BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Computing Skills

3rd Semester /2nd In-Sem. Examination

B. Voc. Program Summer Semester(2019)

ITN1302 **Time: 1 Hour**

Wireless Network **Max. Marks: 20**

Instruction: Answer All Questions

Section – A

05X01 = 05 Marks

Q.1 Networking Layer concerns with_____.
a) Bits
b) Nibble
c) Frames
d) Packets

Q.2 Which one of the following is the process for ICMP used for?
a) Exception Handling
b) Addressing
c) Error and Diagnostic Function
d) Forwarding

Q.3 Which one of the following is the network layer protocol of internet?
a) Transmission Control Protocol
b) Hyper Text Transfer Protocol
c) Ethernet
d) Internet Protocol

Q.4 Which one of the following is not the function of network layer?
a) Internetworking
b) end to end delivery
c) Congestion Control
d) Routing

Q.5 ISP stands for _____.
a) Internet Service Protocol
b) Internet Service Provider
c) Intranet Service Provider
d) Internal Service Protocol

Section – B

03X02 = 06 Marks

Q1. Define IP Subnet. Write the format of subnet mask.

Q2. Difference between MAC address and IP address.

Q3. Define IEEE standards. Give some examples.

Section – C

03X03 = 09 Marks

Q1. Write the basic functionality of following devices:
1. Router
2. Access Point
3. Switch

Q2. Explain the advantages of wireless network over wired.

Q3. Define and explain:
1. Wi Fi
2. NIC
3. DNS

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3rd Semester 2nd In-Sem. Examination

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Section – B

03X02 = 06 Marks

Q1. Define IP Subnet. Write the format of subnet mask.

Answer: A sub network or subnet is a logical subdivision of an IP network. The practice of dividing a network into two or more networks is called sub – netting. Computers that belong to a subnet are addressed with an identical most-significant bit-group in their IP addresses.

Format:- (***.***.***.***)

Q2. Difference between MAC address and IP address.

Answer:

IP	MAC
Layer 2	Layer 3
It identifies connection of a computer on the internet.	It identifies the physical address of a computer on the internet.
IPv4 is a 32-bit (4 bytes) address, and IPv6 is a 128-bits (16 bytes) address.	It is 48 bits (6 bytes) hexadecimal address.
IP address is assigned by the network administrator or Internet Service Provider.	MAC address is assigned by the manufacturer of NIC card.
RARP protocol can retrieve IP address of a device.	ARP protocol can retrieve MAC address of a device.
Internet Protocol	Media Access Control

Q3. Define IEEE standards. Give some examples.

Answer: The Institute of Electrical and Electronic Engineers (IEEE) is a global association and organization of professionals working toward the development, implementation and maintenance of technology-centered products and services.

802.3 – Ethernet

802.7 – Broadband LAN Practices

802.11 – Wi-Fi

Section – C 03X03 = 09 Marks

Q1. Write the basic functionality of following devices:

1. Router
   The main **purpose** of a **router** is to connect multiple networks and forward packets destined either for its own networks or other networks. A **router** is considered a layer-3 device because its primary forwarding decision is based on the information in the layer-3 IP packet, specifically the destination IP address.
2. Access Point
   It is a hardware device used in a wireless local area network (WLAN) for data transmitting and receiving. An **access point** connects users to other users within the network and also serves as the **point** of interconnection between the WLAN and a fixed wire network
3. Switch
   The **basic** function that any **switch** is supposed to perform is to receive information from any source connected to it and dispatch that information to the

appropriate destination only. This thing differentiates **switches** from hubs. Hub gets the information and forwards that to every other device in the network.

Q2. Explain the advantages of wireless network over wired.

Wireless networks enable multiple devices to use the same internet connection remotely, as well as share files and other resources.

They also allow mobile devices, such as laptops, tablets and mobile phones to move around within the network area freely and still maintain a connection to the internet and the network.

There are also disadvantages to wireless networks, however, especially when you compare them with wired networks, which generally maintain a faster internet speed and are more secure.

Below, I have listed all of the above points, plus the other main advantages and disadvantages of a wireless network vs wired network.

