Registration No_____

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Computing Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, I Semester,

2nd In-Sem. Examination

Course Code: ITN1101 **Time: 1 Hour**

Course Name: Introduction to Computers **Max. Marks: 20**

Instructions:-

1. Answer all questions from Section A, each question carries one mark.
2. Answer all questions from Section B, each question carries two marks.
3. Answer all questions from Section C, each question carries three marks.

Section – A

05X01 = 05 Marks

Q1.The decimal equivalent of the octal number $(645)_8$ is _____

a) $(450)_{10}$
b) $(451)_{10}$
c) $(421)_{10}$
d) $(501)_{10}$

Q2.The largest two digit hexadecimal number is _____

a) (FE)16
b) (FD)16
c) (FF)16
d) (EF)16

Q3. Representation of hexadecimal number (6DE)H in decimal:

a) $6 * 16^2 + 13 * 16^1 + 14 * 16^0$
b) $6 * 16^2 + 12 * 16^1 + 13 * 16^0$
c) $6 * 16^2 + 11 * 16^1 + 14 * 16^0$
d) $6 * 16^2 + 14 * 16^1 + 15 * 16^0$

Q4.Convert the binary equivalent 10101 to its decimal equivalent.

a) 21
b) 12
c) 22
d) 31

Q5. Which of the following is not a binary number?

a) 1111
b) 101
c) 11E
d) 000

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Section – B

03X02 = 06 Marks

Q6. Add two binary numbers 11011011010 and 0101001O1?

Q7. Perform binary subtraction: 101111 – 010101 =?

Q8. Write down the truth table and draw the diagram of two input OR gate, AND gate and EXOR Gate.

Section – C

03X03 = 09 Marks

Q9. Explain what is a combinational circuit?

Q10. Write down 5 classifications of the Integrated Circuits based on the density of integration with number of logic gates in each.

Q11. Explain what is a half-adder? Draw the diagram.

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Section – B

03X02 = 06 Marks

Q6. Add two binary numbers 11011011010 and 010100101?

Ans. 11101111111

Q7. Perform binary subtraction: 101111 – 010101 =?

Ans. 011010

Q8. Write down the truth table and draw the diagram of two input OR gate, AND gate and EXOR Gate.

Ans.

2 Input OR gate		
A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

2 Input AND gate		
A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1

2 Input EXOR gate		
A	B	A⊕B
0	0	0
0	1	1
1	0	1
1	1	0

Section – C

03X03 = 09 Marks

Q9. Explain what is a combinational circuit?

Ans. In a combinational circuit, the output depends upon present input(s) only i.e, not dependant on the previous input(s). The combinational circuit has no memory element. It consists of logic gates only.

Q10. Write down 5 classifications of the Integrated Circuits based on the density of integration with number of logic gates in each.

Ans. The classification of Integrated Circuits is done accordingly to the density of integration: ♣ SSI (Small Scale Integration) – Elementary logic functions, up until 100 components and implement around 10 logic gates. ♣ MSI (Medium Scale Integration) – Encoders, multiplexers, counters, etc. Up until 100 and 1000 components and implement around 100 logic gates. ♣ LSI (Large Scale Integration) – Memories, microprocessors, calculators, etc. Up until 1000n and 10000 components and implement around 1000 logic gates. ♣ VLSI (Very Large Scale Integration) – Over 10000 components in a single chip, technology that has between 20 and 30 years. ♣ SLSI (Super-Large Scale Integration) – Allows between 50000 and 100000 components in a single chip.

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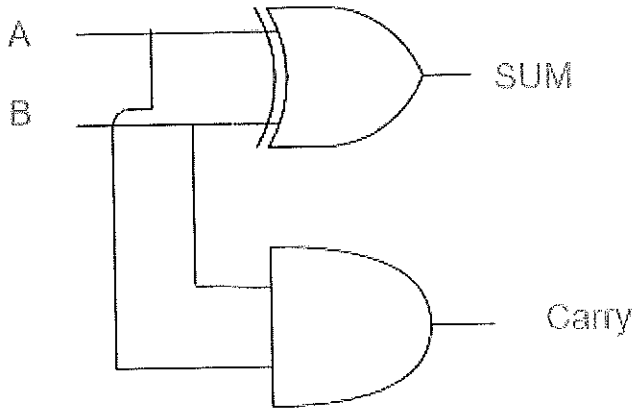
Q11. Explain what is a half-adder? Draw the diagram.

