

# **E-COMMERCE & ERP**

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## **NOTE:**

MAKAUT course structure and syllabus of 8<sup>th</sup> semester has been changed from 2022. E-COMMERCE & ERP has been introduced as a new subject in present curriculum. The syllabus of this subject is almost same as E-Commerce [CS 802E]. Taking special care of this matter we are providing the relevant MAKAUT university solutions of E-Commerce [CS 802E], so that students can get an idea about university questions patterns.

## **ELECTRONIC COMMERCE**

### **Multiple Choice Type Questions**

1. The IT Act was passed by the Indian Parliament in the year [WBUT 2007, 2013]  
a) 1999      b) 2000      c) 2001      d) 2002

Answer: (b)

2. How many types of trade cycle are there in e-commerce?

[WBUT 2009, 2014, 2015, 2018]

- a) One      b) Two      c) Three      d) Four

Answer: (c)

3. E-Commerce is not suitable for

[WBUT 2010, 2013]

- a) sale/purchase of expensive jewellery and antiques  
b) sale/purchase of mobile phones  
c) sale/purchase of branded clothes  
d) online job searching

Answer: (d)

4. Which of the following describe E-commerce?

[WBUT 2017]

- a) Doing business electronically      b) Doing business  
c) Sale of goods      d) All of these

Answer: (a)

5. Which is a function of E-commerce?

[WBUT 2017]

- a) Marketing      b) Advertising  
c) Warehousing      d) All of these

Answer: (d)

### **Short Answer Type Questions**

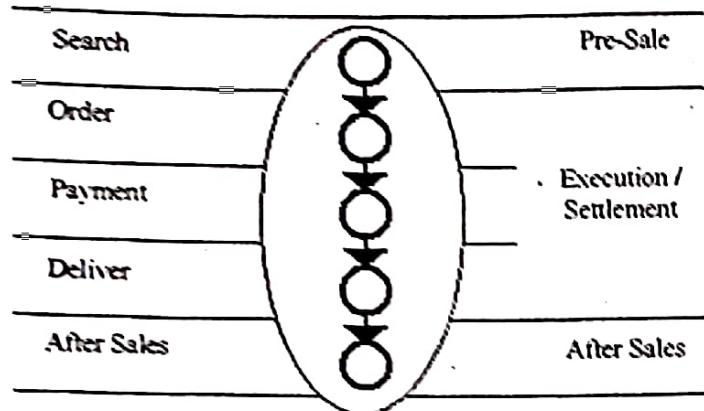
1. What is trade cycle? What are the activities a trade cycle would include?

[WBUT 2005, 2006, 2008, 2011, 2015, 2017, 2018]

Answer:

A trade cycle is the series of exchanges, between a customer and supplier that take place when a commercial exchange is executed. A general trade cycle consists of:

- Pre-Sales:** Finding a supplier and agreeing the terms.  
**Execution:** Selecting goods and taking delivery.  
**Settlement:** Invoice (if any) and payment.  
**After-Sales:** Following up complaints or providing maintenance.

**2. What is ubiquity?**

[WBUT 2007, 2010]

**Answer:***Refer to Question No. 2(b) of Long Answer Type Questions.***3. What is e-shopping? What are the advantages and disadvantages of e-shopping?**

[WBUT 2007, 2011]

**Answer:**

Online shopping or e-shopping is the process whereby consumers directly buy goods or services from a seller in real-time, without an intermediary service, over the Internet. If an intermediary service is present the process is called electronic commerce. An online shop, e-shop, e-store, internet shop, webshop, webstore, online store, or virtual store evokes the physical analogy of buying products or services at a bricks-and-mortar retailer or in a shopping mall.

The Reseda E-Shop master project consists of the planning, design and implementation of an online shop and website for Reseda Engineering. An online shop, internet shop, webshop or online store is "an electronic commerce application used for B2B or B2C", which serves to sell products or services over the internet. As such, an online shop is part of the e-commerce field of the e-business framework. The two primary objectives of the Reseda E-Shop application are the presentation of the company's products on the website and the possibility for online orders and consulting. Further features include general company information (company, employees, products, factory, showroom), contact possibilities (address and email, email form, address form), news (online news, newsletter), customer account (customer data, orders, consulting) and support options.

