UNIT - II

Q. 1. Discuss the various issues of internet and intranet based on e-commerce.

Ans. Internet and Intranet Based E-commerce Issues : It is clear that Internet and intranet are basic tools to implement the e-commerce. But as we know that internet is free to every body so creates lot of problem for e-commerce implements. Let us see some of them as follows :

1. Security : While shopping on the internet, most people typically do not think about what is happening in the background. Web shopping is generally very easy. We click on a related site, go into that site, buy the required merchandise by adding it to our card, enter our credit card details and then expect delivery within a couple of days.

2. Privacy : Customer information has to pass through several hands so security and privacy of the information are a major concern. The safety and security of a customer's personal information lies within the hands of the business.

Many people are not willing to disclose their personal information on the web. It is up to individuals to decide how much personal information they are willing to disclose and how it might be used. Interestingly, one survey found that many people who disclose personal information do so in hope of financial benefit.

3. Copyright : Many attempts have been made to address the issues related to copyrights on digital content, E-commerce has a tremendous impact on copyright and related issues and the scope of copyrights is affecting how e-commerce evolves. It is essential that legal rules are set and applied appropriately to ensure that digital technology does not undermine the basic doctrine of copyright and related rights. From one perspective, the internet has been described as "the world's biggest copy machine".

4. Trademark : Generally, an individual, a company or any sort of legal entity can own a trademark. When someone else tries to use that trademark (*e.g.,* your distinctive name or logo) without authorization, it could be considered an illegal dilution of the distinctive trademark.

Software that is available free of cost on the Net allows the transfer of songs and videos without the authorization of rights holders. Moreover, CD burners and portable MP3 players allow copyright violations to occur rather easily.

5. Online Terms, Conditions, Policies and Laws : At the moment, most online privacy policies are produced by private businesses for individual companies. Governments are developing legislation to support and strengthen the privacy protection measures of many businesses. These initiatives are aimed at regulating the storage, use and disclosure by businesses of personal information.

The privacy laws of their host country affect overseas companies. Every organization should be very careful while applying terms and conditions for the electronic transaction for internet users. Privacy and security policies not only reflect the organizations practice but also the rules and regulations for doing business with the company. Major issues regarding the legalization of electronic transactions include the following :

(a) Ensure proper online contracts.
(b) Record retention obligations.
(c) Original documentation, in terms of TAX and VAT requirements.
(d) Import/export regulations.
(e) Exchange control regulation.

(f) Foreign data protection law.

6. Legislation Dilemma : Electronic transactions separate e-business from traditional types of businesses. When a transaction takes place? who has jurisdiction? Who has the authority to apply law over the transaction?

For example, if you buy a laptop in your local computer store, you know your legal rights. If the computer does not work when you take it home and the store refuses to settle up, then you can probably take the dispute to your local small claims court.

Q. 2. What type of network is needed for e-commerce and what are the market forces influencing the I-way?

Ans. Network for E-commerce : In any country successful implementation of e-commerce depends on the infrastructure available. Network for commerce can be discussed at following three levels :

1. Corporate networks
2. Commercial networks
3. Internet

Commercial activities can be managed through the common networks shared by corporate, consumers and others involved. The common network may be LAN, WAN, MAN or ultimately internet. Through internet easy and cheap communication is possible any where and with any one.

1. Introduction to I-way : Electronic commerce needs a network infrastructure to transport the content-data, audio, visual, text, animation and so on. This network infrastructure is provided by what is known as the I-way or business super highway. The information super highway may be defined as "a high capacity, electronic pipeline to a consumer or business premises that is capable of simultaneously supporting a large number of electronic commerce applications and providing interactive connectivity between users and services and between users and other users".

The commercial user requires, voice, data and video conferencing services. The development of integrated electronic commerce applications in manufacturing, health, education, banking, and insurance and other industries is paying the way for a network infrastructure providing the support to various types of information.