Q3. Define and explain:

1. Wi Fi – Wireless Fidelity (Wi-Fi is the name of a popular wireless networking technology that uses radio waves to provide wireless high-speed Internet and network connections)
2. NIC – Network Interface Card (A network interface card (NIC) is a hardware component without which a computer cannot be connected over a network. It is a circuit board installed in a computer that provides a dedicated network connection to the computer. It is also called network interface controller, network adapter or LAN adapter)
3. DNS – Domain Name Server (Definition of: DNS. DNS. (Domain Name System) The Internet's system for converting alphabetic names into numeric IP addresses. For example, when a Web address (URL) is typed into a browser, DNS servers return the IP address of the Web server associated with that name.)

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Computing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

ITN1303: Basics of Network Security

Time: 1 Hour

Max. Marks: 20

Instruction: Answer All Questions

Section – A

05X01 = 05 Marks

Q1. Which one of the following port states determined by Nmap?

a) Active, inactive, standby
b) Open, filtered, unfiltered
c) Open, half-open, closed
d) Active, closed, unused

Q2. Which one of the following phases of hacking performs an actual attack on a network or system?

a) Reconnaissance
b) Maintaining
c) Access Scanning
d) Gaining Access

Q3. Which one of the following ports is used by Telnet?

a) 22
b) 20
c) 80
d) 23

Q4. Which one of the following is a type of social engineering?

a) Shoulder surfing
b) User identification
c) System monitoring
d) Face-to-face communication

Q5. Which one of the following are the types of scanning?

a) Port, network, and services
b) Network, vulnerability, and port
c) Passive, active, and interactive
d) Server, client, and network

Section – B

03X02 = 06 Marks

Q1. How do you define risk, vulnerability, and threat, in the context of network security?

Q2. What is a Honeypot? Discuss.

Q3. How do you deal with "Man In The Middle" attacks?

Section – C

03X03 = 09 Marks

Q1. What is a Denial of service attack? Explain.

Q2. List the three main types of security testing? Explain.

Q3. What are the motives of Cyber Criminals? Explain.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Computing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, 3rd Semester,

2nd In-Sem. Examination

ITN1303: Basics of Network Security

Time: 1 Hour

Max. Marks: 20

Instruction: Answer All Questions

Section – A

05X01 = 05 Marks

Q1. Which one of the following port states determined by Nmap?

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a) Port, network, and services
c) Passive, active, and interactive
b) **Network, vulnerability, and port**
d) Server, client, and network

Section – B

03X02 = 06 Marks

Q1. How do you define risk, vulnerability, and threat, in the context of network security?

Ans. A risk is defined as the result of a system being secure but not secured sufficiently, thereby increasing the likelihood of a threat. A vulnerability is a weakness or breach in your network or equipment (e.g. modems, routers, access points). A threat is the actual means of causing an incident; for instance, a virus attack is deemed a threat.

Q2. What is a Honeypot? Discuss.

Ans. Honeypot is a fake computer system that behaves like a real system and attracts hackers to attack it. Honeypot is used to find out loopholes in the system and to provide a solution for these kinds of attacks.

Q3. How do you deal with "Man In The Middle" attacks?

Ans. A Man in the Middle attack happens when there is a third party that's monitoring and controlling a conversation between two parties, with the latter completely unaware of the

situation. There are two ways of dealing with this attack. First of all, stay off of open Wi-Fi networks. Second, both parties should employ end-to-end encryption.

Section – C

03X03 = 09 Marks

Q1. What is a Denial of service attack? Explain.

Ans. A denial-of-service (DoS) is any type of attack where the attackers (hackers) attempt to prevent legitimate users from accessing the service. In a DoS attack, the attacker usually sends excessive messages asking the network or server to authenticate requests that have invalid return addresses. The network or server will not be able to find the return address of the attacker when sending the authentication approval, causing the server to wait before closing the connection. When the server closes the connection, the attacker sends more authentication messages with invalid return addresses. Hence, the process of authentication and server wait will begin again, keeping the network or server busy.
DoS attacks can cause the following problems:

1. Ineffective services
2. Inaccessible services
3. Interruption of network traffic

Q2. List the three main types of security testing? Explain.