**4. To float a new e-commerce company, on which parameters should the strategy be formulated? Explain.**

[WBUT 2008]

**Answer:****Potential Benefits of E-commerce:**

- Lower administrative costs
- Lower search costs for buyers
- Reduced inventory costs by increasing competition among suppliers and reducing inventory carried
- Lower transaction costs by eliminating paperwork, automation

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- Increased production flexibility by ensuring just-in-time parts delivery
- Improved quality of products by increasing cooperation among buyers and sellers
- Decreased product cycle time by sharing of designs and production schedules
- Increased opportunities for collaborating with suppliers and distributors
- Greater price transparency.

### **5. Describe various risks in e-commerce.**

[WBUT 2012]

**Answer:**

- i) **Authentication:** Authentication is any process by which you verify that someone is who they claim they are.
- ii) **Privacy and Protection of Information:** The challenge in privacy and Protection of Information is to share data while protecting personally identifiable information.
- iii) **Fraud and Misrepresentation:** If a company knowingly publishes inaccurate information about a product with the intent to generate more sales then that is fraud. If a company believes the information could be true, even if they don't investigate for themselves, then that is misrepresentation.
- iv) **Reliability of trading partners:** The trading partners has to rely on themselves on potential information.
- v) **Technology Risk:** The risks for E-commerce include both technology risk and moral hazard. Information technology such as Internet is the core factor influencing the development of E-commerce. However, technology risk is a big threat for the application of information technology.

### **6. What is the difference between E-commerce & E-business?**

[WBUT 2013]

**Answer:**

E-commerce is buying and selling using an electronic medium. It is accepting credit and payments over the net, doing banking transactions using the Internet, selling commodities or information using the World Wide Web and so on.

E-Business in addition to encompassing E-commerce includes both front and back-office applications that form the engine for modern E-commerce. E-business is not just about E-commerce transactions; it's about re-defining old business models, with the aid of technology to maximize customer value. E-Business is the overall strategy and E-commerce is an extremely important facet of E-Business.

### **7. State the functions in e-commerce.**

[WBUT 2014]

**Answer:**

These are the typical functions of an e-commerce system available both on back office and front office:

- Registration
- Basket
- Payment
- Product management
- Orders management
- VAT and shipping costs

**Registration:** In order to make a purchase, users must register with the site, providing all the information needed for shipping and billing.

The data will be stored on a database and will be available from the back office.

**Basket:** The basket is a tool that, like a shopping basket, allows users to select the products they want and then go to the checkout for payment.

**Payment:** The payment system is a mechanism that facilitates dialogue between the parties involved in financial transactions: the bank, the store and we with our credit card.

**Product management:** This is the main part of the e-commerce system and provides all the features required for product placement, order fulfillment, etc., key to the management of online sales.

**Order management:** The order is the card that summarises all the delivery and order information to enable correct delivery.

**VAT and shipping costs:** In addition to the cost of products purchased, the system manages the VAT and the shipping charges. The e-commerce module is able to manage VAT rates in countries within and outside the EU.

Shipping costs both fixed and variable based on the weight and volume of the shipment.

### **Long Answer Type Questions**

**1. a) What is e-commerce?**

[WBUT 2005, 2006, 2010, 2011, 2013, 2014, 2015, 2017, 2018]

**b) Describe some of the advantages and the limitations of E-commerce.**

[WBUT 2005, 2006, 2010, 2011, 2013, 2015, 2017, 2018]

**c) What are the rules and regulations for controlling E-commerce? [WBUT 2005]**

**Answer:**

a) **Electronic commerce**, commonly known as e-commerce or e-Commerce, consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks. Popularly, E-Commerce or Electronic Commerce (EC) is the practice of buying and selling varied good and services on the World Wide Web (Internet). E-Commerce in its basic sense means the same as traditional commerce where buyers and sellers come together for doing business by buying and selling goods and services. The difference is that e-commerce happens over wired communication lines connected throughout the globe where the World Wide Web serves as the central medium for all trading transactions. E-Commerce also happens through the use of more limited forms of communication such as email, facsimile or fax.

**b) Advantages of Electronic Commerce**

- Faster buying/selling procedure, as well as easy to find products.
- Buying/selling 24/7.
- More reach to customers, there is no theoretical geographic limitations.
- Low operational costs and better quality of services.
- No need of physical company set-ups.
- Easy to start and manage a business.

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- Customers can easily select products from different providers without moving around physically.