2. Requirement of I-way : The success of e-commerce based business depends on the information flow and to make information flow smooth a capable I-WAY (information super highway) is required.

The I-way will provide the supports to,

(a) consumers, end users or business consuming and paying for information product/services,

(b) users who become information publishers by setting up on-line servers,

(c) value-added information providers, including third party brokers and other intermediaries, as well as originators of services who add value by packing or building on service provided by others,

(d) information service providers, who are commercial, government or private providers, or publishers of information goods and services.

Users and enterprise play multiple roles as consumer and producers of information. These roles are not fixed but can be combined in various ways such that enterprise can, for example, concurrently be information consumers and service providers.

3. Components of the I-way : The I-way consists of various components, which can be broadly categorized as :

(a) Network Access Equipment : To access any network some specific equipments are required, at the customer end and enables the consumer to access the network. It consists of the hardware such as computers, modems, routers, switches for computer networks, set-top boxes for television networks and software platform such as browsers and operating systems.

(b) Access Media : A suitable bandwidth and transmission media is required for the successful implementation of e-commerce. Any nation should have good communication backbone to implement the e-commerce.

Access media can be divided into four categories :

(i) Telecom media
(ii) Cable TV
(iii) Wireless media
(iv) Internet, intranet and extranet (on line media).

Q. 3. Write the short note on global information distribution network.

Ans. Global Information Distribution Network : Now-a-days e-commerce activities are not limited to any country only but now world becomes a global village. So a proper network infrastructure is required to connect the people and business across the world. These types of distribution network may include following type of networks :

1. Long Distance Networks : Long distance telephone connectivity is provided through cable (co-axial or fiber) by the inter exchange carriers. Long distance cellular networks are using the wireless technologies to connect the consumers worldwide.

2. Satellite Networks : Satellite network plays a vital role in the telecommunication industry. They have advantages over the terrestrial networks in that :

(a) They are accessible from any point on the global.
(b) They can provide broadband digital services to many points without the cost of acquiring wire/cable installation.
(c) They can add receiving and sending sites without significant additional costs.

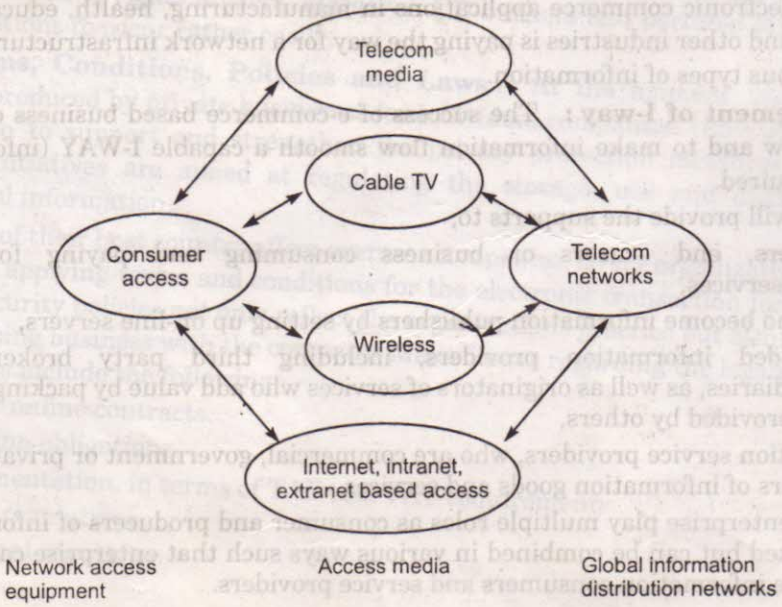

Fig. Components of information super highway.

3. Internet : The internet forms a well-known component of the global information distribution network. It targets a wide range of e-commerce applications such as video on demand, homo shopping, e-mail, EDI, information publishing, information retrieval, video conferencing and many more.

