols provide virtual circuit between hosts?

a) TCP b) UDP c) IP d) ARP

3. Which one of the following ranges of address are used in the first octet of Class B address?

a)1-126 b)0-127 c)192.223 d) 128-191

4. Which one of the following protocols is used to find the hardware address of local device?

a) RARP b)ARP c)IP d)ICMP

5. Which one of the following is the size of the Ethernet Address?

a) 1 byte b) 4 byte c) 6 byte d) 8 byte

6. Which one of the following commands is used to delete the data configured in NVRAM?

a) erase running-config b) erase startup-config c) delete running-config d) delete run

7.Which one of the following is a Class C IP address?

a) 10.135.176.231 b) 135.23.11.78 c) 191.17.192.18 d) 224.16.17.98

8. Which one of the following is true regarding Switch forward packets based on ?

a) IP Address b)MAC Address c) IPX D)Layer 3 protocol

9. Which one of the following is the sub layer of the data link layer?

a) Logical link control b) Physical c) Network Layer d)Media Access control

10. Which one of the following commands is used to add banner in cisco router configuration?

a) add banner b) banner motd # c) motd banner # d) add banner #

11) Which one of the following is the default administrative distance for RIP?

a) 100 b)120 c)0 d)200

12. Which one of the following commands shows the encapsulation for interface S0?

a) Sh ip protocol b)Sh int s0 c)Sh ip interface d)Sh process

13. Which one of the following commands is used for showing the route in a router?

a) Sh ip route b) Sh route c) Sh ip protocol d) Sh ip int brief

14. Which one of the following is a Valid number for Standard numbered IP ACL?

a) 87 b) 1000 c) 2187 d) 3100

15. Which one of the following wildcard masks is most useful for matching IP packets in Subnet 10.11.12.0 255.255.240.0 ?

a) 0.0.0.0 b) 0.0.15.255 c) 0.0.0.31 d) 0.0.0.240

16. Which one of the following routing protocols is considered to use link static logic?

a) RIPV1 b) RIPV2 c) OSPF d) IGRP

17. Which one of the following code implies route learned with EIGRP?

a) E b) I c) D d) G

18. Which one of the following PPP protocols authenticates device on the other end of a link without sending any password information in clear text?

a) MD5 b) PAP c) CHAP d) DES

19. Which one of the following commands is used to check the IOS in Cisco router?

a) Sh history b)Sh Clock c) Sh flash d) Sh version

20. Which one of the following is the valid host for 192.168.2.69/29 network?

a) 2 b)6 c)16 d) 30

Section-B Attempt any SIX Questions in this Section (6x5) Mar

1. What are the different types of routes available in routers?
2. Define Administrative Distance. Write AD for different routing protocols?
3. What are the major difference between IPv4 & IPV6 addressing?
4. Define PAP & CHAP with Functions.
5. Define Collision & Broadcast Domain. How many collision domains & broadcast domains are available for Hub, Switch, Router?
6. What are the different modes of the router? Write the function of it.
7. What are the major function of router?
8. Define CDP & its functions?

Section-C Attempt ALL Questions in this Section (5X10) Marks

1. Describe steps required for the Cisco router password recovery.
2. Describe types of interior & exterior routing protocols.
3. Describe the steps required for the backup & restore the router configuration.
4. Describe ACL & its types.
5. Describe data link protocols used in network communication.

Registration No: .....

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END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1301 Network Server Management

Time: 3 Hours

Max. Marks: 100

Section-A Multiple Choice Questions **(20x1) Marks**

Note: Attempt all Questions in this Section

1.Which one of the following protocol provide connectionless Service at Transport Layer?

a) TCP b) UDP c) IP d) ARP **Answer B**

2. Which one of the following protocol provide virtual circuit between hosts?

a) TCP b) UDP c) IP d) ARP **Answer A**

3. Which one of the following range of address used in the first octet of Class B address?

a)1-126 b)0-127 c)192.223 d) 128-191 **Answer D**

4. Which one of the following protocol used to find the hardware address of local device?

a) RARP b)ARP c)IP d)ICMP **Answer B**

5. Which one of the following is the byte of the Ethernet Address?

a) 1 byte b) 4 byte c) 6 byte d) 8 byte **Answer C**

6. Which one of the following command used to delete the data configured in NVRAM?

a) erase running-config b) erase startup-config c) delete running-config d) delete run **Answer B**

7.Which one of the following is Class C IP address?

a) 10.135.176.231 b) 135.23.11.78 c) 191.17.192.18 d) 224.16.17.98 **Answer D**

8. Which one of the following is true regarding Switch forward packets based on?

a) IP Address b) MAC Address c) IPX D)Layer 3 protocol **Answer B**

9. Which one of the following are the sub layers of the data link layer?

a) Logical link control b)Physical c)Network Layer d)Media Access control **Answer A,D**

10. Which one of the following command is used to add banner in cisco router configuration?

a) add banner b) banner motd # c) motd banner # d) add banner # **Answer B**

11) Which one of the following is the default administrative distance for RIP?

a) 100 b)120 c)0 d)200 **Answer B**

12. Which one of the following command show the encapsulation for interface S0 ?

a) Sh ip protocol b)Sh int s0 c)Sh ip interface d)Sh process **Answer B**

13. Which one of the following command used for showing route in router?

a) Sh ip route b) Sh route c) Sh ip protocol d) Sh ip int brief **Answer A**

14. Which one of the following Valid number for Standard numbered IP ACL?

a) 87 b) 1000 c) 2187 d) 3100 **Answer A**

15. Which one of the following wildcard masks most useful for matching IP packets in Subnet 10.11.12.0 255.255.240.0 ?

a) 0.0.0.0 b) 0.0.15.255 c) 0.0.0.31 d) 0.0.0.240 **Answer B**

16. Which one of the following routing protocol is considered to use link static logic?

a) RIPV1 b) RIPV2 c) OSPF d) IGRP **Answer C**

17. Which one of the following code implies route learned with EIGRP?

a) E b) I c) D d) G **Answer C**

18. Which one of the following PPP authenticate protocols authenticate device on the others end of a link without sending any password information in clear text?

a) MD5 b) PAP c) CHAP d) DES **Answer C**

19. Which one of the following command used to check the IOS in Cisco router?

a) Sh history b)Sh Clock c) Sh flash d) Sh version **Answer C**

20. Which one of the following is the valid host for 192.168.2.69/29 network?

a) 2 b)6 c)16 d) 30 **Answer B**

Section-B Short-Answer Type Questions **(6x5) Marks**

Note: Attempt any Six Questions in this Section

1. What are the different types of routes available in routers?

A) Static or Static default

Static, if one route is fixed for transmission it will stay fixed. If that link is down it cannot connect and reach the destination even if there are alternate paths. Static route is used for smaller networks. Symbol of static is s.

Static default– it sends data to unknown destination + specified n/w.ex in isp we can have different connections. It uses 0.0.0.0 as the address for connection. Symbol of static default is s*.

B) Dynamic route

It will choose the path by itself. Paths are found by the routing protocols.
Chooses the best or main path. If that path fails, it will find out the next alternate path.
Routing protocols like RIP/EIGRP/OSPF decide the paths.

2.Define Administrative Distance. Write AD for different routing protocols?

Administrative distance is the feature that routers use in order to select the best path when there are two or more different routes to the same destination from two different routing protocols.

Routing Protocol	AD Value
RIP	120
EIGRP	90
IGRP	100
OSPF	110

3.What are the major difference between IPv4 & IPV6 addressing?

Version 4	Version 6
32bit	128 bit
Address possible = $(2)^{32}$	Address possible =$(2)^{128}$
Represent in decimal form	Represent in hexadecimal form
Different Class A,B,C ,D,E	No Classes
Separated by dots	Separated by colons

4.Define PAP & CHAP with Functions.

PAP is in clear text. It mostly refers to providing a password to an account. The password gets thru the wire. It is vulnerable to sniffing cause whoever is listening would know the password. Password authentication protocol (PAP) and challenge handshake authentication protocol (CHAP) are both used to authenticate PPP sessions and can be used with many VPNs. Basically, PAP works like a standard login procedure; the remote system authenticates itself to the using a static user name and password combination. The password can be encrypted for additional security, but PAP is subject to numerous attacks. In particular, since the information is static, it is subject to password guessing as well as snooping.

CHAP, on the other hand, issues a challenge. The password never actually makes it thru the wire but a question is asked.CHAP takes a more sophisticated and secure approach to authentication by creating a unique challege phrase (a randomly generated string) for each authentication. The challenge phrase is combined with device host names using oneway hashing functions to authenticate in way where no static secret information is ever transmitted over the wire. Because all transmitted information is dymanic, CHAP is significantly more robust than PAP.

5.Define Collision & Broadcast Domain. How many collision domains & broadcast domains are available for Hub, Switch, Router?

Collision domain, as the name implies, a part of a network where packet collisions can occur. A collision occurs when two devices send a packet at the same time on the shared network segment. The packets collide and both devices must send the packets again, which reduces network efficiency. Collisions are often in a hub environment, because each port on a hub is in the same collision domain. By contrast, each port on a bridge, a switch or a router is in a separate collision domain.

Broadcast domain is a domain in which a broadcast is forwarded. A broadcast domain contains all devices that can reach each other at the data link layer (OSI layer 2) by using broadcast. All ports on a hub or a switch are by default in the same broadcast domain. All ports on a router are in the different broadcast domains and routers don't forward broadcasts from one broadcast domain to another.

Hub = One Collision domain & One Broadcast domain

Switch = As per number of ports Collison domain varies i.e 8 ports have 8 while One

Broadcast domain.

Router = As per ports collision & broadcast domain varies.

6.What are the different modes of the router? Write the function of it.

Command Mode	**Access Method**	**Prompt**
User EXEC	Log in.	Router>
Privileged EXEC	From user EXEC **mode**, use the enable EXEC command.	Router#
Global configuration	From privileged EXEC **mode**, use the configure terminal privileged EXEC command.	Router(config)#

7.What are the major function of router?

A) Packet switching- all incoming data is switched to packets. It deals only with packets (data with IP address)
B) Packet filtering- router sends and receives only packets. It is used in WAN, so all incoming packets are filtered mainly for security.
C) Internetwork communication- joining of two or more networks.
D) Path selection- router is used to select the shortest and best path from source to destination.
E) QoS- Quality of Service: QoS is the ability of the n/w to provide better or special service to a set of users or applications.

8. Define CDP & its functions?

- CDP is Cisco discovery protocol
- It is a layer 2 protocol
- It works based on mac addresses.(h/w addresses)
- It is used to find adjacent Cisco devices.
- It is a Cisco proprietary protocol means used to find only the neighbouring Cisco devices.

It is used to find out

1. IP addresses
2. Port numbers
3. iOS details
4. Router models
5. Switch models
6. Interface details

7. Device ID- hostname

Section-C Essay Type Questions **(5X10) Marks**

Note: Attempt all Questions in this Section

1.Describe steps required for the Cisco router password recovery.

First, hook up the DB9 end of the standard light blue serial cable to your serial port. The other end of the cable should plug into the port labeled "**Console**" on the back of the Cisco router. If you do not have a serial port, then you'll need to go purchase a USB-to-serial adapter cable and install it on your computer.

Now that your hardware is connected, establish a serial connection with the router. The settings you need are:

Baud: 9600 ,Data bits: 8 ,Parity: No,Stop bits: 1,Flow Control: None

On Windows, I use putty for this connection. Yes, putty can be used to make serial connections as well as telnet/ssh. Hyperterminal works great as well. On Linux, I use minicom and on FreeBSD/OpenBSD, I use cu (cu -s 9600 -l /dev/cuad0).

Reboot the router and **press the Break key** to interrupt the boot sequence.

Type **confreg 0x2142**. This tells the router to bypass NVRAM during bootup. In other words, your existing configuration won't be loaded. The good news is that it won't be deleted either.

Type **reset** to reboot the router. Answer No when prompted to run setup.

Type **copy start run**. This loads your startup configuration into memory. Now, if you type a **show run config**, you'll see the router configuration. Also, you should notice that your router name is now in the prompt instead of the default "Router".

Change the enable secret – "**enable secret new_password**"

Change the register back to 0x2102:

config-register 0x2102

When the router reboots it will load the old configuration with the new password.

Save the password so that it will be persistent during reboots, type **copy run start**

Reboot the router by typing **reload** at the enable prompt.

Now, keep that password in a nice safe place – in your head does not count. I keep mine saved in a safe place for future retrieval and I make sure my customers have a copy as well. Remember, passwords are nice until you forget them.

2.Describe types of interior & exterior routing protocols.

Interior Gateway Protocol (IGP) is a Routing Protocol which is used to find network path information within an Autonomous System.

Known Interior Gateway Protocol (IGP) Routing Protocols are Routing Information Protocol (RIP), Interior Gateway Routing Protocol (IGRP), Open Shortest Path First (OSPF) and Intermediate System to Intermediate System (IS-IS)

Exterior Gateway Protocol (EGP) is a Routing Protocol which is used to find network path information between different Autonomous Systems. Exterior Gateway Protocol (EGP) is commonly used in the Internet to exchange routing table information. There is only one Exterior Gateway Protocol (EGP) exists now and it is Border Gateway Protocol (BGP).

3.Describe the steps required for the backup & restore the router configuration.

Requirements

- Access to a Trivial File Transfer Protocol (TFTP) or File Transfer Protocol (FTP) server.
- Connectivity - Routers must be able to access the FTP or TFTP server. Use the **ping** command to verify connectivity

Use a TFTP Server to Backup and Restore a Configuration

This is a step-by-step approach to copy a configuration from a router to a TFTP server, and back to another router. Before you proceed with this method, make sure you have a TFTP server on the network to which you have IP connectivity.

1. At the Router> prompt, issue the **enable** command, and provide the required password when prompted.
   The prompt changes to Router#, which indicates that the router is now in privileged mode.
2. Copy the running configuration file to the TFTP server:
3. CE_2#**copy running-config tftp:**
4. Address or name of remote host []? 192.168.1.10
5. Destination filename [ce_2-confg]? backup_cfg_for_my_router
6. !!
7. 1030 bytes copied in 2.489 secs (395 bytes/sec)
   CE_2#
8. Router#**copy tftp: running-config**
9. Address or name of remote host []? **192.168.1.10**
10. Source filename []? backup_cfg_for_my_router
11. Destination filename [running-config]?
12. Accessing tftp://10.66.64.10/backup_cfg_for_my_router...
13. Loading backup_cfg_for_router from 192.168.1.10 (via FastEthernet0/0): !
14. [OK - 1030 bytes]

15. 1030 bytes copied in 9.612 secs (107 bytes/sec)
CE_2#

4.Describe ACL & its types.