Ans. The three main types of security testing are:

1. **Vulnerability Scanning:** Automated software scans a system against known vulnerabilities.
2. **Security Scanning:** Manual or automated technique to identify network and system weaknesses.

Penetration testing: Penetration testing is on the security testing which helps in identifying vulnerabilities in a system.

Q3. What are the motives of Cyber Criminals? Explain.

Ans. The motives of Cyber Criminals are:

- Power assurance---to restore criminal's self-confidence or self-worth through low-aggression means;---e.g. cyberstalking
- Power assertive---to restore criminal's self-confidence or self-worth through moderate- to high-aggression means---not to harm the victim but to get control of the victim;
- Anger (retaliatory)---rage towards a person, group, institution, or a symbol---the offender may believe that they are correcting some injustice
- Sadistic---derive gratification from the pain/suffering of others
- Profit-oriented---material or personal gain

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Registration No.: .....

School of Computing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, III Semester

2nd In-Sem. Examination

ITN1305 Optical fiber communication

Time: 1 Hour
Max. Marks: 20

Section – A

05X01 = 05 Marks

Q1. Which one of the following is a multi-fiber connector?

a. ST b. SC c. MT-RJ d. BICONIC

Q2. Which geometry of the connector and fiber end ensures a physical contact (PC) finish?

a. Flat b. Rough c. Curved d. None

Q3. Which part of the connector holds the fiber in place?

a. Ferrule b. Cap c. Boot d. Body

Q4. 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

Q5. Which one of the following is true for absorption?

a. Absorption is uniform
b. It is only important in single mode fibers
c. It spreads out the light pulse
d. It transfers energy to other directions

Section – B

03X02 = 06 Marks

Q1. Describe ferrule materials used with fiber optics connectors.

Q2. What is dispersion? List the different types of dispersion.

Q3. List the different tools used for connector termination.

Section – C

03X03 = 09 Marks

Q1. What is connector? Explain its different components.

Q2. Explain the intrinsic factors that affect connector performance.

Q3. Explain the different types of single fiber contact connectors.

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Registration No.: .....

School of Computing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, III Semester

2nd In-Sem. Examination

ITN1305 Optical fiber communication

Time: 1 Hour
Max. Marks: 20

Section – A **05X01 = 05 Marks**

Q1. Which one of the following is a multi-fiber contact connector?

a. ST b. SC c. MT - RJ d. BICONIC

c.

Q2. Which geometry of the connector and fiber end ensures a physical contact (PC) finish?

a. Flat b. Rough c. Curved d. None

c.

Q3. Which part of the connector holds the fiber in place?

a. Ferrule b. Cap c. Boot d. Body

a.

Q4. Which one of the following is true for basic safety for good work habits?

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

d.

Q5. Which one of the following is true for absorption?

a. Absorption is uniform
c. It spreads out the light pulse
b. It is only important in single mode fibers
d. It transfers energy to other directions

a.

Section – B **03X02 = 06 Marks**

Q1. Describe ferrule materials used with fiber optics connectors.

Ferrules typically are made of metal, ceramic, or plastic with a selection of hole or bore diameters ranging from slightly larger than the optical fiber diameter to slightly smaller to allow for minute variations in the manufactured optical fiber cladding diameters.
• The ferrule must be of the right shape and have material properties to ensure a low-loss interconnection.

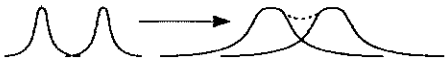
- Ceramic materials such as aluminum oxide and zirconium oxide are among the best materials for ferrules, offering the best combination of characteristics. They are hard enough to protect the fiber end, and their *coefficient of thermal expansion*, the measure of how much a material expands and contracts with temperature changes, is about the same as the optical fiber itself.
- Metal ferrules, typically made of stainless steel, are stronger than ceramic, but they are less dimensionally stable.
- Plastic ferrules are less expensive than metal or ceramic, but they are neither as strong nor as stable as the other materials.

Q2. What is dispersion? List the different types of dispersion.

Dispersion is the spreading out of a light pulse in time as it propagates down the fiber.