All the components of I-way together provide a network infrastructure for the e-commerce activities. This requires the use of common standards and installing gateways between various networks. A final requirement is the hardware and software to move huge amounts of data effortlessly over the complex network as shown in below figure :

It is clear from previous figure that consumers can interact all over the world through various types of media available on communication network.

Q. 4. What are the issues, problems and prospects related to internet based e-commerce?

Ans. Issues and Problems Related to Internet Based E-Commerce : Mainly there are six problems and issues related to e-commerce based on internet. These are described below :

1. Cost : Several organisations tend to ignore the internet support for their business, as they have a conception that implementing e-commerce would be very costly. E-commerce involves four cost components.

(i) Connection : It includes the cost of taking internet either through a direct link or from Internet Service Provider (ISP).

(ii) Hardware and software : It consists of the cost of hardware that includes new technology computers and other peripherals and the cost of software for supporting and working on hardware.

(iii) Set-up : It covers the cost of technical and skilled employers for setting up the e-commerce system.

(iv) Maintenance : It means the cost of training the employees who would handle the websites for e-commerce including the maintenance of webpages.

2. Security : Major issues related to the security problems are :

(i) Data can be intercepted as it passes through several channels.

(ii) Database could be hacked. Thus, all the highly important information could be lost.

(iii) Some virus attacks could destroy the information stored.

3. Legal Issues : The most serious issue for conducting e-commerce are the legal issues related to it. Till date, many countries do not have proper and adequate laws and regulations for conducting e-commerce. Some important concerns are :

(i) If sensitive data of customer is made available to strangers, then what would happen?

(ii) For security the data is encrypted. Generally, encrypted data is not allowed to cross the national boundaries. So, how would organizations perform transactions globally?

4. Training and Maintenance : It is the most essential part for any system to work properly. A well-qualified staff would be required for initiating, updating and maintaining the internet facilities essential for e-commerce.

5. Lack of Information : Internet is an unknown mode of communication for the organizations that haven't used any electronic media for reaching to their customers. For such organizations, it is very difficult to assume the effectiveness of internet and e-commerce. Another problem is that via e-commerce, only a specific group of people could be targeted as majority of people do not use internet.

6. Lack of Skilled Employees : As e-commerce is performed more regularly and on a larger scale, more employees, rather skilled employees, would be required. Even for surfing internet, basic knowledge of operating computer and using internet is required. From designing website to electronic credit management and maintenance required skilled labour and employees.

Q. 5. How could the several issues related to e-commerce over internet be solved?

Ans. Solution of the Issues Related to e-commerce over Internet :

1. Cost : The company can start using e-commerce slowly and gradually with limited service on a small scale and then determine the value added to the company. In early stages, upper management support should be acquired so that as the service takes off, the funds and resources will be available.

2. Security : For dealing with the issues related to security can be resolved by taking the following steps :

(i) Data could be saved from interception by the techniques such as encryption, firewalls etc.

(ii) We can start using the internet only for transactions that require limited processing of sensitive data.

(iii) Attack from viruses can be prevented by using security hardware and software and various antiviruses.

3. Legal Issues : Legal issues can be resolved with the proper support of Government and hiring legal experts related to E-commerce.

4. Training and Maintenance : The issues related to training and maintenance can be handled by outsourcing certain functions and services that may include Internet server configuration, power backup and 24 hour support facilities. If an organization develops its own system then there will be a requirement of efficient and qualified support staff.

5. Lack of Information : The customers may be made to know the benefits of e-commerce. Advertising of the website may get the customers to know about the product and services. The organizations must train their employees to perform e-commerce and also provide useful information about internet.

6. Lack of Skilled Employees : It is very important issue for performing E-commerce. Outsourcing is initially an easy way to handle the lack of expertise within the organization and reduce the company expenses. The organizations may also organize training programmes for their employees.

Q. 6. What are the various networking devices?

Ans. Networking Devices : Some networking devices are :

1. Hubs : It acts as a common connection point for devices in a network. They are represented by small, unmarked rectangular boxes.