An access list is a sequential series of commands or filters.
These lists tell the router what types of packets to:
accept or deny
Acceptance and denial can be based on specified conditions.
ACLs applied on the router's interfaces.
Two types of ACLs
Standard IP ACLs
Can only filter on source IP addresses
It ranges from 1 to 99
Extended IP ACLs
Can filter on:

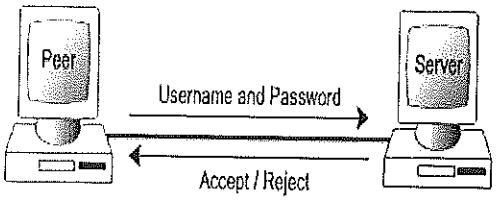
- Source IP address
- Destination IP address
- Protocol (TCP, UDP)
- Port Numbers (Telnet – 23, http – 80, etc.)
- *and other parameters*

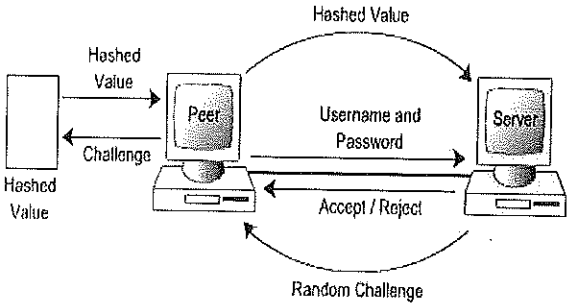
It ranges from 100 to 199.
ACLs must be defined on a:
per-protocol (IP, IPX, AppleTalk) □□per direction
(in or out)
per port (interface) basis.
ACLs control traffic in one direction at a time on an interface.
A separate ACL would need to be created for each direction, one for inbound and one for outbound traffic.
Finally every interface can have multiple protocols and directions defined.

5.Describe data link protocols used in network communication

Data-link layer protocols are commonly called the data link protocols
These protocols communicate between two devices such as, routers, and bridges
Data packets are sent over the link created by the protocols
Data-link protocols consist of:
High Level Data Link Control (HDLC) protocol
Point-to-Point protocol (PPP)
The encapsulation on a Cisco synchronous serial interface is HDLC
HDLC needs to be configured if the data link protocol is change to some other protocol, and HDLC has to be set back to default
To configure the HDLC protocol to be set as default, use the router CLI
The PPP allows computers to connect to the Internet using a dial-up telephone line and ISDN
PPP was originally designed to transport IP traffic over point-to-point links
PPP can transfer data over synchronous and asynchronous links
It supports a transfer of data over different network protocols
Point-to-Point protocol is used to transmit data packets over serial point-to-point links
The three phases of session establishment are given as follows:
Link establishment phase ,Authentication phase ,Network layer protocol phase

Point-to-Point protocol supports authentication of devices
Once a link is established between nodes the process of authentication starts
PPP supports two authentication protocols Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP)





Registration No.: .....

SCHOOL OF COMPUTING SKILLS

END-SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1302 Wireless Networks

Time: 3 Hours

Max. Marks: 100

Instructions:

1. Calculator is strictly prohibited.
2. Missing data if any can be suitably assumed.
3. In Section A, all questions are compulsory
4. In Section B, attempt any 6 questions
5. In Section C, all questions are compulsory

Section – A

20×01 = 20 Marks

Q1. Which one of the following is correct for access point (AP) in wireless LAN?

(A) Device that allows wireless devices to connect to a wired network

(B) Wireless devices itself

(C) Both device that allows wireless devices to connect to a wired network and wireless devices itself

(D) None of the above

Q2. Which one of following is correct for wireless ad-hoc network?

(A) Access point is not required (B) Access point is must

(C) Either Lagging or Leading (D) None of the above

Q3. Which one of the following is true in WPA?

(A) Wi-fi protected access (B) wired protected access

(C) wired process access (D) wi-fi process access

Q4. Which one of the following device is the wireless equivalent of a wired hub?

(A) Bridge (B) Repeater

(C) Antenna (D) Access-point

Q5. Which one of the following family of specifications for wireless local area networks (WLANs) developed by IEEE?

(A) 3G (B) 802.11

(C) 802.3 (D) 802.5

Q6. Which one of the following is true for code-division multiple access (CDMA) version of the IMT-2000 standard?

(A) CDMA (B) WCDMA

(C) CMYK (D) CDMA2000

Q7. Which one of the following security protocols is designed to provide a wireless LAN with a level of security and privacy comparable to a wired LAN?

(A) WEP (B) 802.11x

(C) RMON (D) LDAP

Q8. Which one of the following is kept constant during Frequency Modulation?

(A) Frequency (B) Amplitude

(C) Phase (D) Both Phase and Amplitude

Q9. Which one of the following modulation index (m) is true for over modulation?

(A) $m<1$ (B) $m>1$

(C) $m=1$ (D) None of the above

Q10. Which one of the following is true for GSM in wireless communication?

(A) Grade system mobile (B) Global system for mobile

(C) Global signal mechanism (D) Thermometer

Q11. Which one of the following is true for Bluetooth network?

(A) Piconet (B) Bluenet

(C) Sctternet (D) Toothnet

Q12. Which one of following is true for modulation process?

(A) Carrier characteristics vary with message signal

(B) Message signal characteristics vary with carrier signal

(C) Both carrier and message signal are varied

(D) None of the above

Q13. Which of the following is true for digital form of Amplitude Modulation?

(A) ASK (B) PSK

(C) FSK (D) None of the above

Q14. Which one of the following is true for wireless transmission?

(A) Radio waves (B) Microwaves

(C) Infrared (D) All the above

Q15. Which one of the following Frequency range is true for 802.11a standard?

(A) 5 GHz (B) 2.4GHz

(C) 2.5GHz (D) None of the above

Q16. Which of the following terminal is true for FM wave?

(A) Less resistant to noise (B) More resistant to noise

(C) No resistant to noise (D) None of them

Q17. Which of the following service set as building block of a wireless is true for IEEE 802.11?

(A) LAN (B) WAN protocol

(C) MAN (D) All the above

Q18. Which of the following resistor is true for Angle modulation?

(A) AM (B) FM

(C) PM (D) Both PM and FM

Q19. Which of the following is true for velocity of light?

(A) $3X10^8$ m/s (B) $3X10^8$ cm/s

(C) $3X10^8$km/s (D) None of the above

Q20. Which one of the following is true for Frequency unit?

(A) Volt (B) Hz

(C) Meter (D) None of the above

Section – B

06×05 = 30 Marks

Attempt any 06 questions:

Q21. What is wireless network? Describe the different kinds of wireless networks. What are the different generation of wireless networks?

Q22. What is modulation process? Why is modulation needed? What are the differences between AM and FM wave?

Q23. What is Point-to- point Tunneling Protocol (PPTP) method? How does PPTP VPN work?

Q24. What are the main factors affecting the wireless networks? What is ESS and BSS of wireless networks?

Q25. What do you mean WLAN controller? How does WLAN work?

Q26. What is wireless access point? What is the difference between access point and router? Indicate the steps for access point configuration?

Q27. What are the purposes for wireless LAN security policy? What are policies wireless LAN securities?

Q28. What is wireless router? Describe the steps for wireless router configurations.

Section – C

05×10 = 50 Marks

Q29. What do you mean by AM wave? What are the advantages of AM wave? Explain the process of generation of AM wave with proper schematics.

Q30. What are the advantages of FM wave? Why FM wave is more resistant to noise? Explain with proper schematics how FM wave can be generated?

Q31. What is fading in wireless network? Describe different kinds of fading. Which factors are important to affect the path loss of radio wave. Write the free space propagation model for radio wave.

Q32. There are two radio waves of frequencies 30 KHz and 30 MHz respectively. You want to transmit the message signal using modulation. Between these two which radio wave is more fruitful to transmit the message signal and why? Velocity of light wave (c) $=3X10^8$ m/s.

Describe the radio wave propagation mechanisms. What are the different forms of digital modulation techniques for radio wave propagation?

Q33. What do you mean by a wireless Adhoc network? What are the different Adhoc networks? Describe the various Adhoc network. Write the various applications of Adhoc network.

Registration No.: .....

SCHOOL OF COMPUTING SKILLS

END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1302 Wireless Networks **Time: 3 Hours**

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Q20. Which one of the following is true for Frequency unit?

(A) Volt (B) Hz

(C) Meter (D) None of the above

Section – B

06×05 = 30 Marks

Attempt any 06 questions:

Q21. What is wireless network? Describe the different kinds of wireless networks. What are the different generation of wireless networks?

Ans: Wireless network is a computer network which uses wireless for network. It is a method where the home telecommunication networks avoid using the costly cables. This communication networks usually implemented and administered radio communication.

Different kinds of wireless networks

Wireless PAN (Personal Area Network)

Wireless LAN (Local Area Network)

Wireless mess network

Wireless MAN (Metropolitan Area Network)

Wireless WAN (Wide Area Network)

Cellular network

Different generation of Wireless Networks

First Generation(1G)

Second Generation (2G)

Third Generation (3G)

Fourth Generation (4G)

Q22. What is modulation process? Why is modulation needed? What are differences between AM and FM wave?

Ans: Modulation is a process in which the characteristics of carrier signal is varied in accordance with information bearing signal.

Modulation allows us to send a signal over a bandpass frequency range. If every signal gets its own frequency range, then we can transmit multiple signals simultaneously over a single channel, all using different frequency ranges. Another reason to modulate a signal is to allow the use of a smaller antenna.

AM	FM
Amplitude is modulated	Frequency is modulated
Process is more simple	Process is complex
Environmental factors affect the amplitude of the modulated wave so AM is more prone to noise	Environmental factors can n't affect the frequency so it is more resistant to the noise

Q23. What is Point-to- point Tunneling Protocol (PPTP) method? How does PPTP VPN work?

Ans: PPTP is one of the methods to implement Virtual Private Networks. Confidentiality or encryption does not provided by PPTP. The reliability of PPTP is being tunneled for the purpose of providing privacy. PPTP works by sending Point-to-Point Protocol to the peer with the Generic Encapsulation protocol. Because of its easy way of configuration, it is most popular protocol used in VPNs. It was the first protocol for VPNs and was supported by Dial-up network of Microsoft.

PPTP uses the TCP port 1723 for communication which in turn uses the GRE protocol. The data packets transmitted through the tunnel are encapsulated and treated as IP packets. When initiated from the client side, PPTP tunneling doesn't need supporting devices like routers, etc

Q24. What are the main factors affecting the wireless networks? What is ESS and BSS of wireless networks?

Ans: Reflection: Wireless signals bounce off to the materials. Wireless signal just bounces off through the metal

Scattering: Signal hits a surface and breaks apart in multiple pieces and made the original signal weaker.

Absorption: Absorption occurs when wireless signal hits the material and absorbed. Usually, water molecule absorbs the wireless signals.

ESS and BSS Service Sets. ... It must configure all connecting devices and Access Points (APs) in a service set to use the same SSID. The two types of service sets are Basic Service Set (BSS)

and Extended Service Set (ESS). A BSS consists of a group of computers and one AP, which links to a wired LAN.

Q25. What do you mean WLAN controller? How does WLAN work?

Ans: A wireless LAN (WLAN) controller is a combination of Lightweight Access Point Protocol (LWAPP) to manage light-weight access points in large quantities by the network administrator or network operations center. The wireless LAN controller is part of the Data Plane within the Cisco Wireless Model. The WLAN controller automatically handles the configuration of wireless access-points.

WLANs use radio, infrared and microwave transmission to transmit data from one point to another without cables. Therefore, WLAN offers way to build a Local Area Network without cables. This WLAN can then be attached to an allready existing larger network, the internet for example.

Q26. What is wireless access point? What is the difference between access point and router? Indicate the steps for access point configuration?

Ans: In a wireless local area network (WLAN), an access point is a station that transmits and receives data (sometimes referred to as a transceiver). An access point connects users to other users within the network and also can serve as the point of interconnection between the WLAN and a fixed wire network.

A wireless router connects a group of wireless stations to an adjacent wired network. Conceptually, a wireless router is a wireless AP combined with an Ethernet router. A wireless router forwards IP packets between your wireless subnet and any other subnet.

Steps:

- Access the router's web-based setup page. ...
- When the router's web-based setup page opens, click Status then click Wireless.
- Take note of the MAC Address.
- Connect a computer to the access point.
- Assign a static IP address on the computer

Q27. What are the purposes for wireless LAN security policy? What are policies wireless LAN securities?

Ans: This policy specifies the conditions that wireless infrastructure devices must satisfy to connect to any DoIT network. Only wireless systems that meet the criteria of this policy or have been granted an exclusive waiver by the Director of EIS are approved for connectivity to DoIT's networks

- Register Access Points: All wireless Access Points / Base Stations connected to the network must be registered and approved by DoIT. All approved Access Points / Base Stations are subject to periodic penetration tests and audits.
- Approved Technology: All wireless LAN hardware implementations shall utilize Wi-Fi certified devices that are configured to use the latest security features available.
- Physical Location: Security mechanisms should be put in place to prevent the theft, alteration, or misuse of Access Points / Base Stations. All devices shall be locked and secured in an appropriate manner

Q28. What is wireless router? Describe the steps for wireless router configaration.

Ans: A wireless router is a device that performs the functions of a router and also includes the functions of a wireless access point. It is used to provide access to the Internet or a private computer network.

Steps of configurations:

WAN (Wide Area Network) Setting

LAN (Local Area Network) Setting

DHCP (Dynamic Host Configuration Protocol) Setting

SSID and Other Basic Wireless Settings

Wireless Network Authentication

Section – C

05×10 = 50 Marks

Q29. What do you mean by AM wave? What are the advantages of AM wave? Explain the process of generation of AM wave with proper schematic.

Ans: Amplitude modulation (AM) is a technique where the amplitude (signal strength) of the carrier wave is varied in proportion to that of the message signal.

Advantages of AM

a. Simple to implement.

b. AM Transmitters are less complex.

c. AM Receivers are very cheap and no specialized components are needed

d. AM wave can travel longer distance

e. AM waves have low bandwidth

AM generation

1. Amplitude modulation (AM) is defined as a process in which the amplitude of the carrier wave c(t) is varied about a mean value, linearly with the baseband signal m(t).

$$c(t) = A_c \cos(2\pi f_c t)$$

$$s(t) = A_c[1 + k_a m(t)] \cos(2\pi f_c t)$$

where ka is a constant called the amplitude sensitivity of the modulator responsible for the generation of the modulated signal s(t).

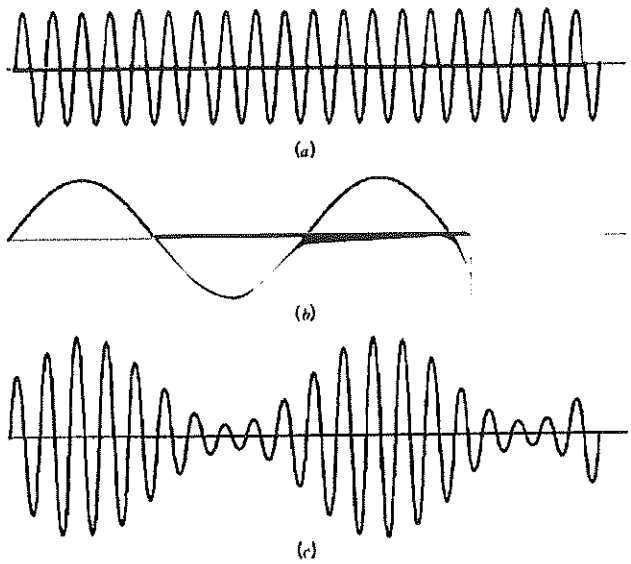

Fig: AM wave

Q30. What are the advantages of FM wave? Why FM wave is more resistant to noise? Explain with proper schematic how FM wave can be generated?