Ans. A logic circuit, that can add two 1-bit numbers and produce outputs for sum and carry, is called a half-adder.



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School of Computing Skills

Session: 2020-21 (Summer Semester)

B. Voc. Program, I Semester,

2nd In-Sem. Examination

Course Code: ITN1104 **Time: 1 Hour**

Course Name: Basics of Networking **Max. Marks: 20**

Section – A

05X01 = 05 Marks

05 objective type questions, each question carries 01 mark.

1. UDP in the Internet Protocol Suite is related to-
   A) Layer 1 B) Layer 2
   C) Layer 3 D) Layer 4

2. The OSI model has _____layers.
   A) 7 B) 6
   C) 5 D) 4

3. In the IPv4 addressing format, the number of networks allowed under Class C addresses is-
   A) 2^{24} B) 2^{21}
   C) 2^{14} D) 2^{7}

4. In IEEE project 802, the Logic Link Control (LLC) is used to control and handle the
   A) Errors B) Frames
   C) Flow D) All of the above

5. Bluetooth is a _____technology that connected devices in a small area.
   A) VLAN B) Wired LAN
   C) Wireless LAN D) None of the above

Section – B

03X02 = 06 Marks

03 short answer type questions, each question carries 02 marks.

1. What is the difference between IPv4 and IPv6?
2. What is NIC in computer networking?
3. What is the Address Resolution Protocol (ARP)?

Section – C

03X03 = 09 Marks

03 essay type questions, each question carries 03 marks.

1. What is the OSI model? Just brief its layers.
2. Explain the following:
   a) Router
   b) Bridge
   c) Access Point
3. What is the IEEE 802 standard? Why IEEE 802 standards are important in computer networking?

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B. Voc. Program, I Semester,

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Course Code: ITN1104 **Time: 1 Hour**

Course Name: Basics of Networking **Max. Marks: 20**

Section – A

05X01 = 05 Marks

05 objective type questions, each question carries 01 mark.

1. TCP/IP model does not have _____ layer but OSI model have this layer.
   A) session layer B) presentation layer
   C) application layer D) both (a) and (b)

Ans. D) both (a) and (b)

2. Which layer provides the services to user?
   A) application layer B) session layer
   C) presentation layer D) none of the above

Ans. A) application layer

3. The default subnet mask for a class B network can be
   A) 255.255.255.0 B) 255.255.0.0
   C) 255.255.192.0 D) 255.0.0.0

Ans. B) 255.255.0.0

4. _____ is the most widely used local area network protocol.
   A) Token Ring B) Ethernet
   C) Token Bus D) none of the above

Ans. B) Ethernet

5. Gigabit Ethernet has a data rate of _____Mbps.
   A) 10000 B) 1000
   C) 100 D) 10

Ans. B) 1000

Section – B

03X02 = 06 Marks

03 short answer type questions, each question carries 02 marks.

1. What is IP? How many versions of IPs are there?

Ans.

- An IP address is a number identifying of a computer or another device on the Internet.
- It is similar to a mailing address, which identifies where postal mail comes from and where it should be delivered.
- IP addresses uniquely identify the source and destination of data transmitted with the Internet Protocol. \
- The IP is the fundamental protocol for communications on the Internet. It specifies the way information is packetized, addressed, transferred, routed, and received by networked devices.

IP versions: IPv4 and IPv6

- IPv4 addresses are 32 bits long (four bytes). An example of an IPv4 address is 216.58.216.164, which is the front page of Google.com.