2. Switches : They filter and forward packets between LAN segments. They are represented by a box marked with X.

3. Routers : They connect any number of LANs represented by a square marked with a unidirectional cross pattern.

4. File Servers : They provide a central repository for LAN users and are represented by files overlaying a server device.

5. Database Servers : Support LAN database service. They are represented by a database bucket overlaying a server device.

Q. 7. What is I-way?

Ans. I-way : I-way is also known as information superhighways. Effective and efficient linkage between the customer and the supplier is the demand of e-commerce. To make the sites attractive and to provide a user friendly interface with multiple forms to consumers more and more multimedia contents are added to the sites. Multimedia contents include combination of text, audio, video and graphics. Thus, a large database and high speed networking is required to store and distribute large amounts of information with multimedia contents to consumers.

Just as to delivery goods to consumers in traditional business activities a good transportation system and fine roads are required, in the same way in e-commerce suppliers require better and improved ways of information known as I-ways.

Q. 8. What are the market forces influencing the I-Way? *(2009)*

Ans. Market Forces Influencing the I-Way : The existence of any initial product of any type of service is a factor of market forces. The understanding is important because e-commerce application are dependent on the underlying I-way. Suppose if we choose TV as our access ramp we may be limiting ourselves to certain applications such video on demand .

There is limitation to access two way interaction.

Such limitation raise the question of which use role the I-way will eventually support. The possibilities include :

1. Use who becomes information publishers by setting up on line servers.
2. Consumers and users or businesses consuming and paying for information products.
3. Information service providers who are commercial, government or private providers or publishers of information and services.
4. Value added information providers including third party brokers and other intermediaries as well as originators of services.

We see that users and firms play multiple roles as consumers and producers of information. Examination of the various uses roles provides an indication of the market structure and could explain why many companies are merging and realigning themselves. Companies once narrowly focused on one type of uses role now seek to broaden their markets and serve as many users as possible.

Two points are worth considering here :

(i) The boundaries among communication entertainment and information are not absolute.

(ii) The boundaries among equipment are not absolute.

Today we are allowed television sets and PCs to interact or exchange any sort of data.

Q. 9. What is broadband? Also explain its various types.

Or **Describe the working of broad band system.** *(2009)*

Ans. Introduction to Broadband : High-speed internet access or "broadband" allows users to access the internet and internet-related services at significantly higher speeds than those available through "dial-up" internet access services. The Federal Communications Commission (FCC) generally defines broadband service as data transmission speeds exceeding 200 kilobits per second (Kbps), or 200,000 bits per second, in at least one direction : downstream (from the internet to your computer) or upstream (from your computer to the internet).

Working

Broadband allows users to access information via the internet using one of several high speed transmission technologies. Transmission is digital, meaning that text, images and sound are all transmitted as "bits" of data. The transmission technologies that make broadband access possible move these bits much more quickly than traditional telephone or wireless connections, including traditional dial-up internet access.

Once we have a broadband connection to our home or business, devices such as computers can be attached to this broadband connection by existing electrical or telephone wiring, coaxial cable or wirelessly.

Advantages

Broadband allows us to take advantage of new services not available with a dial-up interne connection. Some Voice Over Internet Protocol (VOIP) services only allow us to call other peopl

using the same service, but others allow us to call anyone who has telephone number- including local, long distance, mobile and international numbers.

Types

Broadband includes several high-speed transmission technologies such as :

1. Digital Subscriber Line (DSL) : DSL is a wireless transmission technology that transmits data faster over traditional copper telephone lines already installed to homes and businesses. DSL based broadband provides transmission speeds ranging from several hundred (kbps) to millions of bits per second (mbps).

The following are types of DSL transmission technologies :

(a) Asymmetrical Digital Subscriber Line (ADSL) : It is used primarily by residential customers, such as internet surfers, who receive a lot of data but do not send much. ADSL typically provides faster speed in the downstream direction than the upstream direction. ADSL allows faster downstream data transmission over the same line used to provide voice service, without disrupting regular telephone calls on that line.