### **Disadvantages of Electronic Commerce**

- Any one, good or bad, can easily start a business. And there are many bad sites which eat up customers' money.
- There is no guarantee of product quality.
- Mechanical failures can cause unpredictable effects on the total processes.
- As there is minimum chance of direct customer to company interactions, customer loyalty is always on a check.
- There are many hackers who look for opportunities, and thus an ecommerce site, service, payment gateways, all are always prone to attack.

c) The first draft of the Information Technology (IT) Bill was introduced as early as 1999. The IT Act, which finally came into existence in 2000, includes laws and policies concerning data security and cyber crimes. Apart from the IT Act, the Indian Copyright Act of 1972 deals with copyright issues in computer programs. We briefly discuss the IT Act and other laws, which companies can use to safeguard proprietary information.

The Act covers cyber and related information technology laws in India. The IT Act has made amendments to the Indian Penal Code of 1860, the Indian Evidence Act of 1872, the Bankers' Books Evidence Act of 1891 and the Reserve Bank of India Act of 1934, to update them with the provisions of the Act. The information security issues under the IT Act are the following:

#### **Section 43:**

According to Section 43 of the IT Act, if a person without the permission of the person in-charge of the computer system, accesses, downloads any data, introduces virus or causes denial of access, will be liable for a penalty of up to rupees 10 million.

#### **Section 65: Tampering with Computer Source Code**

Section 65 of the IT Act deals with the issue of tampering with computer source documents. According to Section 65, anyone who deliberately or purposely hides, destroys or alters any computer source code or induces someone else to do so shall be punishable with imprisonment up to three years, or with fine, which may go up to two lakh rupees, or with both.

#### **Section 66: Hacking**

Section 66 of the IT Act deals with the issue of hacking. According to Section 65, hacking is committed if someone, with the intention of causing wrongful loss or damage (or with the knowledge that such damage or loss is likely to result) to the public / any person, destroys / deletes / alters any information residing in a computer resource, diminishes its value or utility, or affects it injuriously by any means. If a person commits hacking, he/she is liable to be punished with imprisonment up to three years, or with a fine, which may go up to two lakh rupees, or with both.

#### **Section 72: Breach of Confidentiality and Privacy**

Section 72 of the Act relates to the disclosure of certain information by any person who has gained access to such information in pursuance of a power granted under the

Information Technology Act. In case a person who has secured access to any electronic record, book, register, correspondence, information, document, or other material discloses any of these to any other person, he will be punished with imprisonment for a term, which may extend to two years, or with a fine, which may go to ten lakh rupees, or with both. The above provision does not apply to the disclosure of personal information regarding a person in a website or by his email service provider, etc

**2. a) What is the difference between E-commerce and E-business? [WBUT 2007]**

**Answer:**

In both cases, the e stands for "electronic networks" and describes the application of electronic network technology - including Internet and electronic data interchange (EDI) - to improve and change business processes. E-commerce covers outward-facing processes that touch customers, suppliers and external partners, including sales, marketing, order taking, delivery, customer service, purchasing of raw materials and supplies for production and procurement of indirect operating-expense items, such as office supplies. It involves new business models and the potential to gain new revenue or lose some existing revenue to new competitors. E-commerce implies business transactions over the internet where the parties involved are either selling or buying. The transactions conducted in e-commerce basically involve the transfer or handing over ownership and rights to products or services. Technically, e-commerce is only a part of e-business because, by definition, e-business refers to all online business transactions including selling directly to consumers (e-commerce), dealing with manufacturers and suppliers, and conducting interactions with partners. Information exchange via centralized database is also done in e-commerce. Business functions are only limited to the companies' technological resources. E-commerce principally involves money exchanges in the transactions. In e-business, as it is broader, it is not limited to monetary transactions. All aspects in business are included like marketing, product design, supply management, etc. E-business is more about making great products, brainstorming and giving quality service, planning about product exposure and executing it. Well, of course, e-commerce is an integral part of the e-business process but in strict terms, it is the activity of selling and buying.

**b) Discuss about the unique feature of E-commerce.**

[WBUT 2007]

**Answer:**

The unique features of e-commerce are:

**Ubiquity** - In traditional commerce, a marketplace is a physical place we visit in order to transact. For example, television and radio are typically directed to motivating the customer to go someplace to make a purchase. E-commerce is ubiquitous, meaning that it is available just about everywhere at all times. It liberates the market from being restricted to a physical space and makes it possible to shop from your desktop. The result is called a market space. From consumer point of view, ubiquity reduces transaction costs - the cost of participating in a market. To transact, it is no longer necessary that you spend time and money traveling to a market. At a broader level, the ubiquity of e-commerce lowers the cognitive energy required to complete a task.