Ans:

Advantages of FM wave

- Improved signal to noise ratio (about 25dB) w.r.t. to man made interference.
- Resistant to noise: One of the main advantages of frequency modulation that has been utilised by the broadcasting industry is the reduction in noise. As most noise is amplitude based, this can be removed by running the signal through a limiter so that only frequency variations appear. This is provided that the signal level is sufficiently high to allow the signal to be limited.
- Smaller geographical interference between neighboring stations.
- Less radiated power.
- Well defined service areas for given transmitter power.

Noise easily can affect the amplitude rather than frequency of the signal. So, if information contain in FM wave noise can't affect FM wave. Thus, FM is more resistant to noise.

Frequency modulation (FM) is that form of angle modulation in which the instantaneous frequency *f(t)* is varied linearly with the message signal m(t), as shown by

$$f_i(t) = f_c + k_f m(t) \quad \text{.....(1)}$$

The term fc represents the frequency of the unmodulated carrier, and the constant k represents the frequency sensitivity of the modulator, expressed in Hertz per volt.

The frequency-modulated signal is therefore described in the time domain by

$$s(t) = A_c \cos\left[2\pi f_c t + 2\pi k_f \int_0^t m(\tau)\, d\tau\right] \quad \text{..... (2)}$$

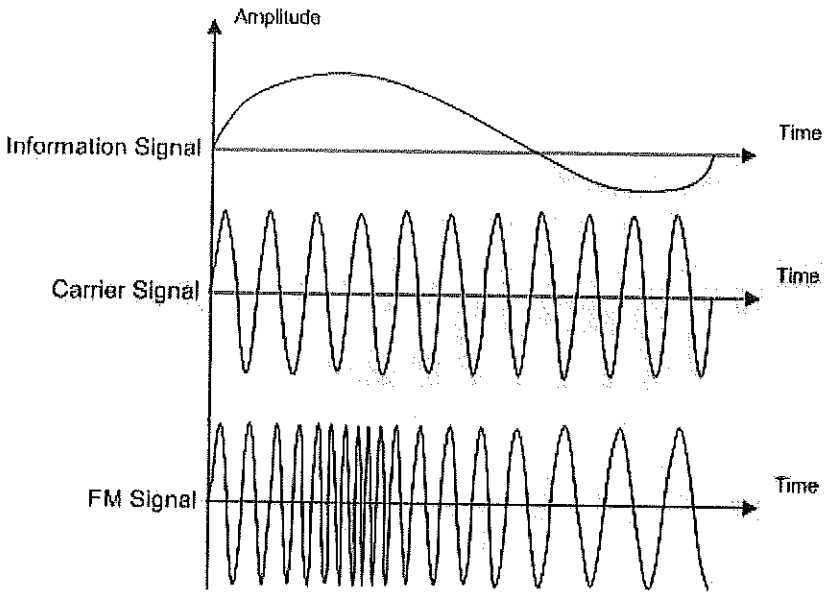

Fig 2: Frequency modulated wave

Q31. What is fading in wireless network? Describe different kinds of fading. Which factors are important to affect the path loss of radio wave. Write the free space propagation model for radio wave.

Ans: Fading is nothing but a fluctuation of signal at receiver end.

- **Fast (Small-Scale) Fading**

- Due to interference between multiple versions of the same transmitted signal arriving at the receiver at slightly different times
- Recall that multi-path propagation may be caused by reflection, diffraction and scattering

– **Slow (Large-Scale) Fading**
  - Obstacles between transmitter and receiver partially absorb the transmission
  - Example: Transmitter outside a building, receiver inside a building, walls blocking transmission

The path loss depends on:

– Radio frequency
– Distance between transmitter and receiver
– Antenna characteristics (height, location, gains)
– Nature of the terrain (urban/rural, vegetation/clear)
– Propagation medium (dry/moist air)

- **Free space model:** It assumes that there is only one clear line-of-sight path between the transmitter and receiver

$$P_r = P_t G_t G_r \left(\frac{\lambda}{4\pi d}\right)^2$$

Q32. There are two radio waves of frequencies 30 KHz and 30 MHz respectively. You want to transmit the message signal using modulation. Which radio wave is more fruitful to transmit the message signal and why? Velocity of light wave (c) =$3X10^8$ m/s.

Describe the radio wave propagation mechanisms. What are the different forms of digital modulation techniques for radio wave propagation?

Ans: Wave length of 30 KHZ wave =$3x10^8$ /30 kHz=10^4 m

Antenna length (L) for 30 KHz=$\lambda/4$= 10^4m/4=2.5 km

Wave length for 30 MHZ wave =$3X10^8$ /30MHz=10 m

Antenna Length (L) for 30 MHz= 10m/4=2.5 m.

So, it has been observed that the antenna size is less for 30 MHz radio wave. Thus, 30 MHz radio wave is more fruitful for transmission of message signal.

Radio wave propagation mechanisms:

- Reflection: When the propagating radio wave hits an object which is very large compared to its wavelength, the wave gets reflected by that object.
- Diffraction: When a wave hits an impenetrable object of size comparable to its wavelength, the wave bends at the edges of the object, thereby propagating in different directions.
- Scattering: When a wave travels through a medium, which contains many objects with dimensions small when compared to its wavelength, the wave gets scattered into several weaker outgoing signals.

Digital forms of modulation

- **Amplitude Shift Keying (ASK):** It represents digital data by varying the amplitude of the carrier wave.
- **Frequency Shift Keying (FSK):** It represents digital data by varying the frequency of the carrier wave.
- **Phase Shift Keying (PSK)**: It represents digital data by varying the phase of the carrier wave

Q33. What do you mean by a wireless Adhoc network? What are the different adhoc networks? Describe the various adhoc network. Write the various applications of adhoc network.

Registration No: .....

SCHOOL OF COMPUTING SKILLS

END-SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1303 Basics of Network Security

Time: 3 Hours

Max. Marks: 100

Section-A : Attempt All Questions in this Section

20X1 Marks

1. In computer security which one of the following means that computer system assets can be modified only by authorized parties?
   a) Confidentiality
   b) Integrity
   c) Availability
   d) Authenticity

2. Which one of the following is an independent malicious program that does not need any host program?
   a) Trap doors
   b) Trojan horse
   c) Virus
   d) Worm

3. Which one of the following is a term known as Intruders?
   a) Account Accessor
   b) Data Accessor
   c) Hacker or Cracker
   d) Computer Accessor

4. Network layer firewall works as which one of the following?
   a) Frame filter
   b) Packet filter
   c) Both Frame as well as Packet filter
   d) None of the mentioned

5. Which one of the following is used to protect data and passwords?
   a) Encryption
   b) Authentication
   c) Authorization
   d) Non-repudiation

6. Which one of the following malicious program cannot do anything until actions are taken to activate the file attached by the malware?
   a) Trojan Horse
   b) Worm
   c) Virus
   d) Bots

7. In cryptography, which one of the following is known as cipher text?
   a) algorithm for performing encryption and decryption

b) encrypted message

c) both algorithm for performing encryption and decryption and encrypted message

d) Decrypted message

8. A substitution cipher with key 3 will convert plain text string "NETWORKING" into which one of the following:
   a) NETJHOKANO
   b) KEHJAYHAGO
   c) QHWZRUNLQJ
   d) JQLNURZWHQ

9. A Computer virus program is usually hidden in which one of the following?
   a) operating system
   b) application program
   c) disk driver
   d) both a and b

10. Which one of the following is the name of the first computer virus?
   a) The Famous
   b) HARLIE
   c) PARAM
   d) Creeper

11. FTP server listens for connections on which one of the following port numbers?
   a) 20
   b) 21
   c) 22
   d) 23

12. Which one of the following stands for VIRUS?
   a) Very Intelligent Result Until Source
   b) Vital Information Resources Under Seize
   c) Viral Important Record User Searched
   d) Very Interchanged Resource Under Search

13. Which one of the following is not an antivirus software?
   a) AVG
   b) Avast
   c) MCAfee
   d) Code Red

14. Which one of the following is relevant to this statement "both email attachments and downloaded files can spread malware".
    a) True
    b) False
    c) Maybe
    d) None of the above

15. Which one of the following will be the strongest password?
    a) bsdubsdubsdubsdu
    b) BsduBsdu@123
    c) Bsdubsdu @123
    d) Bsdubsdu$# @1234

16. Which one of the following is true for Social engineering?
    a) Website created for people who share common interests.
    b) Scams distributed through email such as phishing, pharming and impersonation.
    c) A targeted attack on a personal computer.
    d) It is a DDoS attack on web server.

17. Which one of the following will define a logic bomb when it is activated by a time related event?
    a) trojan horse
    b) time bomb
    c) virus
    d) time related bomb sequence

18. Which one of the following is the altering of data so that it is not usable unless the changes are undone?
    a) biometrics
    b) encryption
    c) ergonomics
    d) compression

19. Which one of the following is short for malicious software?
    a) Malairasoft
    b) Moleculewar
    c) Malware
    d) Malisoft

20. Which one of the following defines the term 'cyber-crime'?
    a) Any crime that uses computers to jeopardise or attempt to jeopardise national security.
    b) The use of computer networks to commit financial or identity fraud.
    c) The theft of digital information.
    d) Any crime that involves computers and networks.

Section-B: Attempt Any SIX Questions in this Section

6X5 Marks

Q 1. Differentiate between the active and the passive attacks?

Q 2. Differentiate between TCP and UDP.

Q 3. What do you mean by Physical Security of the system and how will you achieve it?

Q 4. What is DDoS attack? How does it work?

Q 5. What is the difference between Time-bombs and Logic-bombs in computer systems?

Q 6. What is cryptanalysis?

Q 7. What is Antivirus? Explain its functioning.

Q 8. What are the OS updates and why do we need them?

Section-C: Attempt All Questions in this Section

5X10 Marks

Q 1. What are the 3 pillars of Information security? Explain

Q 2. What is Malware? Explain its types.

Q 3. Explain the terms threat, risk, attack and vulnerability with the help of examples.

Q 4. Write short notes on:
a) Spy Ware b) Ad Ware

Q 5. Explain the difference between antivirus and firewall.

Registration No: .....

SCHOOL OF COMPUTING SKILLS

END-SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1303 Basics of Network Security

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Max. Marks: 100

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   c) Hacker or Cracker
   d) Computer Accessor

4. Network layer firewall works as which one of the following?
   a) Frame filter
   b) Packet filter
   c) Both Frame as well as Packet filter
   d) None of the mentioned

5. Which one of the following is to protect data and password?
   a) Encryption
   b) Authentication
   c) Authorization
   d) Non-repudiation

6. Which one of the following malicious program cannot do anything until actions are taken to activate the file attached by the malware.
   a) Trojan Horse
   b) Worm
   c) Virus
   d) Bots

7. In cryptography, which one of the following is known as cipher text?

a) algorithm for performing encryption and decryption
b) **encrypted message**
c) both algorithm for performing encryption and decryption and encrypted message
d) Decrypted message

8. A substitution cipher with key 3 will convert plain text string "NETWORKING" into:
   a) NETJHOKANO
   b) KEHJAYHAGO
   c) QHWZRUNLQJ
   d) JQLNURZWHQ

9. Computer virus program is usually hidden in which one of the following?
   a) operating system
   b) application program
   c) disk driver
   d) both a and b

10. Which one of the following is the name of first computer virus?
    a) The Famous
    b) HARLIE
    c) PARAM
    d) Creeper

11. FTP server listens for connections on which one of the following port numbers?
    a) 20
    b) **21**
    c) 22
    d) 23

12. Which one of the following stands for VIRUS?
    a) Very Intelligent Result Until Source
    b) Vital Information Resources Under Seize
    c) Viral Important Record User Searched
    d) Very Interchanged Resource Under Search

13. Which one of the following is not an antivirus software?
    a) AVG
    b) Avast
    c) MCAfee
    d) Code Red

14. Which one of the following is relevant to this statement "both email attachments and downloaded files can spread malware".

a) **True**
b) False
c) Maybe
d) None

15. Which one of the following will be the strongest password?

a) bsdubsdubsdubsdu
b) BsduBsdu@123
c) Bsdubsdu @123
d) Bsdubsdu$# @1234

16. Which one of the following is true for Social engineering?

a) Website created for people who share common interests.
b) Scams distributed through email such as phishing, pharming and impersonation.
c) A targeted attack on a personal computer.
d) It is a DDoS attack on web server.

17. Which one of the following will define a logic bomb when it is activated by a time related event?
a) trojan horse
b) time bomb
c) virus
d) time related bomb sequence

18. Which one of the following is the altering of data so that it is not usable unless the changes are undone?
a) biometrics
b) encryption
c) ergonomics
d) compression

19. Which one of the following is short for malicious software?
a) Malisoft
b) Malairasoft
c) Moleculewar
d) Malware

20. Which one of the following defines the term 'cyber-crime'?

a) Any crime that uses computers to jeopardise or attempt to jeopardise national security
b) The use of computer networks to commit financial or identity fraud
c) The theft of digital information
d) Any crime that involves computers and networks

Section-B: Attempt Any SIX Questions in this Section

6x5 Marks

Answer1. Difference between active and passive attacks is that in active attacks the attacker intercepts the connection and modifies the information, whereas, in a passive attack, the attacker intercepts the transit information with the intention of reading and analysing the information not for altering it.

Answer2. TCP (Transmission Control Protocol) is connection oriented, whereas UDP (User Datagram Protocol) is connection-less. ... UDP does not use acknowledgments at all, and is usually used for protocols where a few lost datagrams do not matter. Because of acknowledgments, TCP is considered a reliable data transfer protocol.

Answer3. Physical security is the protection of personnel, hardware, software, networks and data from physical actions and events that could cause serious loss or damage to an enterprise, agency or institution. This includes protection from fire, flood, natural disasters, burglary, theft, vandalism and terrorism.

Answer4. A distributed denial-of-service (DDoS) attack occurs when multiple systems flood the bandwidth or resources of a targeted system, usually one or more web servers. Such an attack is often the result of multiple compromised systems (for example, a botnet) flooding the targeted system with traffic. A botnet is a network of zombie computers programmed to receive commands without the owners' knowledge. When a server is overloaded with connections, new connections can no longer be accepted. The major advantages to an attacker of using a distributed denial-of-service attack are that multiple machines can generate more attack traffic than one machine, multiple attack machines are harder to turn off than one attack machine, and that the behaviour of each attack machine can be stealthier, making it harder to track and shut down.

Answer5. The main differences between logic bombs and time bombs is that a logic bomb may have a timing function implemented into it as a failsafe if the conditions are not met in a certain time period (it may delete itself or activate its payload using the timing system), while time bombs only use timing functions to (de)activate themselves. Time bombs, once activated, will unload their payload (which may be malicious) in a similar way logic bombs deliver their payloads to the target.