(b) Symmetrical Digital Subscriber Line (SDSL) : It is used typically by businesses for services such as video conferencing. Speed of downstream and upstream traffic is equal.

Faster forms of DSL typically available to businesses include :

(i) High-data rate Digital Subscriber Line (HDSL); and

(ii) Very High-data-rate Digital Subscriber Line (VDSL).

2. Cable Modem : Cable modem service enables cable operators to provide broadband using the same coaxial cables that deliver pictures and sound to your TV set.

3. Wireless : Wireless broadband connects a home or business to the internet using a radio link between the customer's location and the service provider's facility. Wireless broadband can be mobile or fixed.

Wireless technologies using longer range directional equipment provide broadband service in remote or sparsely populated areas where DSL or cable modem service would be costly to provide. Speeds are generally comparable to DSL and cable modem. An external antenna is usually required.

4. Satellite : Just as satellites orbiting the earth provide necessary links for telephone and television service, they can also provide links for broadband. Satellite broadband is another form of wireless broadband, also useful for serving remote populated areas.

5. Broadband over Powerline (BPL) : BPL is the delivery of broadband over the existing low and medium voltage electric power distribution network. BPL speeds are comparable to DSL and cable modem speeds. BPL can be provided to homes using existing electrical connections and outlets.

Q. 10. Write the short note on :

1. ATM **2. ISDN.**

Ans. 1. ATM : Asynchronous Transfer Mode (ATM) technology will play a central role in the evolution of current workgroup, campus and enterprise networks. ATM delivers important advantages over existing LAN and WAN technologies, including the promise of scalable bandwidths at unprecedented price and performance points and Quality of Service (QOS) guarantees, which facilitate new classes of applications such as multimedia.

ATM is a very complex technology, perhaps the most complex ever developed by the networking industry. While the structure of ATM cells and cell switching do facilitate the development of hardware intensive, high performance ATM switches, the deployment of ATM networks requires the overlay of a highly complex, software intensive, protocol infrastructure. This infrastructure is required to both allow individual ATM switches to be linked into a

network, and for such networks to internetwork with the vast installed base of existing local and wide area networks.

2. ISDN : Integrated Service Digital Network (ISDN) is a digital telephone service that provides fast, accurate data, transmission over existing copper telephone wiring.

ISDN is based on a number of fundamental blocks. First, there are two types of ISDN "channels" or communication paths :

(a) B-channel : The Bearer ("B") channel is a 64 kbps channel which can be used for voice, video, data or multimedia calls. B-channels can be aggregated together for even higher bandwidth applications.

(b) D-channel : The Delta ("D") channel can be either a 16 kbps or 64 kbps channel used primarily for communications (or "signaling") between switching equipment in the ISDN network and the ISDN equipment at your site.

These ISDN channels are delivered to the user in one of two pre-defined configurations :

(i) Basic Rate Interface (BRI) : Basic Rate Interface (BRI) is the ISDN service most people use to connect to the internet. An ISDN BRI connection supports two 64 kbps B-channels and one 16 kbps D-channel over a standard phone line. BRI is often called "2B+D" referring to its two B-channels and one D-channel. The D-channel on a BRI line can even support low-speed (9.6 kbps) × .25 data, however this is not a very popular application in the United States.

(ii) Primary Rate Interface (PRI) : An ISDN PRI connection supports 23 64 kbps B-channels and one 64 kbps D-channel (or 23B+D) over a high speed DS1 (or T–1) circuit. The European PRI configuration is slightly different, supporting 30B+D.

Uses of ISDN : ISDN offers the speed and quality that previously was only available to people who bought expensive, point-to-point digital leased lines. ISDN has become the service of choice for many communications applications. Popular ISDN applications include :

- Internet access.
- Telecommuting/remote access to corporate computing.
- Video conferencing.
- Small and home office data networking.