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**Global Reach** - E-commerce technology permits commercial transactions to cross cultural and national boundaries far more conveniently and effectively as compared to traditional commerce. As a result, the potential market size for e-commerce merchants is roughly equal to the size of world's online population.

**Universal Standards** - One strikingly unusual feature of e-commerce technologies is that the technical standards of the Internet and therefore the technical standards for conducting e-commerce are universal standards i.e. they are shared by all the nations around the world.

**Interactivity** - Unlike any of the commercial technologies of the twentieth century, with the possible exception of the telephone, e-commerce technologies are interactive, meaning they allow for two-way communication between merchants and consumer.

**Information Density and Richness** - The Internet vastly increase information density. It is the total amount and quality of information available to all market participants, consumers and merchants. E-commerce technologies reduce information collection, storage, communication and processing costs. At the same time, these technologies increase greatly the accuracy and timeliness of information, making information more useful and important than ever. As a result, information becomes plentiful, cheaper and of higher quality. Information richness refers to the complexity and content of a message.

**Personalization** - E-commerce technologies permit personalization. Merchants can target their marketing messages to specific individuals by adjusting the message to a person's name, interests and past purchases. The technology also permits customization. Merchants can change the product or service based on user's preferences or prior behavior.

E-commerce technologies make it possible for merchants to know much more about consumers and use this information more effectively than ever before. Online merchants can use this information to develop new information asymmetries, enhance their ability to brand products, charge premium prices for high quality service and segment the market into an endless number of subgroups, each receiving a different price.

### c) What is the goal of business?

[WBUT 2007]

#### **Answer:**

The **goal** of business in an open market system to make money over a time **period**. This is how you evaluate the progress of your business by the money you make and keep.

Applying this principle, the underlying prescription for business success is high income and low expenses. However, making money is not and should not be the only driving force in your business, but it must be addressed each time you make a decision concerning its income and expense. Any given business activity can have at least one of these three goals:

1. The activity can generate **cash flow**
2. The activity can generate **opportunities**
3. The activity can generate **visibility**

As a quick hint, if it's not clear how an activity in your business leads to one of the goals above, it's time to determine whether you continue to do that activity. Doing something that isn't worth doing comes at the cost of something worth doing.

It's one thing to plan strategically and quite another to operate strategically. When you align both, you can get some powerful results. Thinking in terms of cash flow, opportunity, and visibility helps achieve these results precisely because it helps you do this alignment faster and more frequently. It's one thing to plan strategically and quite another to operate strategically. When you align both, you can get some powerful results. Thinking in terms of cash flow, opportunity, and visibility helps achieve these results precisely because it helps you do this alignment faster and more frequently.

**3. a) What are the various cyber crimes?**

[WBUT 2016]

**Answer:**

Cyber crime encompasses any criminal act dealing with computer and networks called hacking. Additionally, cyber crime also includes traditional crimes conducted through the internet.

For example: hate crimes, telemarketing and Internet fraud, identity theft, and credit card account thefts are considered to be cyber crimes when the illegal activities are committed through the use of a computer and the Internet. The other kinds of cyber crimes are SQL injections, Theft of FTP Passwords, Cross-site scripting, Virus dissemination, Logic bombs, Denial-of-Service attack, Phishing, Email bombing and spamming, Web jacking, Cyber stalking, Data diddling etc. are other few to mention.

**b) What is the need for cyber law?**

[WBUT 2016]

**Answer:**

Cyber means the use of Internet technologies and computers it includes computers, networks, software, data storage devices, Internet, websites, emails, ATM machines etc. To protect the cyber crime over Internet, this law is passed to protect the Internet cyber crime. This law is approved by the government. Cyber law Includes:

- Cyber crimes
- Electronic and Digital Signatures
- Intellectual Property
- Data protection and privacy

**Importance of Cyber Law:**

- Companies now be able to carry out electronic commerce using the legal infrastructure provided by the Act
- Act allows Government to issue notification on the web thus heralding e-governance
- Protect Computer fraud and Unauthorized access
- Consumers are now increasingly using credit cards for shopping
- Most people are using email, cell phones and SMS messages for communication as well as Deal with Internet Banking Transactions

**c) What are the different measures to prevent cyber crimes?**

[WBUT 2016]

**Answer:**

Cybercrime prevention can be straight-forward - when armed with a little technical advice and common sense, many attacks can be avoided. In general, online criminals are trying to make their money as quickly and easily as possible. The more difficult you make their job, the more likely they are to leave you alone and move on to an easier target. The tips below provide basic information on how you can prevent online fraud.