Answer6. Cryptanalysis is the study of ciphertext, ciphers and cryptosystems with the aim of understanding how they work and finding and improving techniques for defeating or weakening them. For example, cryptanalysts seek to decrypt ciphertexts without knowledge of the plaintext source, encryption key or the algorithm used to encrypt it

Answer7. Antivirus programs are designed to protect a computer from malware, (a term used to describe malicious software). Malicious software, including viruses, trojans and keyloggers, may delete files, slow your computer and steal your personal data. Most antivirus programs offer real-time protection. This means that the antivirus program protects computer from incoming threats too.

Answer8. When new versions of operating systems are launched, such as Microsoft Windows, Apple OS X / iOS or Android, they are generally accompanied by improved usability, additional features and an enhanced user experience. However, cybercriminals

quickly find vulnerable areas in the new operating system and continue to do so for the lifetime of the version. To counter this, the software companies release regular updates – such as security updates or critical updates which protect against malware and security exploits. Other types of updates correct errors or enhance functionality within the operating system, and are not necessarily security related. They also detect which of their manufacturers' other programs you are running on your device and provide updates to these as well.

Section-C: Attempt all Questions in this Section

5x10 Marks

Answer1. The CIA (Confidentiality, Integrity, and Availability) triad of information security is an information security benchmark model used to evaluate the information security of an organization. The CIA triad of information security implements security using three key areas related to information systems including confidentiality, integrity and availability.

Confidentiality: Ensures that data or an information system is accessed by only an authorized person. User Id's and passwords, access control lists (ACL) and policy based security are some of the methods through which confidentiality is achieved.

Integrity: Integrity assures that the data or information system can be trusted. Ensures that it is edited by only authorized persons and remain in its original state when at rest. Data encryption and hashing algorithms are key processes in providing integrity.

Availability: Data and information systems are available when required. Hardware maintenance, software patching/upgrading and network optimization ensures availability

Answer2. Malware is any software intentionally designed to cause damage to a computer, server or computer network. Malware does the damage after it is implanted or introduced in some way into a target's computer. The code is described as **computer viruses, worms, Trojan horses, ransomware, spyware, adware,** and among other terms. Malware has a malicious intent, acting against the interest of the computer user—and so does not include software that causes unintentional harm due to some deficiency, which is typically described as a software bug.

Answer3. Threat – Anything that can exploit a vulnerability, intentionally or accidentally, and obtain, damage, or destroy an asset.

Vulnerability – Weaknesses or gaps in a security program that can be exploited by threats to gain unauthorized access to an asset.

Risk – The potential for loss, damage or destruction of an computer security as a result of a threat exploiting a vulnerability.

Attack -- is any attempt to expose, alter, disable, destroy, steal or gain unauthorized access to or make unauthorized use of an Asset.

Answer4. Spyware is software that aims to gather information about a person or organization, sometimes without their knowledge, that may send such information to another entity without the consumer's consent, that asserts control over a device without the consumer's knowledge, or it may send such information to another entity with the consumer's consent, through cookies.

Adware, or advertising-supported software, is software that generates revenue for its developer by automatically generating online advertisements in the user interface of the software or on a screen presented to the user during the installation process. The software may generate two types of revenue: one is for the display of the advertisement and another on a "pay-per-click" basis, if the user clicks on the advertisement. The software may implement advertisements in a variety of ways, including a static box display, a banner display, full screen, a video, pop-up ad or in some other form.

Rootkit is a clandestine computer program designed to provide continued privileged access to a computer while actively hiding its presence. The term rootkit is a connection of the two words "root" and "kit." It is difficult to detect rootkits. There are no commercial products available that can find and remove all known and unknown rootkits. There are various ways to look for a rootkit on an infected machine. Detection methods include behavioural- based methods (e.g., looking for strange behaviour on a computer system), signature scanning and memory dump analysis.

Answer5. **Firewall**: It is a software or hardware which take care of your system from incoming internet traffic continuously. Firewall is just like your system gatekeeper which stops suspicious packets from entering into the system.

Antivirus: It is a software which protects your system from viruses, worms, and malicious files internally. It first scans your system, identifies the malicious files or viruses and finally removes these malicious files or viruses.

Registration No: .....

SCHOOL OF COMPUTING SKILLS

THIRD SEMESTER EXAMINATION – 2018

END SEMESTER, B. VOC. PROGRAM

ITN 1304 Linux/Red Hat System Administration

Max. Marks: 100

Time: 3 Hours

Section-A Attempt ALL questions (20x1) Marks

1. Which one of the following is correct for UNIX/Linux operating system?
   a) Unix is a multi-user, multi-tasking operating system
   b) Unix is a single user, multi-tasking operating system
   c) Unix is a multi-user, single processing operating system
   d) Unix is not an operating system
2. Which one of the following programming languages is used for writing Unix?
   a) C
   b) Pascal
   c) Java
   d) Cobol
3. Which one of the following persons developed Linux kernel?
   a) Dennis Ritchie
   b) Linus Torvalds
   c) Brian Wilson Kernighan
   d) None of the above
4. Which one of the following is a commercial distribution of Linux?
   a) Fedora
   b) Debian
   c) Red Hat Enterprise Linux
   d) Kali
5. Which one of the following file systems is **NOT** used in Linux?
   a) ext3
   b) ext4
   c) XFS
   d) NTFS
6. Which one of the following contains the information about all the files and directories in Linux?
   a) Index Node Table
   b) File Allocation Table
   c) All of the above
   d) None of the above
7. Which one of the following commands is used to change file access permissions in Linux?
   a) chown
   b) chmod
   c) chgrp
   d) chprm
8. Which one of the following commands is used to rename a file in Linux?
   a) rm
   b) ren
   c) mv
   d) cp
9. Which one of the following is a command line interpreter?
   a) Kernel
   b) BIOS
   c) Shell
   d) X Windows
10. Which one of the following is the default prompt for the C shell?
    a) $
    b) %
    c) #
    d) !
11. Which one of the following commands is used to show the differences between files?
    a) diff

b) cmp
c) difference
d) df

12. Which one of the following commands is used set a user's password?
    a) password
    b) passwd
    c) paswd
    d) chpass
13. Which one of the following will be the permissions -rwxr--r-- represented in octal expression?
    a) 777
    b) 666
    c) 744
    d) 711
14. A user does a chmod operation on a file. Which one of the following is true?
    a) The last accessed time of the file is updated
    b) The last modification time of the file is updated
    c) The last change time of the file is updated
    d) None of the above mentioned
15. Which one of the following directory contain device special files?
    a) /etc
    b) /etc/dev
    c) /root/bin
    d) /dev
16. Which one of the following is not a valid run-level
    a) S
    b) 0
    c) 8
    d) 1
17. Which one of the following is loaded into memory when system is booted?
    a) Kernel
    b) Shell
    c) Commands
    d) Script
18. Which one of the following daemon manages the physical memory by moving process from physical memory to swap space when more physical memory is needed.
    a) Sched daemon
    b) Swap daemon
    c) Init daemon
    d) Process daemon
19. Which one of the following commands is used to obtain process information in the current shell?
    a) kill
    b) bg
    c) fg
    d) ps
20. Which one of the following is considered as the super daemon in Unix?
    a) sysinit
    b) init
    c) inetd
    d) proc

Section-B **Answer any SIX questions** **(6X5) Marks**

1. What is a Linux Shell? List different shells available in Linux.
2. What is Linux kernel? Explain.
3. What are Pipes and I/O redirection in Linux? Give an example of each.
4. What is the function of nslookup command? Explain with example.
5. What Is Bash Shell? Explain.
6. What Is the difference between > and >> operators?
7. What information is displayed by the top command?
8. Discuss two commands used to delete directories? Give examples.

Section-C **Attempt ALL questions** **(5X10) Marks**

1. Explain all the tasks of a System Administrator.
2. How disk quota can be configured in Linux? Explain in detail.
3. What is the procedure for configuring DHCP server in Linux? How a MAC address can be bound to a specific IP?
4. NIS server for domain "ruj-bsdu.in" is to be installed. Write down all the steps for configuring this NIS server?
5. List and explain DNS Resource Records.

Registration No: .....

SCHOOL OF COMPUTING SKILLS

THIRD SEMESTER EXAMINATION – 2018

END SEMESTER, B. VOC. PROGRAM

ITN 1304 Linux/Red Hat System Administration

Max. Marks: 100

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    a) $

b) %
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11. Which one of the following commands is used to show the differences between files?
    a) diff
    b) cmp
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    d) df
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12. Which one of the following commands is used set a user's password?
    a) password
    b) passwd
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    a) S
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    a) Sched daemon
    b) Swap daemon
    c) Init daemon
    d) Process daemon
    Ans: b
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    a) kill
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    c) fg
    d) ps
    Ans: d
20. Which one of the following is considered as the super daemon in Unix?
    a) sysinit
    b) init
    c) inetd
    d) proc
    Ans: b

Section-B **Answer any SIX questions** **(6X5) Marks**

1. What is a Linux Shell? List different shells available in Linux.

   Answer : Linux shell is a user interface used for executing the commands. Shell is a program the user uses for executing the commands. In UNIX, any program can be the users shell. Different commonly available shells in Linux are:

   Bash shell: On Linux, bash is the standard shell for common users. This shell is a so-called superset of the Bourne shell, a set of add-ons and plug-ins. This means that the Bourne Again shell is compatible with the Bourne shell: commands that work in sh, also work in bash.

   Tcsh shell: tcsh is a Unix shell based on and compatible with the C shell. It is essentially the C shell with programmable command-line completion, command-line editing, and a few other features.

   Korn shell: The Korn shell is considered a member of the Bourne shell family and uses as its shell prompt the $ symbol. Because it is the easiest shell to use, inexperienced users usually prefer the Korn shell.

2. What is Linux kernel? Explain.

   Answer: The Linux kernel is an open-source Unix-like computer operating system kernel. The Linux kernel was conceived and created by Linus Torvalds for his personal computer and with no cross-platform intentions, but has since expanded to support a huge array of computer architectures, many more than other operating systems or kernels. It contains the core of the operating system. A hardware abstraction layer sits between the user programs and BIOS, which prevents the user programs to access the hardware directly. The services of Linux kernel are accessed through system calls. Linux rapidly attracted developers and users who adopted it as the kernel for other free software projects. The most popular operating system for smart phones, Android is based on Linux kernel. A wide variety of other embedded devices, such as routers, smart TVs, set-top boxes, and webcams use Linux kernel.

3. What are Pipes and I/O redirection in Linux? Give an example of each.

   Answer : A pipe is a chain of processes so that output of one process (stdout) is fed an input (stdin) to another. UNIX shell has a special syntax for creation of pipelines. The commands are written in sequence separated by |.

   e.g. sort file | lpr (sort the file and send it to printer)

   Linux I/O Redirection

   Redirection can be defined as changing the way from where commands read input to where commands sends output. You can redirect input and output of a command.

For redirection, meta characters are used. Redirection can be into a file (shell meta characters are angle brackets '<', '>') or a program (shell meta characters are pipe symbol '|').
eg. ls -l > trs.txt (Redirect the output of the command ls -l to trs.txt)

4. What is the function of nslookup command? Explain with example.

Answer: nslookup (name server lookup) is a tool used to perform DNS lookups in Linux. It is used to display DNS details, such as the IP address of a particular computer, the MX records for a domain or the NS servers of a domain.

nslookup can operate in two modes: interactive and non-interactive. The interactive mode allows you to query name servers for information about various hosts and domains or to print a list of hosts in a domain. The non-interactive mode allows you to print just the name and requested information for a host or domain.
e.g. nslookup www.yahoo.co.in (to find out the IP address)

Reverse name lookup i.e., IP address to host name resolution, can also be performed using nslookup command.
e.g., nslookup 172.217.161.5
Server: 8.8.8.8
Address: 8.8.8.8#53

Non-authoritative answer:
5.161.217.172.in-addr.arpa name = del03s10-in-f5.1e100.net.

5. What Is Bash Shell? Explain.

Answer: BASH is short for Bourne Again SHell. It was written as a replacement to the original Bourne Shell (represented by /bin/sh). It combines all the features from the original version of Bourne Shell, plus additional functions to make it easier and more convenient to use. It has since been adapted as the default shell for most systems running Linux. The default prompt for BASH shell is $ for normal users and # for super user or root user.

Bash is a command processor that typically runs in a text window where the user types commands that cause actions. Bash can also read and execute commands from a file, called a shell script. Like all Unix shells, it supports file name globbing (wildcard matching), piping, here documents, command substitution, variables, and control structures for condition-testing and iteration. The keywords, syntax and other basic features of the language are all copied from sh. Other features, e.g., history, are copied from csh and ksh. Bash is a POSIX-compliant shell, but with a number of extensions.

6. What Is the difference between > and >> operators?

   Answer: Both the operators are used for IO redirection, however the difference between > and >> is the way they operate. If > operator is used it redirects the output of a command to other device (in Linux IO devices are also treated as files). In case of file redirection the destination file is overwritten. If >> operator is used then the output of a command is appended in the destination file. The example of each operator is given below

   eg. ls -l > trs.txt (the ouput of command ls is redirected to a file, if the file does not exist then it will be created and if it exists it will be overwritten.
   eg. ls -l >> trs.txt (the output of ls command is redirected to file "trs.txt" however if the file contains some text it it the output of ls command will be appended to the end of the file.)

7. What information is displayed by the top command?

   Answer: top (table of processes) is a task manager program found in many Unix-like operating systems that displays information about CPU and memory utilization. It produces an ordered list of running processes selected by user-specified criteria, and updates it periodically. Default ordering is by CPU usage, and only the top CPU consumers are shown. top shows how much processing power and memory are being used, as well as other information about the running processes. Some versions of top allow extensive customization of the display, such as choice of columns or sorting method. top is useful for system administrators, as it shows which users and processes are consuming the most system resources at any given time.

8. Discuss two commands used to delete directories? Give examples.

   Answer: The two commands used for deleting the directories in Linux are "rm" and "rmdir". However if rm command is used without any switches it will delete the directory only if the directory does not contain any file or subdirectories. If rm -fr is used then it will delete all the files and subdirectories.

   eg. rm -fr MyDir (removes all the files and subdirectories contained in MyDir directory. The rm "remove" command is used to delete files. When used recursively, it may be used to delete directories.)

   The rmdir command removes each directory specified on the command line, if they are empty. That is, each directory removed must contain no files or directories, or it cannot be removed by rmdir.