Why ISDN to Access the Internet : More and more people are discovering that ISDN is the right internet answer.

As the internet becomes more and more information-intensive with graphics, sound, video and multimedia, our ability to take advantage of these new resources depends on the speed of our internet connection. Are our downloads frequently aborted because of transmission errors?

With ISDN, our internet access is :

- **Even faster :** ISDN's digital technology assures us the cleanest connection to the internet so we won't be slowed down by re-transmission because of old analog technology.

More efficient and economical : ISDN brings increased capabilities, reduced costs and improved productivity to organizations both large and small. When we're looking for something on the internet, we can get there faster.

Q. 11. What is frame relay? Give its advantages and disadvantages.

Ans. Frame Relay : Frame relay is a virtual circuit technology that provides low level service in response to the following demands :

1. Higher data rate at lower cost.
2. To be able to send bursty data.
3. Less overhead due to improved transmission media.

Frame relay does not provide error checking.

Advantages of Frame Relay :

1. Operates at a higher speed.
2. Operates only in physical and data link layers.
3. Allows bursty data.
4. Allows a frame size of 9000 bytes that can accommodate all LAN frames.

Disadvantages of Frame Relay :

1. It is still not enough for protocols with higher data rates.
2. Allows variable length frames which can create varying delays for different users.
3. They are expensive than other traditional WANs.
4. Frame relay is not suitable for sending delay sensitive data like real time voice or video.

Q. 12. What do you mean by mobile commerce?

Ans. Mobile Commerce : Mobile commerce is concerned with e-commerce applications via the media of wireless and mobile computing. A mobile commerce environment allows the users to access personal or business information and carry out all e-commerce activities while travelling away from home or workplace. The demand for such e-commerce access by the mobile users has made mobile computing and wireless a key topic in e-commerce. The key feature of mobile computing environment is that the user need not maintain a fixed position in the network.

Two terms used generally with mobile commerce are the wireless services and mobile computing. Wireless is a transmission method that enables mobile computing *i.e.*, it enables communication without wires. The goal of wireless is to enable distributed and mobile computing, thus overcoming the limitations in communication due to dispersed locations and geography.

Mobile computing on the other hand, focuses on the applications side. It builds on the concept of being able to compute no matter where the user is. The goal of mobile computing is to provide a true computing freedom, free from the limitations of location and geography, so that the users can connect to a network from anywhere, any time and operate as if they were sitting in the home or office.

Users with the following kind of profiles are candidates for mobile computing :

1. Who need to send and receive e-mails while on the road.
2. Who need constant access to the office's internal bulletin board system while on the road.
3. Who need access to software applications such as corporate databases while mobile.
4. Who are constantly on the road but need to process data constantly.
5. And many more.

These profiles have different requirements of technology, equipment and software applications. Some may require only one-way data broadcasts while others may require short messaging services and still others may use the mobile computing environment for file transfer.

In sum, the need for increased mobility and location independent data management have given rise to mobile computing and wireless transmission.

Q. 13. What are the advantages of wireless and mobile computing?

Ans. Now a days wireless is becoming the most popular with the development of e-commerce because of the following reasons :

Mobility : Mobility indicates constant physical movement of a person and his network appliance, *i.e.*, it is extending the office to any location in which a person might be–at home, at a

conference or even travelling. Mobility is the ability to access the network information and services any time and anywhere. This is facilitated through the wireless networks.

Ease of Installation in Difficult-to-wire Areas : The implementation of wireless networks offers many tangible cost savings when performing installations in difficult-to-wire areas such as rivers, freeways.

Also many restrictions and regulations may not allow the digging of trenches in the ground to lay cables or optical fiber for the interconnection of networked sites. Here, a wireless WAN or MAN may be the only alternative. Sometimes drilling of holes in the walls during the installation of LAN cabling may not be allowed or possible. This can easily be handle by wireless network.