B

- The maximum value of a 32-bit number is 2^{32}, or 4,294,967,296. So the maximum number of IPv4 addresses, which is called its address space, is about 4.3 billion.
- In the 1980s, this was sufficient to address every networked device, but scientists knew that this space would quickly become exhausted.
- A major advantage of IPv6 is that it uses 128 bits of data to store an address, permitting 2^{128} unique addresses, or 340,282,366,920,938,463,463,374,607,431,768,211,456. The size of IPv6's address space — 340 duo decillion — is much, much larger than IPv4.

2. Just brief the following standards:
IEEE 802.11
IEEE 802.15

Ans. IEEE 802 is divided into 22 parts that cover the physical and data-link aspects of networking. The family of standards is developed and maintained by the IEEE 802 LAN/MAN Standards Committee, also called the LMSC. IEEE stands for Institute of Electrical and Electronics Engineers.

IEEE 802.11 - Wi-Fi: Wireless LAN Media Access Control and Physical Layer specification. 802.11a, b, g, etc. are amendments to the original 802.11 standard. Products that implement 802.11 standards must pass tests and are referred to as "Wi-Fi certified."

IEEE 802.15 - Wireless Personal Area Networks: Communications specification that was approved in early 2002 by the IEEE for wireless personal area networks (WPANs). 802.15.1-Bluetooth, 802.15.3a- UWB, 802.15.4-ZigBee, 802.15.5-Mesh Network are amendments to the original 802.15 standard.

3. What is the Internet Control Message Protocol (ICMP)? How does ICMP work?

Ans. Internet Control Message Protocol (ICMP)

- The Internet Control Message Protocol (ICMP) is a network layer protocol used by network devices to diagnose network communication issues. ICMP is mainly used to determine whether or not data is reaching its intended destination in a timely manner.
- Commonly, the ICMP protocol is used on network devices, such as routers. ICMP is crucial for error reporting and testing, but it can also be used in distributed denial-of-service (DDoS) attacks.
- The primary purpose of ICMP is for error reporting. When two devices connect over the Internet, the ICMP generates errors to share with the sending device in the event that any of the data did not get to its intended destination. For example, if a packet of data is too large for a router, the router will drop the packet and send an ICMP message back to the original source for the data.
- A secondary use of ICMP protocol is to perform network diagnostics; the commonly used terminal utilities traceroute and ping both operate using ICMP.
- The traceroute utility is used to display the routing path between two Internet devices. The routing path is the actual physical path of connected routers that a request must pass through before it reaches its destination. The journey between one router and another is known as a 'hop,' and a traceroute also reports the time required for each hop along the way. This can be useful for determining sources of network delay.
- The ping utility is a simplified version of traceroute. A ping will test the speed of the connection between two devices and report exactly how long it takes a packet of data to reach its destination and come back to the sender's device. Although ping does not provide data about routing or hops, it is still a very useful metric for gauging the latency between two devices.
- The ICMP echo-request and echo-reply messages are commonly used for the purpose of performing a ping.
- Unfortunately network attacks can exploit this process, creating means of disruption such as the ICMP flood attack and the ping of death attack.