   If any specified directory is not empty, rmdir will not remove it, and will proceed to try and remove any other directories you specified. Directories are processed in the order you specify them on the command line, left to right.

eg. rmdir MyDir1 MyDir2 MyDir3 (removes all the directoriesif they are empty)

Section-C **Attempt ALL questions** **(5X10) Marks**

1. Explain all the tasks of a System Administrator.

   Answer: Following are the routine tasks of System Administrator:
   Setting the Run Level: The Sys Admin decides the run level of the server. If GUI is not required then the system should be be in run level 3 and if GUI is required then the system should be in run level 5.
   System Services: Depending on the role of the server corresponding services are started, enabled and monitored by Sys Admin. For example if the system is configured as mail server then name service, postfix, IMAP and POP3 services are configured and enabled.
   User Management: Creation, suspension and deletion of user accounts is the responsibility of Sys Admin.
   Network Settings: Configuring the network interfaces and maintenance/upgrade of related hardware is responsibility of Sys Admin.
   Scheduling Jobs: Monitoring the server load and scheduling the user jobs is done by System Administrators.
   Quota Management: This covers the enabling of disk quota for each user and monitoring the disk usage.
   Backup and Restore: Scheduling regular backups of system software and user data is the prime responsibility of Sys Admin. In the event of data loss the sys admins should restore it to minimize the data loss.
   Adding and Removing software/packages: Depending on the user's requirement sys admin should install and remove the software/packages from the server. Additionally sys admin has to install any upgrades/patches available from time to time.
   Setting a Printer: Configuring a print queue is the duty of sys admin so that users can take print outs whenever required.
   Monitoring the system (general, logs): sys admins should monitor the various log files to find out any unwanted events occurring in the system. The logs also help in diagnosing system faults.
   Monitoring any specific services running. Eg. DNS, DHCP, Web, NIS, NPT, Proxy etc. because sometimes some services go in sleep mode due to stale caches etc. Such services are to restarted by sys admins.

2. How disk quota can be configured in Linux? Explain in detail.

   Answer: To configure and implement disk quotas, following steps are used:

   - Enable quotas per file system by modifying /etc/fstab
   - Remount the file system(s)
   - Create the quota files and generate the disk usage table
   - Assign quotas

   The details of each of the steps are given below:

For enabling Quotas edit fstab to enable usrquota

```
LABEL=/1          /          ext3   defaults                    1 1
LABEL=/boot       /boot      ext3   defaults                    1 2
LABEL=/users      /users     ext3   exec,dev,suid,rw,usrquota       1 2
LABEL=/var        /var       ext3   defaults                    1 2
LABEL=SWAP-sda5   swap       swap   defaults                    0 0
```

Remounting the File Systems: Issue the umount command followed by the mount command to remount the file system in which quota has been implemented (umount /users;mount /users)

Creating the Quota Database Files: Use quotacheck command to create quota.user file

quotacheck -cu /users

Assigning Quotas per User: assigning the disk quotas with the edquota command (edquota <username>)
eg. Disk quotas for user web_cc (uid 524):

Filesystem	blocks	soft	hard	inodes	soft	hard
/dev/sdb1	988612	1024000	1075200	7862	0	0

3. What is the procedure for configuring DHCP server in Linux? How a MAC address can be bound to a specific IP?
Answer: DHCP (Dynamic Host Configuration Protocol) is a network service that enables clients to obtain network settings (IP Address, Subnet Mask, Default Gateway, DNS Server, Hostname and Domain) automatically from a central server
The DHCP client sends a broadcast request to find the DHCP server and the DHCP server in the subnet responds with an IP address (and other common network parameters) from a pool of IP addresses.
To install DHCP server following steps are used:
To install DCHP simply run the command below.
yum -y install dhcp

Open the file /etc/sysconfig/dhcpd, add the name of the specific interface to the list of DHCPDARGS, for example if the interface is eth0, then add:
DHCPDARGS=eth0
Save the file and exit.

The main DHCP configuration file is normally /etc/dhcp/dhcpd.conf (which is empty by default), it keeps all network information sent to clients.

There are two types of statements defined in the DHCP configuration file, these are:

parameters – state how to carry out a task, whether to perform a task, or what network configuration options to send to the DHCP client.
Declarations – specify the network topology, define the clients, offer addresses for the clients, or apply a group of parameters to a group of declarations.
vi /etc/dhcp/dhcpd.conf

```
option domain-name "ruj-bsdu.in";
option domain-name-servers nms.ruj-bsdu.in;
default-lease-time 600;
max-lease-time 7200;
authoritative;

subnet 192.168.1.0 netmask 255.255.255.0 {
   # specify the range of lease IP address
   range dynamic-bootp 192.168.1.10 192.168.1.254;
   # specify broadcast address
   option broadcast-address 192.168.1.255;
   # specify default gateway
   option routers 192.168.1.1;
}
```

Static IP address to a specific client computer's MAC Address on the network can be assigned by adding following lines in the configuration files:

```
host ubuntu-node {
hardware  ethernet 00:f0:m4:6y:89:0g;
fixed-address 192.168.56.105;
}
host fedora-node {
hardware  ethernet 00:4g:8h:13:8h:3a;
fixed-address 192.168.56.110;
}
```

Save the above file and start the dhcpd service by issuing following commands:
systemctl start dhcpd
systemctl enable dhcpd

To permit DHCP service (DHCPD daemon listens on port 67/UDP) as below:

```
# firewall-cmd --add-service=dhcp --permanent
# firewall-cmd --reload
```

4. NIS server for domain "ruj-bsdu.in" is to be installed. Write down all the steps for configuring this NIS server?
Answer: Network Information Service is Directory Service for Centralized Authentication and Accounting. The NIS server and all NIS clients are members

of a NIS domain. It uses ypserv, yppasswdd and ypbind daemon and also uses portmap and rpc service. It can be configured by using following steps:
First install the packages ypserv and rpcbind:
yum -y install ypserv rpcbind
Now set NIS domain name:
ypdomainname ruj-bsdu.in
#echo "NISDOMAIN=ruj-bsdu.in" >> /etc/sysconfig/network
Edit the securents file:
vi /var/yp/securenets

Add IP addresses you allow to access to NIS server
255.0.0.0 127.0.0.0
255.255.255.0 192.168.1.0

Edit the hosts file:
vi /etc/hosts
add server and clients' IP address for NIS database
192.168.1.20 nisserv.ruj-bsdu.in nisserv

Now start the services:
systemctl start rpcbind ypserv ypxfrd yppasswdd
systemctl enable rpcbind ypserv ypxfrd yppasswdd

Now, update NIS database
/usr/lib64/yp/ypinit -m
At this point, construct a list of the hosts which will run NIS servers. nisserv is in the list of NIS server hosts. When you are done with the
list, type a <control D>.
next host to add: nisserv.ruj-bsdu.in
next host to add:# Ctrl + D key
The current list of NIS server looks like this:
nisserv.ruj-bsdu.in
Is this correct? [y/n: y] y
Press y key and Enter.
It will take few minutes to build the databases and will display the messages on the screen. The final message will be:
"nisserv.ruj-bsdu.in has been set up as a NIS master server."
Users in local server should be added to NIS database, by following commands:
cd /var/yp
make
Configure firewall to allow NIS services or ports. Some services listen different ports when they restart, so fix ports for them and allow them by Firewalld.
vi /etc/sysconfig/network
Add to the end of file
YPSERV_ARGS="-p 944"
YPXFRD_ARGS="-p 945"

Now edit yppasswd file:
vi /etc/sysconfig/yppasswdd

Add line as follows
YPPASSWDD_ARGS="--port 946"

Now restart the services as follows:
systemctl restart rpcbind ypserv ypxfrd yppasswdd

Configure the firewall:
firewall-cmd --add-service=rpc-bind --permanent
firewall-cmd --add-port=944/tcp --permanent
firewall-cmd --add-port=944/udp --permanent
firewall-cmd --add-port=945/tcp --permanent
firewall-cmd --add-port=945/udp --permanent
firewall-cmd --add-port=946/udp --permanent
firewall-cmd --reload
The system should respond with "success" message for each one of the above commands.

5. List and explain DNS Resource Records.
Answer: Zone DNS database is a collection of resource records and each of the records provides information about a specific object. A list of most common records is provided below:

Address Mapping records (A): The record A specifies IP address (IPv4) for given host. A records are used for conversion of domain names to corresponding IP addresses.

Canonical Name records (CNAME): The CNAME record specifies a domain name that has to be queried in order to resolve the original DNS query. Therefore CNAME records are used for creating aliases of domain names. CNAME records are truly useful when we want to alias our domain to an external domain. In other cases we can remove CNAME records and replace them with A records and even decrease performance overhead.

Host Information records (HINFO): HINFO records are used to acquire general information about a host. The record specifies type of CPU and OS. The HINFO record data provides the possibility to use operating system specific protocols when two hosts want to communicate. For security reasons the HINFO records are not typically used on public servers.

Mail exchanger record (MX): The MX resource record specifies a mail exchange server for a DNS domain name. The information is used by Simple Mail Transfer Protocol (SMTP) to route emails to proper hosts. Typically, there

are more than one mail exchange server for a DNS domain and each of them have set priority.

Name Server records (NS): The NS record specifies an authoritative name server for given host.

Reverse-lookup Pointer records (PTR): As opposed to forward DNS resolution (A DNS records), the PTR record is used to look up domain names based on an IP address.

Start of Authority records (SOA): The record specifies core information about a DNS zone, including the primary name server, the email of the domain administrator, the domain serial number, and several timers relating to refreshing the zone.

Text records (TXT): The text record can hold arbitrary non-formatted text string. Typically, the record is used by Sender Policy Framework (SPF) to prevent fake emails to appear to be sent by you.

Registration No.: .....

SCHOOL OF COMPUTING SKILLS

END SEMESTER EXAMINATION – 2018

SUMMER SEMESTER, B. VOC. PROGRAM

ITN1305 Optical Fiber Communication **Time: 3 Hours**

Max. Marks: 100

Section – A

20x01 = 20 Marks

Q1. Which one of the following is true for **basic safety for good work habits**?

a. Do not eat and drink in work area
b. Use tools for the jobs they were designed to perform
c. Keep a clean workspace
d. All are correct

Q2. Which one of the following **strength member** is used to construct an optical fiber cable?

a. Aramind yarns b. Plastic c. Glass d. Polyethylene

Q3. Which one of the following is the **simplest optical fiber cable**?

a. Simplex cordage b. Distribution cable c. Breakout cable d. Armored cable

Q4. Which one of the following cable is a convenient solution for **space and weight problem**?

a. Ribbon cable b. Distribution cable c. Breakout cable d. Armored cable

Q5. Which one of the following zone **does not permit defects and scratches at endface**?

a. Core b. cladding c. Epoxy ring d. Contact zone

Q6. Which one of the following **is not a fiber optic connector component**?

a. Cap b. Ferrule c. Core d. Strain relief boot

Q7. Which one of the following gives the base color, position and tracer for **D/BL** in a fiber cable?

a. Blue, 13, Black Tracer
b. Yellow, 35, Double Black Tracer
c. Red, 19, Black Tracer
d. Aqua, 36, Double Black Tracer

Q8. Which one of the following is the correct statement for a **loose buffer tube**?

a. It has an inner diameter much larger than that of the coated optical fiber
b. It has an inner diameter much smaller than that of the coated optical fiber
c. Its inner diameter is equal to the diameter of the coated optical fiber
d. It is directly applied to outer coating layer of the optical fiber

Q9. Which one of the following is a **single fiber contact connector**?

a. ST b. SMA c. FDDI d. BICONIC

Q10. Which one of the following effects is caused by **optical fiber type mismatch**?

a. Attenuation b. Back reflection c. Both are correct d. None of these

Q11. Which one of the following is the **cable jacket color of SMF according to TIA-568-C**?

a. Orange b. Yellow c. Slate d. Green

Q12. "Light is confined within the core of a simple optical fiber", due to which one of the following reasons?

a. refraction
b. total internal reflection at the outer edge of the cladding
c. total internal reflection at the core cladding boundary
d. reflection from the fiber plastic coating

Q13. "Optical fibers immune to **EMI**", due to which one of the following reasons?

a. They transmit signals in as light rather than electric current
b. They are too small for magnetic fields to introduce current in them
c. Magnetic fields cannot penetrate the glass of the fiber
d. They are readily shielded by outer conductors in cable

Q14. Which one of the following defines the **core diameter for endface measurement for SMF**?

a. 0 to 25 µm b. 25 to 120 µm c. 120 to 130 µm d. 130 to 250 µm

Q15. Which one of the following is used **to clean optical fiber connectors**?

a. Cleaning stick b. Cleaning swab c. Cleaning fluid d. All are correct

Q16. Which one of the following microscope resolution is required in **SMF for inspection**?

a. 100X b. 220X c. 400X d. 340X

Q17. Which one of the following **tools** is required during **termination of an optical fiber**?

a. Shears b. Stripper c. Lint free wipes d. All are correct

Q18. Which one of the following is the correct use of a **cleaver**?

a. To clean fiber
b. To remove residual coating
c. To cut the fiber and provide perpendicular finish
d. To provide non-reflective black surface

Q19. Which one of the following installation methods is used by a **messenger cable**?

a. Direct burial b. Blown fiber c. Aerial d. Tray and duct

Q20 Which one of the following is the key difference in between the tables **TIA-568-A and TIA-568-C**?

a. VFL is used to find broken fiber cables
b. 80/125 µm size is not defined in revision C
c. Connector mismatches are defined in revision
d. None the above

Section – B

Attempt any 06 questions in this section. **06x05 = 30 Marks**

Q1. What is total internal reflection? Describe the core/cladding sizes of different optical fiber cables.

Q2. What are bending losses? Explain the different types of bending losses.

Q3. How can you identify whether a fiber is SMF or MMF using endface evaluation? Explain.

Q4. Write some general rules for the basic safety of engineering controls and personal protective equipment.

Q5. Explain the following terms with diagram: Lateral misalignment and end separation

Q6. Explain the plenum, riser and general purpose cables along with their uses.

Q7. Define both physical contact (PC) and angled physical contact (APC) finish. Explain how PC and APC finishes affect both insertion loss and back reflectance.

Q8. Explain the different types of single fiber contact connectors.

Section – C

05x10 = 50 Marks

Q1. Explain the use of the following pieces of test equipment:

Continuity tester, VFL, Fiber identifier, fusion splicer, Optical return loss test set.

Q2. Compare various methods used to install a fiber optic cable, such as Tray and duct, conduit, direct burial, aerial, Blown optical fiber.

Q3. Draw core and cladding fiber endface defined by ANSI/TIA-455-57-B. Explain the four zones of endface.

Q4. Explain the different steps for terminating epoxy and polish SC connectors.

Q5. a. Write the advantages and disadvantages of optical fibers.

b. Explain the following terms with diagrams: Numerical aperture and mode field diameter.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of IT/Networking Skills

End-Sem. Examination

B. Voc. Program, Summer Semester (2018-19)

Course Code: ITN1305 **Time: 3**

Course Name: Optical Fiber Communication **Max. Marks: 100**

Instruction: (if any)

Section – A

20 Objective type questions, each question carries 01 mark. **20x01 = 20 Marks**

Q 1. a

Q 2. a

Q 3. a

Q 4. a

Q 5. a

Q 6. c

Q 7. a

Q 8. a

Q 9. a

Q 10. c

Q 11. b

Q 12. c

Q 13. a

Q 14. a

Q 15. d

Q 16. c

Q 17. d

Q 18. c

Q 19. c

Q 20. B

Section – B

(Attempt any 06 questions out of 08 questions) **06x05 = 30 Marks**

Q 1. When light passes from a medium with one index of refraction (m1) to another medium with a lower index of refraction (m2), it bends or refracts away from an imaginary line perpendicular to the surface (**normal line**). As the angle of the beam through m1 becomes greater with respect to the normal line, the refracted light through m2 bends further away from the line. At one particular angle (**critical angle**), the refracted light will not go into m2, but instead will travel along the surface between the two media (**sine [critical angle] = n2/n1** where n1 and n2 are the indices of refraction [n1 is greater than n2]). If the beam through m1 is greater than the critical angle, then the refracted beam will be reflected entirely back into m1 (total internal reflection).