Reduced Installation Time : The installation of cabling is often a time consuming activity. On the other hand, the deployment of wireless LANs, MANs and WANs greatly reduces the need for cable installation, making the network available for use much sooner.

Increased Reliability : A problem inherent to wired networks is the down time due to cable faults such as accidental cutting of cables, eroding of metallic conductors due to moisture etc. These problems interfere with the users' ability to utilize network resources. There are fewer problem with wireless networking because less cable is used.

Long-term Cost Savings : Companies reorganize constantly resulting in the movement of people, new floor plans, office partitions and other renovations. These changes often require re-cabling the networks, incurring both labour and material costs. In some cases these costs may be substantial, especially with the large enterprise networks. The advantage of the wireless networking is based on the lack of cable–the network connection can be moved by simply relocating an employee's PC.

Q. 14. Discuss some of the mobile commerce applications in detail.

Ans. Mobile Commerce : These days business and working scenario requires professionals to work and communicate at their own convence. For this we require different computing services for working while away from office over a mobile network.

Applications : The two major applications of mobile computing in businesses today are remote communications and remote data access.

Remote Communications : The traditional real time communications required people to structure their work around pre-determined or fixed place in the form of an office or home and during fixed hours. However, mobile computing has helped to balance the working environment and hours according to the needs of the organizations and the individuals.

Remote Data Access : A mobile user needs to have access to various applications and data files that reside on the server in the organisation's network.

The aim of the mobile computing environment is to allow workers to be as effective while at remote locations as they are in their usual offices when fully connected.

Some of these are :

1. Point of sale
2. Customer service
3. Field sales automation
4. Virtual meetings
5. Package tracking and delivery services
6. Police services
7. Taxi dispatching
8. and many more.

4. Infrared or Light Based Mobile Computing : Instead of trying to attach a cable from the notebook to the printer or trying to reach a plug, users can point the notebook computer in the direction of the printer and press a key to transfer information by infrared waves.

Infrared works by sending pulses of light from a Light-Emitting Diode (LED) to a photo sensor that decodes the signals.

Whereas the rudimentary infrared devices like the TV remote controls can only send signals, the computing devices can both send and receive the signals.

Because the information is carried by light-waves, the system will not work if any physical obstruction is placed between the sending and the receiving devices.

Most infrared products come with RF transceivers that attach to the serial port on the PC. These devices transfer data within a 10 metre range. They allow the infrared link on any portable system to exchange files with other computers or to access their resources.

Infrared is not very costly.

However, the speed is not comparable to many cable connections. But because it only works at a distance of a few feet, the infrared is not a wireless technology that will compete with cellular communications or similar long distance techniques.

Q. 21. What do you understand by Wireless Application Protocol (WAP)? What are Personal Digital Assistants (PDAs)? *(2009)*

Ans. WAP : The www through internet has its existence all over the world and is easily accessible through computer terminals. The internet connectivity is possible through wireless solutions.

Currently the WAP concepts is gaining popularity to provide service of wireless internet. The devices, used by WAP services are cell phones, pager and PDA. Through WAP one can get information of stocks and can access the blank account by using pagers and phones.

Working Methods of WAP : In this service the user make a request of information using URL. The information is retrieved and given to the users. There are two ways of getting information.

1. The user requests a WAP server for some information which is retrieved and returned to the device.

2. The user device communicate with WAP gateway and requests for information.

PDA : Palm hand helds are Personal Digital Assistants (PDAs) which runs the palm of palm device have evolved from hand helds to smart phones which run both palm of and Window mobiles. This pages describes the range of palm machines known as the pilot through to the latest models currently produced by palm.

It is a hand-held device that containing the softwares to combining the computing, telephone, fax, internet and networking features. A typical PDA can function as a cellular phone, fax sender, web browser and personal organizer. Unlike portable computer most PDA begins as pen based using a stylus rather than keyboard for input. This means they are also incorporated to handwriting recognition features. Some PDA can also react to voice input by using voice recognition technologies. It is available either as a stylus or keyboard.

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