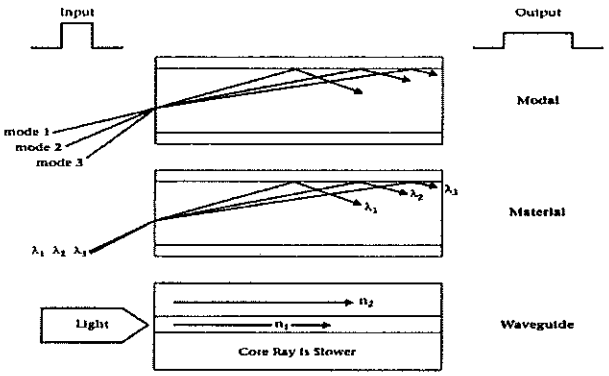
Dispersion

As a pulse travels down a fiber, dispersion causes pulse spreading. This limits the distance and the bit rate of data on an optical fiber.



1 0 1 Symbols become unrecognizable

Dispersion in optical fiber includes model dispersion, material dispersion and waveguide dispersion. Each type is discussed in detail below.



Q3. List the different tools used for connector termination.

Tools

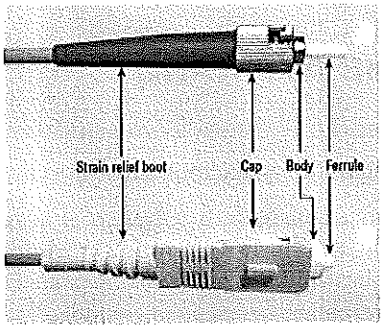
1. Shears – To cut strength material as Kevlar or aramid.
2. Stripper – It is used to remove the outer jacket, tight buffer, and coating.
3. Scribe - A Fiber Optic Scribe is a low cost fiber cleaving tool. It is used to remove the fiber end.
4. Polishing fixture (puck) – It ensure that Ferrule stays perpendicular to the polishing film during the polishing process.
5. Lint free wipes – It are used to lift away oils, grime, and dust from the surface of optical fiber.
6. Cleaning fluid – To clean optical fiber without leaving residue.
7. Alcohol –
8. Cleaver – It is required for pre-polished connectors. It score and break the optical fiber, leaving a perpendicular finish.
9. Non reflective mat – It provides the work surface, over a non-reflective black surface.
10. Optical fiber disposal container – Always use a labelled container with lid to dispose of bare optical fibers.
11. Safety glasses –
12. Tweezers – To prevent injury to your hands from the optical fiber, you may want to handle pieces of bare optical fiber with tweezers.
13. Crimper – It is used to secure the strength member and jacket to the connector.
14. Eye loupe – It provides moderate magnification and used to view the end of the connector ferrule after the scribing process.
15. Rubber pad – It provides a cushioned surface for PC connectors.
16. Cure adapter – It slides over the connector ferrule and helps transfer heat from the curing oven to the connectors.
17. Curing oven – It used to heat the connector and cure the epoxy.

Section – C **03X03 = 09 Marks**

Q1. What is connector? Explain its different components.

A connector is a device that protects the end of the optical fiber while allowing it to be quickly and reliably joined to equipment or other optical fibers.

- Connectors are often used instead of splices to join two optical fibers together because they allow the optical fibers to be disconnected and reconnected easily.
- Splices, on the other hand, are permanent connections between two optical fibers.
- Connectors can be useful when network assignments must be changed, when equipment must be removed/replaced, or when expansion is anticipated.
- **JOB:** It couples an optical fiber end mechanically to a piece of equipment or to another optical fiber so that the cores line up accurately and produce the smallest amount of loss.
- **NEED:** To protect the fiber from repeated handling during connection and disconnection, align the fiber end precisely with its counterpart in the interconnection, and prevent strain on the fiber itself.