Section – C

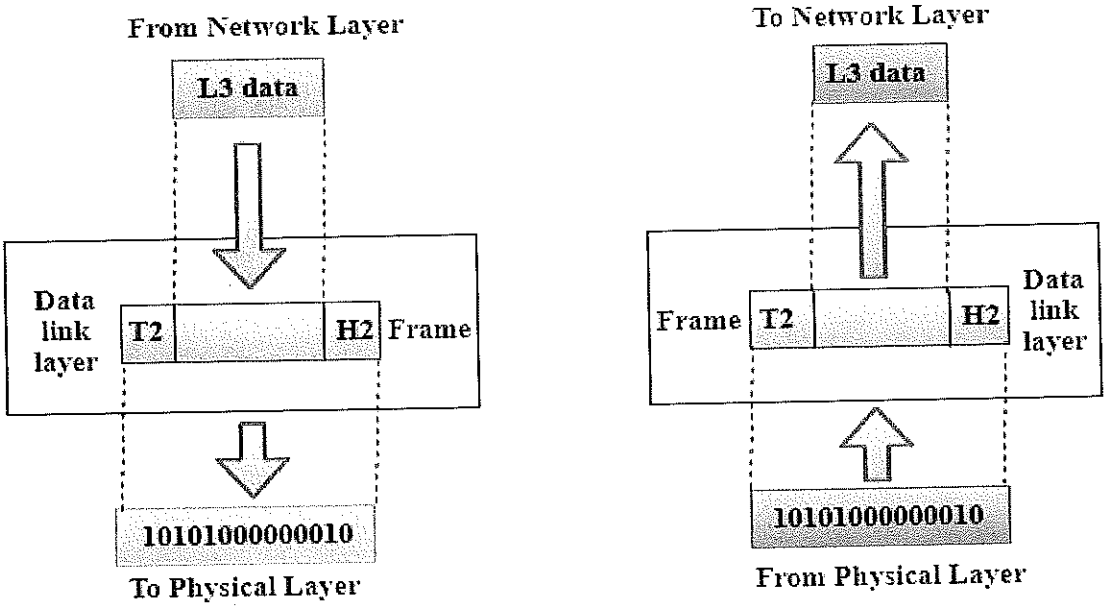
03X03 = 09 Marks

03 essay type questions, each question carries 03 marks.

1. What is the function of data link layer? Explain.

Ans. Data-Link Layer

- This layer is responsible for the error-free transfer of data frames.
- It defines the format of the data on the network.
- It provides a reliable and efficient communication between two or more devices.
- It is mainly responsible for the unique identification of each device that resides on a local network.
- It contains two sub-layers:
  - **Logical Link Control Layer**
    - It is responsible for transferring the packets to the Network layer of the receiver that is receiving.
    - It identifies the address of the network layer protocol from the header.
    - It also provides flow control.
  - **Media Access Control Layer**
    - A Media access control layer is a link between the Logical Link Control layer and the network's physical layer.
    - It is used for transferring the packets over the network.



Functions of the Data-link layer

- **Framing:** The data link layer translates the physical's raw bit stream into packets known as Frames. The Data link layer adds the header and trailer to the frame. The header which is added to the frame contains the hardware destination and source address.

- **Physical Addressing:** The Data link layer adds a header to the frame that contains a destination address. The frame is transmitted to the destination address mentioned in the header.
- **Flow Control:** Flow control is the main functionality of the Data-link layer. It is the technique through which the constant data rate is maintained on both the sides so that

no data get corrupted. It ensures that the transmitting station such as a server with higher processing speed does not exceed the receiving station, with lower processing speed.

- **Error Control:** Error control is achieved by adding a calculated value CRC (Cyclic Redundancy Check) that is placed to the Data link layer's trailer which is added to the message frame before it is sent to the physical layer. If any error seems to occur, then the receiver sends the acknowledgment for the retransmission of the corrupted frames.
- **Access Control:** When two or more devices are connected to the same communication channel, then the data link layer protocols are used to determine which device has control over the link at a given time.

2. Explain the types of NIC.

Ans. Types of Network Interface Cards

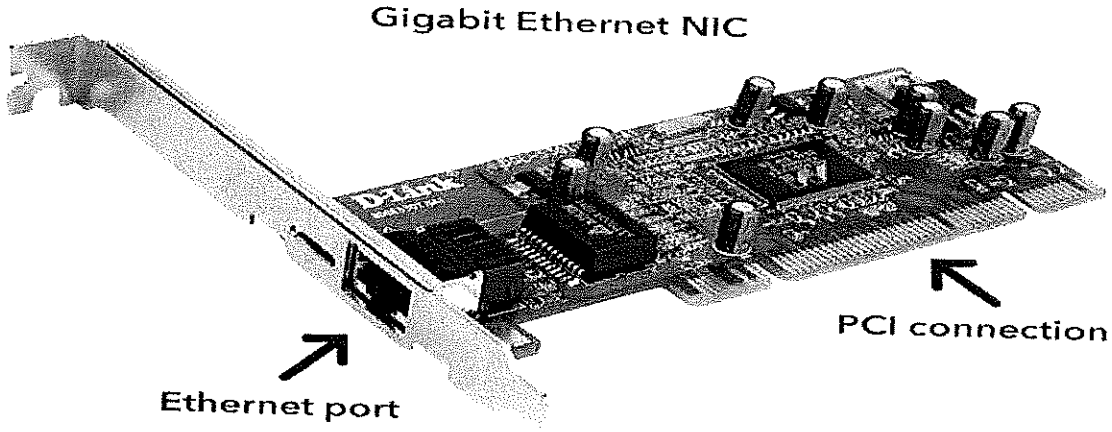
Network Interface Card (NIC) is a hardware unit, which is inbuilt inside a computer provided with a slot, it connects the computer to a computer network for communication with other devices.