Core/Cladding Size- This ratio is expressed in two numbers. The first is the diameter of the optical fiber core. The second number is the outer diameter of the cladding for that optical fiber. Three major core/cladding sizes are in use today: • 8/125 • 50/125 • 62.5/125

8/125

An 8/125 optical fiber is almost always designated as single-mode fiber because the core size is only approximately 10 times larger than the wavelength of the light it's carrying. 8/125 optical fibers are used for high-speed applications.

50/125

In recent years, Corning, as well as other fiber manufacturers, have been promoting 50/125 multimode fibers instead of the 62.5/125 for use in structured wiring installations. It has advantages in bandwidth and distance over 62.5/125 with about the same expense for equipment and connectors. ANSI/TIA/EIA-568-B.3, the fiber-optic-specific segment of the Standard, recognizes 50/125 fiber as an alternate media to 62.5/125.

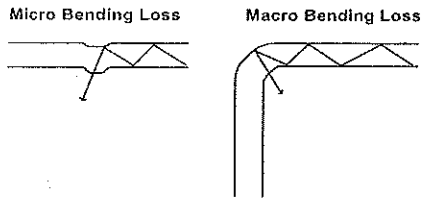
62.5/125

Until the introduction of 50/125, the most common multimode-fiber cable designations was 62.5/125 because it was specified in earlier versions of ANSI/TIA/EIA-568 as the multimode media of choice for fiber installations. It has widespread acceptance in the field. A standard multimode fiber with a 62.5-micron core with 125-micron cladding.

Q 2. Radiative losses occur whenever an optical fiber undergoes a bend of finite radius of curvature. Means bending losses are the result of distortion of the fiber from the ideal straight-line configuration. Fibers can be subject to two types of bend:

a. Macroscopic bends having radii that are large compared to the fiber diameter.

b. Microscopic bend of the fiber axis that can arise when the fibers are incorporated into cables.



While the light is traveling inside the fiber, part of the wave front on the outside of the bend must travel faster than the part of the smaller inner radius of the bend. Since this is not possible, a portion of the wave must be radiated away. Losses are greater for bends with smaller radii. An important cause of attenuation is due to micro-bending of the fiber. Micro-bending is due to irregularly distributed in the fiber with radii of curvature of a few millimeters and deviations from the mean line of a few micrometers. Micro-bends arise from mechanical tensile forces by which the fiber is pressed against a rough surface. Although the effect of variations in diameter can be discussed at length by waveguide theory, here it will be sufficient to say that those components of the light that are traveling in the fiber near its acceptance limit cross outside this boundary and are lost from the fiber. These losses may be avoided by careful cable constructions, avoiding excessive mechanical forces, and controlling the temperature variations of the cable. This is achieved by a loose encasing of the fiber in a plastic sheath or by covering the fiber with soft flexible material.

The large–curvature radiation losses, which are known as macrobending losses. For slight bend the excess loss is extremely small and is essentially unobservable. As the radius of curvature decrease, the loss increases exponentially until at a certain critical radius the curvature loss becomes observable. A sharp bend in a fiber can cause significant losses as well as the possibility of mechanical failure. The tighter the bend cause the worse the losses. Therefore; the critical radius determined by attached instruments indicated a loss of over 6 dB. If bending radius is smaller than critical radius causes damage in optical fiber.

Q 3. **Visual inspection-** by using inspection microscope using 100X, 200X, 400X magnification. Because of dramatic differences in core size, it is easy to tell the difference between a multimode and single mode fiber with an inspection microscope.

One technique is to have 62.5/125 µm optical fiber and 50/125 µm optical fiber simplex patch cords, and compare the fiber with these patch cords to determine the different fibers.

Flexible tape measure- first measures the diameter of the cladding on video inspection microscope display and record that value in your notebook. Then measure the diameter of core and record value. If core diameter is approximately 50 % of cladding, it is a 62.5/125 µm MMF. If core diameter is 40 % of cladding, It is a 50/125 µm MMF.

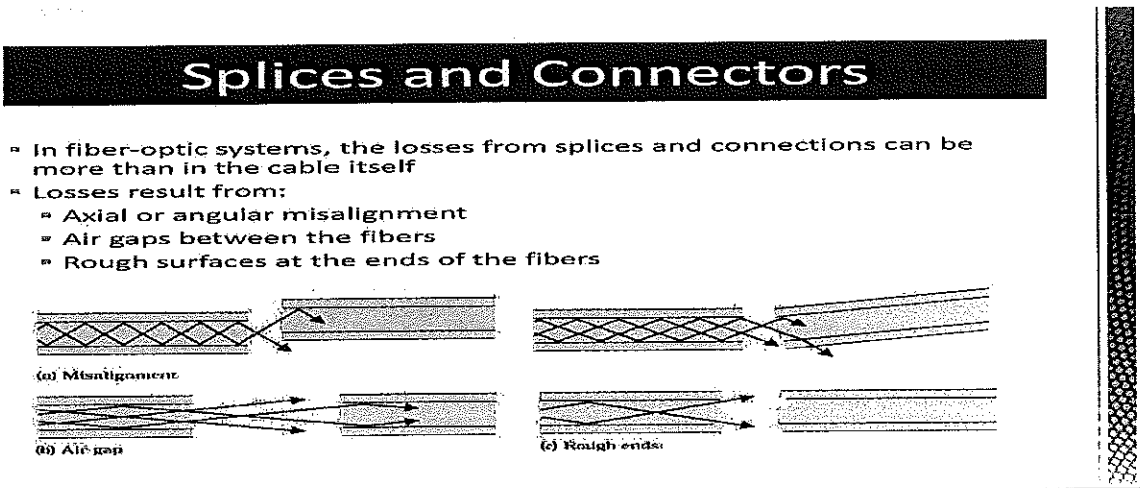
Q 4. **Engineering controls –**

- It includes ventilation in the form of exhaust fans or hoods, special cabinets for storing flammables or workstations that minimize the hazards of specialized work, such as cutting optical fibers.
- Do not try to alter or modify the engineering controls unless the modifications have been approved by your safety officer.
- Do not ignore or try to get around the engineering controls set up.

Personal protective equipment -

- It consists of anything that can wear to protect yourself from materials or situations.
- It includes protective gloves and eyewear.
- It includes respirators for working with chemicals that put out harmful vapours and specialized goggles for working with lasers.
- Always ensure that PPE are in good condition.
- Do not take any warnings lightly.
- Always use hard hat at construction areas.

Q 5. In general, the positions and shapes of the fiber cores are controlled to tight manufacturing tolerances. The attenuation of badly matched fibers may exceed 1 dB/km per connector or splice if they are badly handled during installation stages. A good coupling efficiency requires precise positioning of the fibers to center the cores. The simplest way to avoid connector losses is by splicing the two ends of the fibers permanently, either by gluing of by fusing at high temperatures. Losses in gaps can be viewed as a type of Fresnel loss because existing air space introduces two media interfaces and their associated Fresnel reflection losses. In this case, there are two major losses to be considered. The first loss takes place in the inner surface of the transmitting fiber, and the second loss occurs due to reflections from the surface of the second fiber. One way of eliminating these losses is by introducing a coupler that matches the optical impedances of the two materials. This arrangement results in matched reflection coefficients, which is analogous to matching of impedances.



Q 6. **Plenum cables**

A plenum is a building space, compartment, duct or chamber used for air flow or to form part of an air distribution system. A plenum is a space used to move air to workspaces for the purpose of ventilation, heating or cooling. The informal words for plenums are "air duct" and "air return". The cable used for these spaces are known as plenum cables.

Riser cables

A riser is a floor opening, shaft, or duct that runs vertically through one or more floors. The cable used for these areas are riser cable. Riser cable is intended for use in vertical shafts that run between floors. Many buildings have a series of equipment rooms that are placed vertically in a reinforced shaft for the purpose of enclosing power distribution equipment, HVAC units, telephone distribution and other utility services throughout the building.

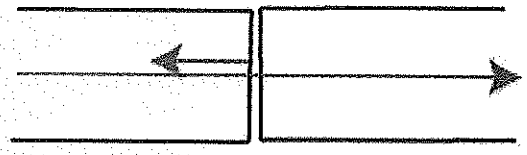
General Purpose cables

A general purpose area is all other area that is not plenum or riser, which is on the same floor. The cable use for these areas are general purpose cables.

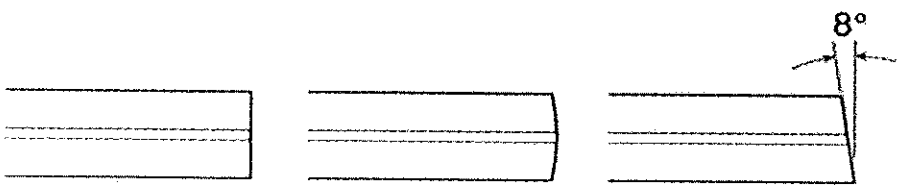
Q 7. **PC Polish** — The Physical Contact (PC) polish results in a slightly curved connector surface, forcing the fiber ends of mating connector pairs into physical contact with each other. This eliminates the fiber-to-air interface, there by resulting in back reflections of -30 to -40 dB. The PC polish is the most popular connector endface preparation, used in most applications.

APC Polish — the Angled PC (APC) polish, adds an 8 degree angle to the connector endface. Back reflections of <-60 dB can routinely be accomplished with this polish.

- Once the optical fiber is terminated with a particular connector, the connector end face preparation will determine what the connector return loss, also known as back reflection, will be.
- The back reflection is the ratio between the light propagating through the connector in the forward direction and the light reflected back into the light source by the connector surface.
- Minimizing back reflection is of great importance in high-speed and analog fiber optic links, utilizing narrow line width sources such as DFB lasers, which are prone to mode hopping and fluctuations in their output.



physical contact (PC) polish on the end of the connector ferrule, which reduces the fresnel reflection. The technique involves polishing the end surface of the fiber to a convex surface or even better at a slight angle (APC or angled physical contact) to prevent reflectance.



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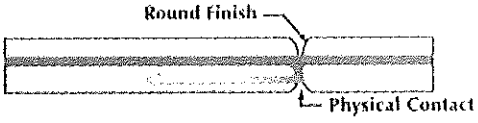
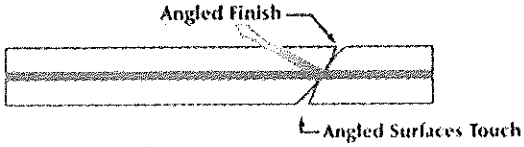
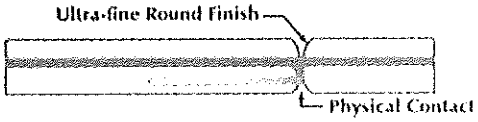
Flat finish causes light to be reflected back into the fiber due to a step in the refractive index caused by the glass-air-glass interface.



Physical Contact (PC) finish minimizes backreflection due to the very small refractive index discontinuity.



Angle physical contact connector cause the reflection to exit the core and dissipate in the cladding.



Ultra polish connector finish uses several grades of polishing film to achieve an ultra-smooth surface.

Q 8. **Single-Fiber Connectors** - Single-fiber connectors have a wide variety of connection methods. Some, including the earliest types, are engaged by pushing and twisting or by using a threaded sleeve to draw the connector tight. Newer forms, however, are square or rectangular snap-in connectors. These are engaged by a simple push that engages a locking mechanism.

SC Connectors - The SC (subscriber connector) is among the most widely used connectors. Originally developed by Nippon Telephone and Telegraph (NTT), the SC has a standard-sized 2.5mm ferrule and a snap-in connector that was created as an alternative to connectors that required turning or twisting to keep them in place. In addition, SC connectors can be installed in only one orientation, making them suitable for an APC endface.

ST Connectors - The ST (straight tip) connector was developed by AT&T as a variation on a design used with copper coaxial cables. This connector has a metal connector cap that must be twisted to lock into place. The ST is considered a legacy connector, as it has been around for quite some time and can still be found in many installations today.

FC Connectors - an FC (face contact) connector is a rugged metal connector with a screw-on connector cap and a 2.5mm ferrule. Like the SC connector, the FC, shown in Figure 26.18, is used in connections where proper polarization must be maintained. Because the connector is cylindrical, it must be aligned with a built-in key. Note, however, that there are several different standards for the size of the key, meaning that the connector must be properly matched with its adapter.

LC Connectors - The LC connector, shown in Figure 26.19, is a small form factor connector. Developed by Lucent Technologies, this snap-in connector is considered to be a smaller version of the SC connector and is sometimes referred to as a mini-SC. The small form factor connector has a 1.25mm ferrule, half the size of an SC connector ferrule.

The smaller form factor allows two LC connectors to fit into roughly the same size space as a single SC connector. Figure 26.20 shows two LC connectors on one side of an SC mating sleeve and an SC connector plugged into the other side of the mating sleeve. The two LC connectors require no more room than a single SC.

D4 Connectors - The D4 connector, also known as a DIN connector, is an older style heavy-duty metal connector with a 2.5mm ferrule and a threaded connector cap that must be screwed on to secure the connector. It was developed by Siemens and is mostly used by Deutsche Telecom, the parent company of T-Mobile Wireless. It is similar in function to the FC connector, but its profile is slightly smaller, allowing it to be used in smaller spaces than the FC connector.

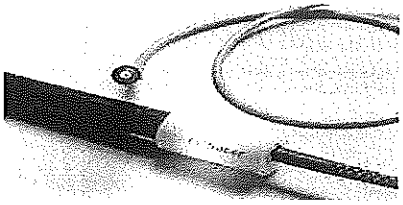
Section – C

Essay type questions, each question carries 10 marks. **05x10 = 50 Marks**

Q 1. Continuity tester, VFL, Fiber identifier, Optical return loss test set, OLTS.

Continuity Testers - A continuity tester is an even simpler and less expensive device than a wire-map tester. It is designed to check a fiber cable connection for basic installation

problems, such as cut in fiber cable. These devices usually cannot detect more complicated faults, but they are sufficient for basic cable testing.



VFL (Visual Fault Locator) - The light that transmits data over fiber-optic cable is invisible to the naked eye, making it difficult to ensure without a formal test that installers have made the proper connections. A visual fault locator (sometimes called a cable tracer) is a quick and dirty way to test the continuity of a fiber-cable connection by sending visible light over a fiber-optic cable. A typical fault locator is essentially a flashlight that applies its LED or incandescent light source to one end of a cable, which is visible from the other end. A fault locator enables you to find a specific cable out of a bundle and ensure that a connection has been established. More powerful units that use laser light sources can actually make points of high loss—such as breaks, kinks, and bad splices—visible to the naked eye, as long as the cable sheath is not completely opaque. For example, the yellow- or orange-colored sheaths commonly used on single-mode and multimode cables (respectively) usually admit enough of the light energy lost by major cable faults to make them detectable from outside. In a world of complex and costly testing tools, fault locators are one of the simplest and most inexpensive items in a fiber-optic toolkit. Their utility is limited when compared to some of the other tools described here, but they are a convenient means of finding a particular cable and locating major installation faults.