Ferrule: The ferrule must hold the fiber exactly at centre in its endface for the best possible connection, so its construction is critical. Not only must the hole for the optical fiber be accurately placed; it must also be sized precisely to receive the exact diameter of the optical fiber cladding.
The optical fiber coating is stripped away prior to inserting the optical fiber into the ferrule.
Ferrules typically are made of metal, ceramic, or plastic with a selection of hole or bore diameters ranging from slightly larger than the optical fiber diameter to slightly smaller to allow for minute variations in the manufactured optical fiber cladding diameters.
Example, for a 125μm optical fiber, ferrules are available with hole sizes ranging from 124μm to 127μm.
Because the ferrule must align the optical fiber end precisely, it must meet several important criteria:
The ferrule must be strong enough to withstand many cycles of connection and disconnection without bending, cracking, or breaking.
• The ferrule must maintain dimensional stability to ensure proper alignment of the optical fiber.
• The ferrule must be of the right shape and have material properties to ensure a low-loss interconnection.

- Ceramic materials such as aluminum oxide and zirconium oxide are among the best materials for ferrules, offering the best combination of characteristics. They are hard enough to protect the fiber end, and their *coefficient of thermal expansion*, the measure of how much a material expands and contracts with temperature changes, is about the same as the optical fiber itself.
- Metal ferrules, typically made of stainless steel, are stronger than ceramic, but they are less dimensionally stable.
- Plastic ferrules are less expensive than metal or ceramic, but they are neither as strong nor as stable as the other materials.
- The cap, sometimes called the coupling nut, fits over the body of the connector and provides a means to secure the connector. The cap can be a locking mechanism, a threaded ring, or a snap attachment, depending on the type of connector.
- A strain relief or boot is typically placed over the cable jacket and secured to the connector body. The boot is generally made of an elastic material that slides over the connector body. Friction between the boot and the connector body holds the boot in place. The boot prevents the cable from being pulled at too great an angle against the connector.
- The ferrule of the connector is the plug, and when two connectors mate, their ferrules are aligned with a sleeve that is typically called a *mating sleeve* or an *alignment sleeve.*

Q2. Explain the intrinsic factors that affect connector performance.

Losses that are caused by factors involving the fibre itself are called "intrinsic losses". The major ones are summarised below:

Concentricity Error

As mentioned earlier, one of the major causes of loss in fibre joins is concentricity error in the fibre. Concentricity error comes about when the axis of the core and that of the total fibre itself are not exactly aligned. That is, the core is not exactly centred in the fibre. Even assuming that the fibres are lined up *exactly* on the outside, concentricity error will cause the cores to be misaligned. Concentricity error is a problem for both SM and MM fibre but it is a significantly greater problem in SM fibres. However, vast improvements in fibre manufacture have been made and major fibre manufacturers have recently (1997) announced big improvements in this area.

Core Shape (Ellipticity)

No matter how precise the manufacture the core will always exhibit a (hopefully very slight) ellipticity. When a fibre is cut and re-joined the orientation of the core will usually not be the same and some light will be lost. This is not a big problem with MM fibre. With SM fibre, any ellipticity causes the fibre to be birefringent. That is, the fibre will exhibit different RIs to orthogonal polarisations of light travelling through it. A join in this case can be a source of birefringent noise (see 2.4.2.1, " Polarisation Mode dispersion (PMd)" on page 61).

Core diameter

In MM fibre light is obviously lost (some modes escape into the cladding) when a core of a larger diameter is joined to one of a smaller diameter.
This happens in the natural situation of every join where the diameter of the fibre core cannot ever be exact. There is always a difference however slight. Note that if the fibres are aligned correctly the loss will occur only when light passes from the larger diameter fibre to the smaller diameter one. Light travelling in the other direction (from smaller to larger) is *not* lost.
In the situation where two fibres of different specifications (with different diameters) are being joined with a connector, then a lot of light is usually lost. This is a common situation, where fibres with a 62.5 »m core can be connected to fibres with a 50 m core. This happens often because most available data communications equipment is pigtailed using 62.5 micron MM fibre. Some users have installed 50 micron MM cabling and so a mismatch is inevitable. Loss of light in this situation (about 3 dB) is unavoidable. Again, this happens only in the direction where light travels from the larger diameter core to the smaller one.

Mode Field diameter

In SM fibres the actual core diameter is not very relevant in considering joins. The diameter of the " Mode Field" (generally larger than the core diameter) is the important parameter.