There are two types of NIC:

- Ethernet NIC
- Wireless Network NIC

Ethernet NIC

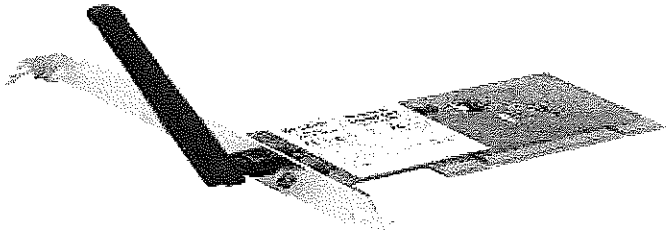
- Ethernet NIC card is a slot for a cable where we have to plug one end of the Ethernet cable into the slots of the computer and another end of the cable is plugged into the modem, likewise, various devices are connected to make a communication set up between them. There are standards in Ethernet they are
  - 5-Base T: It can transmit, paragraphs using coaxial cable up to a distance 1000mts. The 5 refers to the transmission speed of 5 Mbps. The *base* is short for *baseband*, which means that only one Ethernet signal is present on the send and/or receive pair (i.e., there is no multiplexing as with broadband transmissions). The T comes from twisted pair
  - 10-Base T: It uses twisted cables like telephonic cables for communication. 10BASE-T Ethernet provides transmission speed up to 10MBPS and uses coaxial cable or Cat-5 twisted pair cable with RJ-45 connector.
  - 100-Base T: It is also known as fast Ethernet, the speed of data transmitted is very high. It can run on UTP, Optical Fiber, and wirelessly too. It can provide speed up to 100 MBPS. This standard is named as 100BASE-T in IEEE 803.2 using Cat-5 twisted pair cable.
  - Gigabit Ethernet: It is also named as 1000-Base T Ethernet, the special feature of this is it increases the network bandwidth up to 10 times, which can transmit up to 1000mbps of data. IEEE802.3ab standardize Giga-Ethernet over UTP using Cat-5, Cat-5e and Cat-6 cables.



wired-network-interface-card

Wireless Network NIC

- Wireless network NIC cards consist of a small antenna integrated onto the card, where the communication between various devices is set up wirelessly using the router and various network protocols.
- One such example of a wireless network NIC card is Fiber Data Digital Interface (FDDI). In a case where data has to be transmitted over long distances, in such cases, a fiber data digital interface FDDI concept is used which translates data into digital pulses and communicates using optical fiber.
- FDDI is ring-type architecture, which is of 100mbps, transmission, and retransmission for a long distance is an advantage of FDDI.