The fiber identifier acts as the fiber-optic installer or technician's infrared eyes. By placing a slight macrobend in an optical fiber or fiber-optic cable, it can detect infrared light traveling through the optical fiber and determine the direction of light travel. Some fiber identifiers can also detect test pulses from an infrared (800–1700nm) light source. The fiber identifier typically contains two photodiodes that are used to detect the infrared light. The photodiodes are mounted so that they will be on opposite ends of the macrobend of the optical fiber or fiber-optic cable being tested. Figure 33.7 shows the location of the photodiode assemblies in the fiber identifier. The photodiode assemblies look like two small glass lenes. The fiber identifier can typically be used with coated optical fiber, tight-buffered optical fiber, a single optical fiber cable, or a ribbon cable. Each of these must be placed in the center of the photodiodes during testing. Selecting the correct attachment for the optical fiber or optical-fiber.

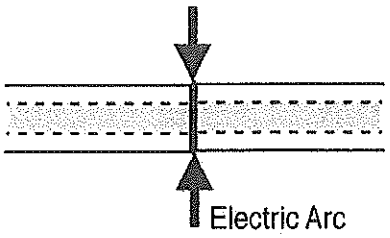
To test an optical fiber or fiber-optic cable, select the correct attachment and install it on the fiber identifier. the fiber identifier ready to test a 900µm tight-buffered optical fiber. Center the tight-buffered optical fiber over the photodiode assemblies and insert a macrobend.

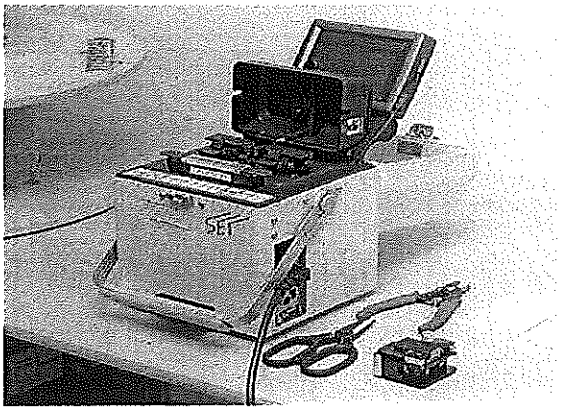
If there is sufficient infrared light energy traveling through the optical fiber, one of the directional arrows on the fiber identifier should illuminate. The directional arrow is pointing in the direction the light is traveling. If a test pulse is being transmitted through the optical fiber, the directional arrow and test pulse indicator should illuminate. The fiber identifier works best with coated optical fiber or tight-buffered optical fiber. Like the VFL, the fiber identifier does not always work with single optical-fiber cables. How well it works with a cable depends on the amount of strength member within the cable, jacket thickness, jacket color, and amount of light energy available from the optical fiber. The fiber identifier can be used

by itself or in conjunction with an OTDR. It can be used to identify traffic in a working fiber-optic link or can be used to help identify the location of a fault.

Fusion Splicing

Fusion splicing is the process of fusing or welding two fibers together usually by an electric arc. Fusion splicing is the most widely used method of splicing as it provides for the lowest loss and least reflectance, as well as providing the strongest and most reliable joint between two fibers.





Virtually all singlemode splices are fusion. Multimode fibers can be harder to fusion splice as the larger core with many layers of glass that produces the graded-index profile are sometimes harder to match up, especially with fibers of different types or manufacturers.
Fusion splicing may be done one fiber at a time or a complete fiber ribbon from ribbon cable at one time. First we'll look at single fiber splicing and then ribbon splicing.
Fusion splicing machines are mostly automated tools that require you preset the splicing parameters or choose factory recommended settings that will control the splicing process itself. All require the use of a precision fiber cleaver that scribes and breaks (cleaves) the fibers to be spliced precisely, as the quality of the splice will depend on the quality of the cleave. Most splicing machines come with a recommended cleaver.
Proper use of both the splicing machine and the cleaver require carefully following the manufacturer's directions. Each manufacturer's product is slightly different and requires somewhat different procedures. Reading the manuals and practice with the machine are important, especially if the operator has not been trained on the particular splicer in use.

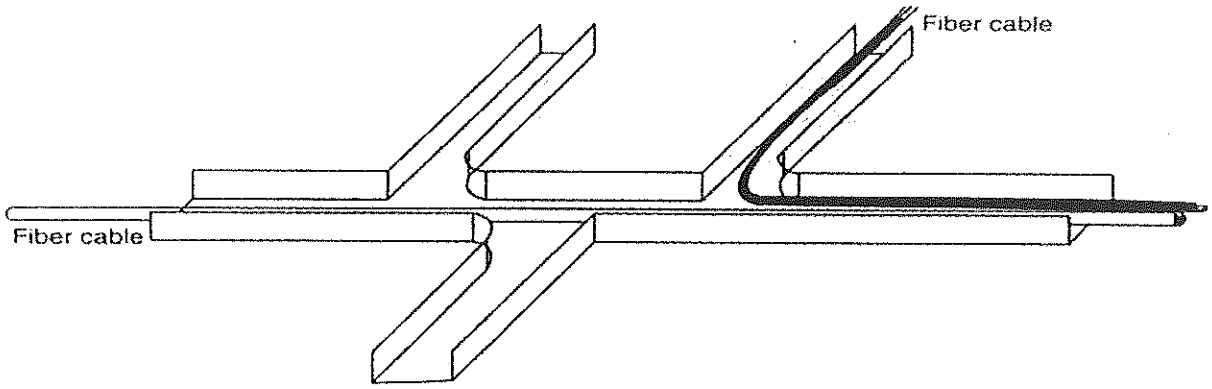
Optical return loss test set -

ORL testing measures the amount of optical light energy that is reflected back to the transmit end of the fiber-optic cable. The energy being reflected back, or back reflections, comes from mechanical interconnections, passive devices, fiber ends, and Rayleigh scattering caused by impurities within the optical fiber. Besides reducing the amount of light transmitted, back reflections can cause various laser light source problems. They can cause the laser's output wavelength to vary. They can also cause fluctuations in the laser's optical output power and possibly permanently damage the laser light source. The impact that back reflections have on the laser light source can cause problems in analog and digital systems. In digital systems, they can increase the BER. In analog systems, they reduce the signal-to-noise ratio (SNR).
The ORL test set measures return loss using an optical continuous wave reflectometer (OCWR). A light source within the ORL test set continuously transmits light through a directional coupler. Light energy returned from the optical fiber is directed to the photodiode of a power meter. The light energy measured by the power meter is the return loss.
ORL measurements of a fiber-optic link should be taken with all patch cords and equipment cords in place. All system equipment should be turned off. The receive connector should remain plugged into the equipment receiver. The transmit connector should be unplugged from the equipment transmitter and plugged into the ORL test set after the test set has been calibrated. The test set should be calibrated as described in the manufacturer's

Q 2.

Tray and duct-:

The main concern for planning indoor fiber cable routes is to avoid any cutting edges and sharp bends. This includes corners and exit slots of trays.

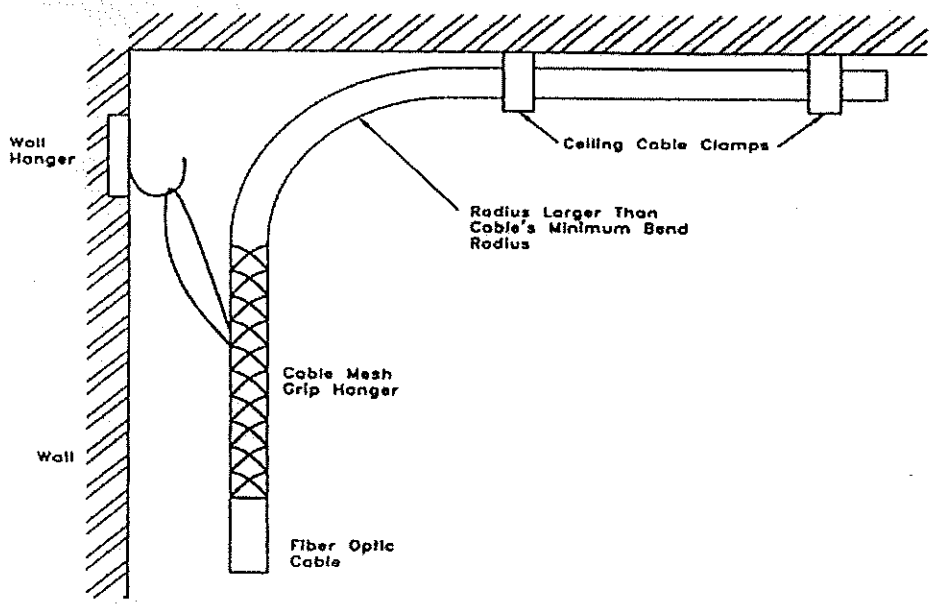


- When fiber cables are placed in the same tray or duct as large and heavy electrical cable, you must take care to avoid placing excessive weight on the fiber cables.

The critical consideration when planning cable duct and trays is the **bending radius**. All bends must have smooth curves. When a fiber cable is pulled into a conduit or cable tray, the conduit's bending radius must be larger than the cable's minimum bending radius for loaded conditions.

Cables in ducts and trays are not subjected to tensile forces. But for vertical runs, this must be carefully designed to minimize the tensile force applied to the vertical run fiber cables. Long vertical runs must be clamped at intermediate points to prevent excessive tensile loading on the fiber cable. The clamping force should be applied over as long a length of the fiber optic cable as practical.

If frequent clamping is not possible, cable hangers can be used at the top of the vertical rises and at intermediate locations along the vertical rises. A popular choice for this situation is the mesh grip or split mesh grip hanger as shown below.



Tray and horizontal ductwork –

Vertical ductwork-

Direct Burial

Optical fibre cables can be manufactured in such a way as to be ideal for long haul buried applications.

- Loose tube designs make the cables particularly able to withstand certain stresses, while the gel filling prevents water migration. Specially selected jacket materials are abrasion and UV resistant.
- Outside plant cables have high tensile strengths to withstand environmental abuse and pressures of direct burial installations.
- Cables directly buried in the ground should be placed deeply enough to provide adequate protection for the cable.
- One of the major hazards a buried cable faces is the possibility of being dug up. It is usually desirable to place a marker tape over the cable but below the soil to warn future workers in the area that an optical fibre cable lies below (figure 11).
- Armoured cables (cables with corrugated steel or FRP (Fibre Reinforced Plastic)) are rodents resistant.

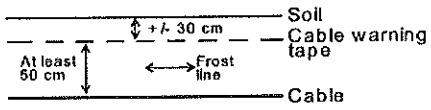


figure 11

Conduit:

Notice: Conduit diameter must be at least 2 times the fibre optic cable diameter.

Fill ratio = (Outside diameter of cable1+ Outside diameter of cable2+ Outside diameter of cable3..)/ Inside diameter of conduit

The NEC specifies the following fill ratios by cross-sectional area for conduit:

1 cable53%, 2 cables 31%, 3 or more cables 40%

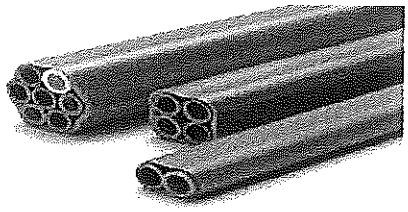
Two ways to install fibre optic cable into conduit:
Cable pulling is the most used method to install a cable into conduit. First of all, a pulling tape is pulled in the conduit. The cable is attached to the pulling tape and then the cable is pulled through the conduit.
Cautions: Always respect the minimum bending radius and never exceed the maximum pulling force value specify in the cable data sheet.

Cable blowing is another way to install cable in conduit. It consists of blowing compressed air in conduit and the air pressure carries the cable through the conduit. This is a specific installation method, which needs very specific and expensive material.

Aerial-
Although most optical fibre cables are intrinsically lightweight, they are subject to stresses caused by the environment they are installed in.

Cables located in aerial runs can be affected by wind and ice, creating a situation that can cause the cable to stretch or sag, pulling on the fibre. Under most conditions aerial optical fibre cables should be supported by an external support member, suspension strand, or "messenger".

Blown fiber



blown fiber and **jetted fiber**—which are used to describe the **placement of a microfiber cable using compressed air**. Those terms infer that the air is pushing or **propelling the microfiber through a microduct**. A more appropriate descriptive term would be **"air lubrication."**

Three steps of installation of blown fiber-

1. **Install the special tubing or conduit.**
2. **Blow the optical fiber through the tubes from location to location.**
3. **Terminate the optical fiber.**

Air is being used as a means to **reduce friction between the microfiber cable jacket and the inside wall of the microduct**. Lubricants, such as air, can be used to reduce friction between two surfaces. With a lubricant, the friction resistance is almost independent of the force between the two surfaces and is not so dependent on the materials of the surfaces. Friction is still related to the temperature, which with lubrication affects the viscosity of the lubricant.