Cladding diameter

When fibres are joined we line the fibres up with each other using the outside of the fibre (you can't see the core). This means that at some point on the outside of the cladding both fibres must align with each other. If the outside diameters of these claddings are different from one another then the cores cannot be aligned.

Numerical Aperture

When MM fibres of different NAs are joined some modes that were possible in the fibre of higher NA cannot travel in the fibre of lower NA. These will enter the cladding and ultimately be lost. Thus some optical power will be lost. Loss from this source will occur in only one direction (from the *higher* NA fibre to the lower NA one). Light travelling in the opposite direction will be retained.
There is another source of loss and noise here. Fibres with different NAs usually have different RIs in the core or the cladding or both. When you join fibres of different RIs the RI changes at the join. The join then becomes a partial mirror and some light will be reflected back down the fibre. This can cause noise (as well as loss) due to the phenomenon of " Return Loss Variation" .

Refractive Index Profile

Differences in RI profile in the joined fibres can cause the same effects as described above for numerical aperture.

Explain the different types of single fiber contact connectors.

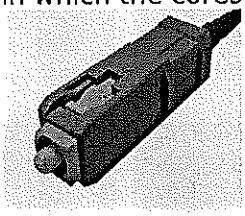
Single-Fiber Connectors

Single-fiber connectors have a wide variety of connection methods:

1. Connections are engaged by pushing and twisting, or by using a threaded sleeve to draw the connector tight.
2. Connections are square or rectangular snap-in connectors. These are engaged by a simple push that engages a locking mechanism.

SC Connectors

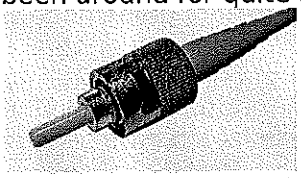
The SC (subscriber connector), is among the most widely used connectors. It is the only single-fiber connector formally recognized by TIA/EIA-568-B.3. Originally developed by Nippon Telephone and Telegraph (NTT), the SC has a standard-sized 2.5 mm ferrule and a snap-in connector that was created as an 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 APC finish connectors or fiber connections in which the cores are required to be aligned to reduce *polarization mode dispersion*



The SC connector is one of the most common types in use.

ST Connectors

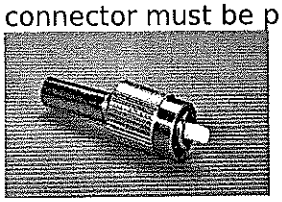
The ST (straight tip) connector, shown in Figure, was developed by AT&T as a variation on a design used with copper coaxial cables. This connector has a metal connector cap that must be twisted to lock into place. The ST is considered a legacy connector, as it has been around for quite some time and can still be found in many installations.



An ST connector must have its connector cap twisted to lock in place.

FC Connectors

An FC (face contact) connector is a rugged metal connector with a screw-on connector cap and
a 2.5 mm ferrule. Like the SC connector, the FC 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, is a *small form factor* plastic 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 1.25 mm ferrule—half the size of a standard connector—that allows it to be used in smaller components and in areas where connectors must be closer together.

D4 Connectors

The D4 connector, also known as a DIN connector, is an older style heavy-duty metal connector
with a 2.5 mm 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.

SMA Connectors

The SMA connector was developed by Amphenol from its line of microwave connectors known
as SubMiniature A. The connector has a 3 mm stainless steel ferrule and a connector cap that is
threaded on the inside. Because it was originally developed before the invention of single-mode
fiber, the SMA connector does not provide as precise a connection as more recent designs. It is still
used in military applications and in the delivery of high-power laser light.

Biconic Connectors

The biconic connector features a stainless steel or ceramic cone-shaped ferrule that helps in
aligning fiber ends during connection. Biconic connectors are threaded on the outside for screw-in placement, and although they are considered legacy connectors, they are still used in
military applications because of their robustness.

Mini BNC Connectors

The mini BNC, shown in Figure 9.8, is similar in appearance to its counterpart made for copper
coaxial cables. The mini BNC (short for either "Bayonet Nut Connector" or "Bayonet-Neill Concelman," the inventor of the original BNC) is a metal twist-lock connector with a 2.5 mm
ferrule. The mini BNC is considered a legacy connector, so while it is rarely installed in new systems,
you may find it on older installations.