wireless-network-interface-card

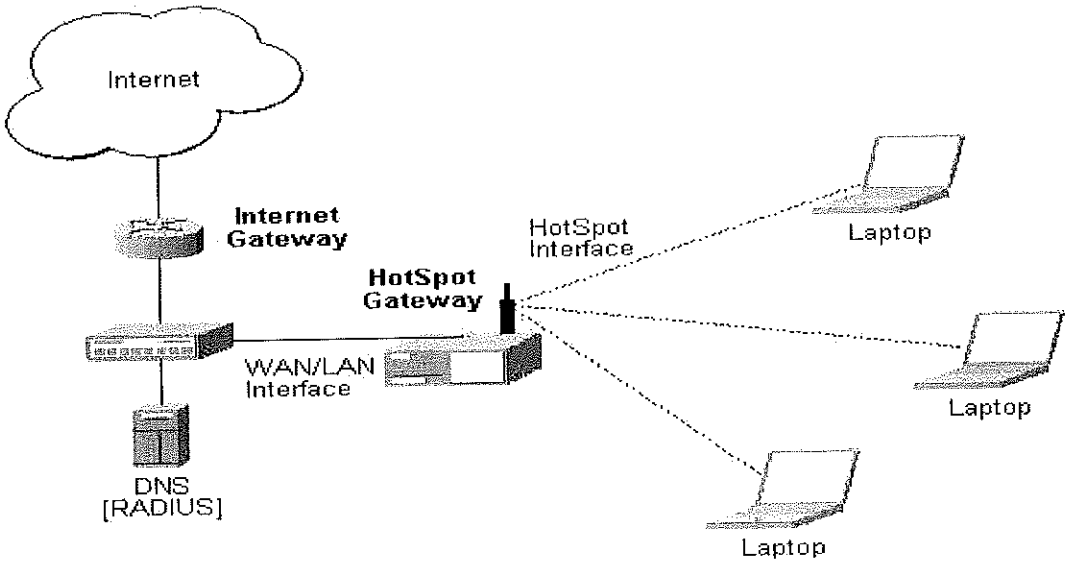
3. Describe the following:

Gateway
Modem
Repeater

Ans.

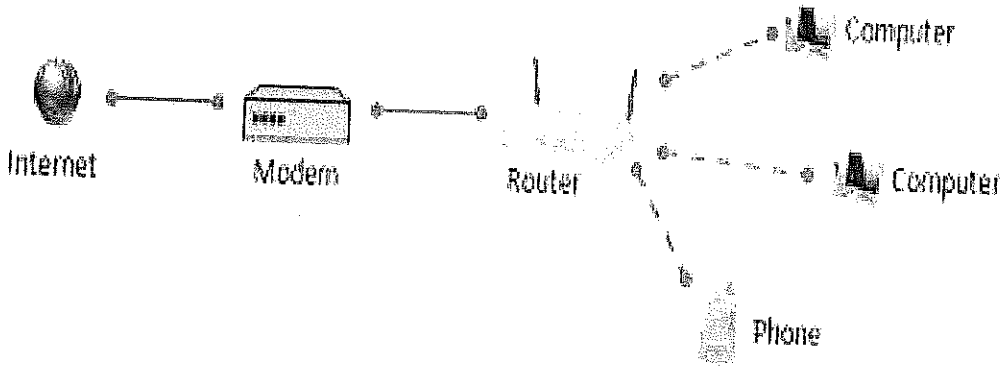
Gateway:

- Gateways normally work at the Transport and Session layers of the OSI model.
- At the Transport layer and above, there are numerous protocols and standards from different vendors; gateways are used to deal with them.
- Gateways provide translation between networking technologies such as Open System Interconnection (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP). Because of this, gateways connect two or more autonomous networks, each with its own routing algorithms, protocols, topology, domain name service, and network administration procedures and policies.
- Gateways perform all of the functions of routers and more. In fact, a router with added translation functionality is a gateway. The function that does the translation between different network technologies is called a protocol converter.



Modem

- Modems (modulators-demodulators) are used to transmit digital signals over analog telephone lines. Thus, digital signals are converted by the modem into analog signals of different frequencies and transmitted to a modem at the receiving location.
- The receiving modem performs the reverse transformation and provides a digital output to a device connected to a modem, usually a computer.
- The digital data is usually transferred to or from the modem over a serial line through an industry standard interface, RS-232. Many telephone companies offer DSL services, and many cable operators use modems as end terminals for identification and recognition of home and personal users. Modems work on both the Physical and Data Link layers.



Repeater

- A repeater is an electronic device that amplifies the signal it receives.
- You can think of repeater as a device which receives a signal and retransmits it at a higher level or higher power so that the signal can cover longer distances, more than 100 meters for standard LAN cables. Repeaters work on the Physical layer.