Q 3. Connector Endface Evaluation The endface of a fiber-optic connector can only be properly evaluated with an inspection microscope. As you know from Chapter 26, many different inspection microscopes are available. Typically, a multimode connector can be evaluated with a 100X microscope, while a single-mode connector requires a minimum of 200X magnification. A 400X microscope works even better for both multimode and single-mode. Figure 34.2 shows two handheld microscopes. The smaller microscope is a 100X and the larger is a 400X. ANSI/TIA-455-57-B provides a guideline for examination of an optical-fiber endface. Figure 34.3 contains possible core and cladding fiber endface results. Each endface in Figure 34.3 is labeled with a number and a letter. The number and letter combinations are listed in Table 34.1. This table is used to identify always acceptable, usually acceptable, and often acceptable endface results. This is endface finish 1-A. Note that 1-A is drawn to have no imperfections, or to be "cosmetically perfect." However, the note next to the figure states that a slight indent or score mark is acceptable. When you are evaluating the endface of a connector with a microscope, the magnification level of the scope has everything to do with the detection of imperfections. Earlier in the text, we mentioned that most multimode fiber-optic connectors could be properly evaluated with a 100X inspection microscope. Viewing a multimode endface with this magnification level will reveal

The same connector viewed with a 400X inspection microscope may show many small scratches that were caused by the polishing abrasive. The endface that looked cosmetically perfect or defect-free with 100X magnification might look really ugly with 400x magnification. Imagine how that endface would look with 600X or 800X magnification. Typically, a multimode fiber-optic connector endface does not have to be cosmetically perfect to provide a low-loss interconnection. In my classes, I (Bill) demonstrate this to the students. I take a patch cord with cosmetically perfect connectors on each end and measure the loss. Then I take another patch cord with connector endfaces that have been polished with only a 1µm abrasive and measure the loss. The students are surprised when the cosmetically perfect patch cord has more loss than the less-than-cosmetically-perfect patch cord. For most applications, a multimode connector endface does not need to be polished with an abrasive finer than 1µm. A 1µm abrasive will leave visible scratches in the endface when viewed with a 400X microscope. However, this same endface may appear scratch-free when viewed with a 100X microscope. To evaluate the endface of a multimode connector, you need to divide the endface into three parts: the core, the inner cladding, and the outer cladding. As shown in

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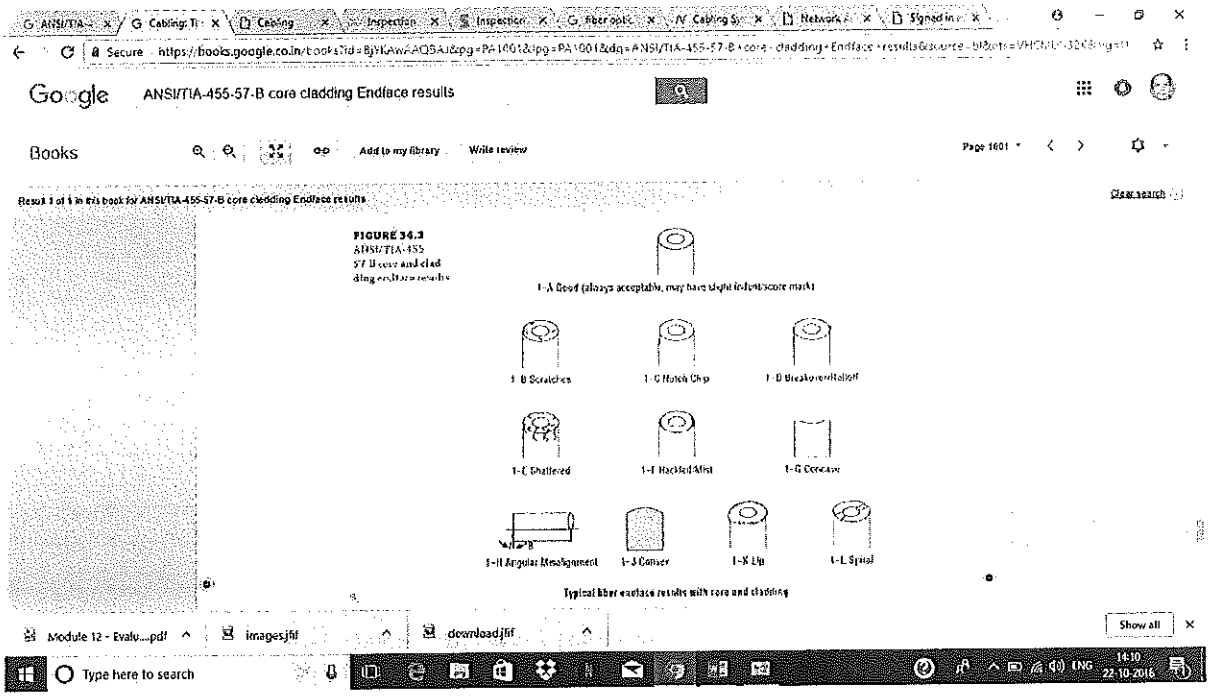
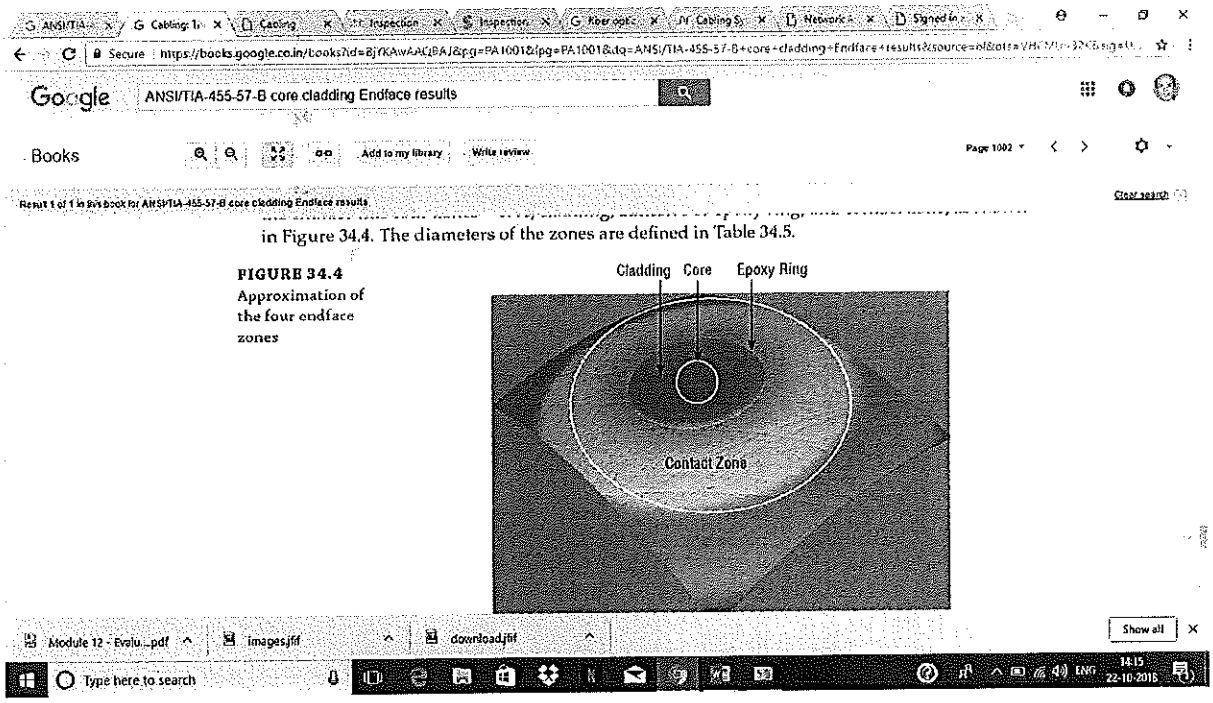
Figure 34.4, the outer cladding is the area from the center of the cladding to the connector ferrule. The inner cladding is the area from the center of the cladding to the core.





in Figure 34.4. The diameters of the zones are defined in Table 34.5.

FIGURE 34.4
Approximation of the four endface zones

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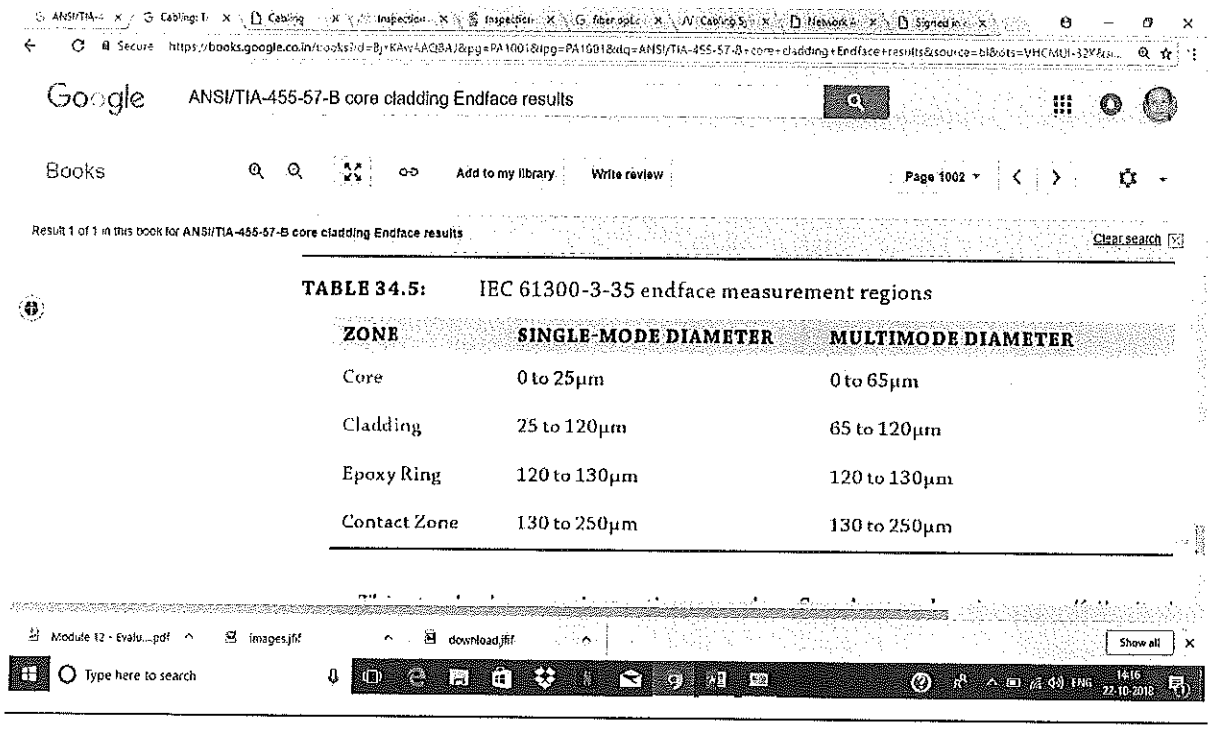

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TABLE 34.5: IEC 61300-3-35 endface measurement regions

ZONE	SINGLE-MODE DIAMETER	MULTIMODE DIAMETER
Core	0 to 25μm	0 to 65μm
Cladding	25 to 120μm	65 to 120μm
Epoxy Ring	120 to 130μm	120 to 130μm
Contact Zone	130 to 250μm	130 to 250μm

Module 12 - Evalu...pdf images.jfif download.jfif Show all

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Q 4.

Step 1: Cable and fiber preparation
Step 2: Epoxy preparation
Step 3: Connector installation
Step 4: Cure the epoxy
Step 5: Cleave fiber and polish connector ends
Step 6: Inspection

STEP 1: CABLE AND FIBER PREPARATION
1. Place cable support (rubber boot) and crimp sleeve onto fiber cable
2. Measure and mark cable
3. Remove outer jacket
4. Insert sheath tube into cable jacket
5. Trim strength member (Kevlar)
6. Measure and mark buffered fiber
7. Remove buffer and fiber coating
8. Set aside prepared cable

STEP 2: EPOXY PREPARATION
1. Remove epoxy divider
2. Mix the epoxy
3. Install the syringe tip
4. Pour mixed epoxy into syringe
5. Remove air from syringe

STEP 3: CONNECTOR INSTALLATION
1. Inject epoxy into connector body-
2. Insert fiber into connector body
3. Install cable sleeve
4. Secure crimp sleeve
5. Install cable support (rubber boot)
6. Install connector holder

STEP 4: CURE THE EPOXY
1. Set-up the curing oven
2. Place connector into oven
3. Cool down the connector assembly

STEP 5: CLEAVE FIBER AND POLISH CONNECTOR ENDS
1. Cleave the fiber
2. Pull away the fiber stub
3. Prepare polishing material
4. Prepare polishing tool
5. Air polish the cleaved fiber
6. Insert connector into polishing tool (polishing puck)
7. First polish - single mode and multimode connectors
8. Second polish - single mode connectors

STEP 6: INSPECTION
1. Attach connector to microscope
2. Inspect fiber end
3. Put on the dust cap

Q 5.

Fiber-optic media (or optical-fiber, or fibers, for short) are any network-transmission media that use glass, or in some cases, plastic, fiber to transmit network data in the form of light pulses.

Fiber-optic transmissions encode the ones and zeros of a network transmission into ons and offs of light. The light source is usually either a laser or some kind of light-emitting diode (LED). The light from the light source is flashed on and off in the pattern of the data being encoded. The light travels inside the fiber until the light signal gets to its intended destination. Fiber-optic cables are optimized for a specific wavelength of light. The wavelength of a particular light source is the length, measured in nanometers, between wave peaks in a typical light wave from that light source.

Advantages of Fiber-Optic Cabling

The following advantages of fiber over other cabling systems explain why it is currently enjoying popularity as a network-cabling medium:

Immunity to electromagnetic interference (EMI)

Higher data rates

Longer maximum distances

Better security

Disadvantages of Fiber-Optic Cabling

Fiber-optic cabling does have a couple of major disadvantages, including higher cost and a potentially more difficult installation.

1. **Numerical aperture** is considered as a light gathering capacity of an **optical fibre. Numerical Aperture** is defined as the Sine of half of the angle of **fibre's** light acceptance cone. i.e. NA= Sin α where α, is called acceptance cone angle.

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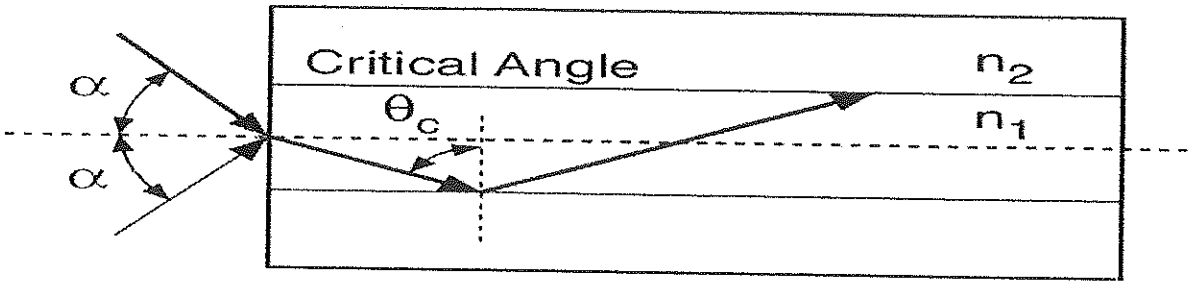
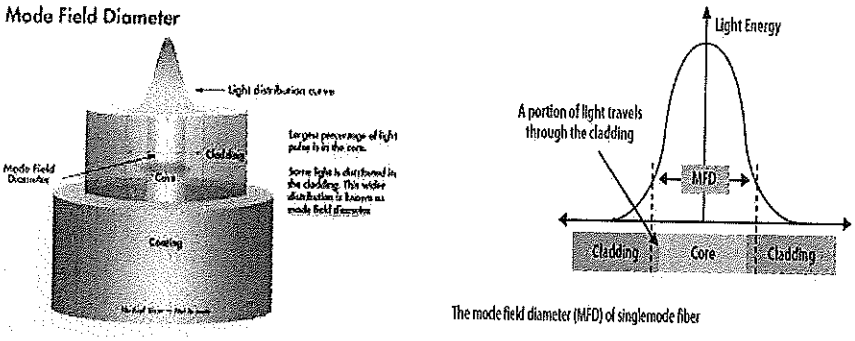
Numerical Aperture



$$NA = \sin \alpha = \sqrt{n_1^2 - n_2^2}$$

$$\text{Full Acceptance Angle} = 2\alpha$$



The mode field diameter (MFD) of singlemode fiber

In fiber optics, the **mode field diameter** (MFD) is an expression of distribution of the irradiance, i.e., the optical power per unit area, across the end face of a single-mode fiber.

For a Gaussian intensity (i.e., power density, W/m^2) distribution in a single-mode optical fiber, the mode field diameter is that at which the electric and magnetic field strengths are reduced to 1/e of their maximum values, i.e., the diameter at which power density is reduced to 1/e^2 of the maximum power density, because the power density is proportional to the square of the field strength.