- 1) Keep your computer current with the latest patches and updates.
- 2) Make sure your computer is configured securely.
- 3) Choose strong passwords and keep them safe.
- 4) Protect your computer with security software.
- 5) Protect your personal information.
- 6) Online offers that look too good to be true usually are.
- 7) Review bank and credit card statements regularly.

**4. Write short note on Cyber Laws.**

[WBUT 2005, 2011]

**Answer:**

Cyber crimes is categorize in two ways. The Computer as a target using a computer to attack other computers. Like; Hacking, Virus/Worm attacks, DOS attack etc.

The computer as a weapon using a computer to commit real world crimes e.g. Cyber Terrorism, IPR violations, Credit card frauds, EFT frauds, Pornography etc. Cyber Crimes are regulated by Cyber Laws or Internet Laws

The cyber laws are governed by the THE INFORMATION TECHNOLOGY ACT, 2000 (No. 21 OF 2000) published by the govt. of India press and some of the important rules are listed, however for detail list IT ACT 2000 may be referred.

1. Authentication of electronic records.
2. Legal recognition of electronic records.
3. Legal recognition of digital signatures.
4. Use of electronic records and digital signatures in Government and its agencies.
5. Retention of electronic records.
6. Publication of rule, regulation, etc., in Electronic Gazette.
7. Confer right to insist document should be accepted in electronic form.
8. Power to make rules by Central Government in respect of digital signature.
9. Attribution, acknowledgment and dispatch of electronic records and Acknowledgment of receipt
10. Time and place of dispatch and receipt of electronic record
11. Secure electronic record.
12. Secure digital signature
13. REGULATION OF CERTIFYING AUTHORITIES & License to issue Digital Signature Certificates
14. PENALTIES AND ADJUDICATION
15. TRIBUNAL, OFFENCES
16. Power of police officer and other officers to enter, search, etc.

# TECHNOLOGIES, WIRELESS APPLICATION PROTOCOL

## Multiple Choice Type Questions

1. Exception the physical layer, WAP consists of..... protocol layers.  
 a) 4      b) 5      c) 6      d) 7      [WBUT 2008]

Answer: (d)

2. Network Layer equivalent to  
 a) OSI model layer 3  
 b) OSI model layer 2  
 c) OSI model layer 5  
 d) none of these      [WBUT 2014]

Answer: (a)

3. Electronic commerce is enabled by  
 a) EDP era technologies  
 b) MIS era technologies  
 c) Internet era technologies  
 d) all of these      [WBUT 2015, 2016]

Answer: (c)

4. ISP stands for  
 a) Internet Service Provider  
 b) Internet Service Protocol  
 c) Intranet Service Protocol  
 d) none of these      [WBUT 2016]

Answer: (a)

## Short Answer Type Questions

1. What is blue-tooth?      [WBUT 2007]

Answer:

The name Bluetooth is borrowed from Harald Bluetooth, a king in Denmark more than 1,000 years ago. The technology represents an opportunity for the industry to deliver wireless solutions that are ubiquitous across a broad range of devices. Bluetooth is a specification for the use of low-power radio communications to wirelessly link phones, computers and other network devices over short distances.

Bluetooth technology was designed primarily to support simple wireless networking of personal consumer devices and peripherals, including cell phones, PDAs, and wireless headsets. Wireless signals transmitted with Bluetooth cover short distances, typically up to 30 feet (10 meters). Bluetooth devices generally communicate at less than 1 Mbps. Bluetooth network feature a dynamic topology called a piconet or PAN. Piconets contain a minimum of two and a maximum of eight Bluetooth peer devices. Devices communicate using protocols that are part of the Bluetooth Specification. Although the Bluetooth standard utilizes the same 2.4 Ghz range as 802.11b and 802.11g, Bluetooth technology is not a suitable Wi-Fi replacement. Compared to Wi-Fi, Bluetooth

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networking is much slower, a bit more limited in range, and supports many fewer devices.

As is true for Wi-Fi and other wireless technologies today, concerns with Bluetooth technology include security and interoperability with other networking standards. Bluetooth was ratified as IEEE 802.15.1.

### **2. Explain about Internet, Intranet & Extranet.**

[WBUT 2015]

**Answer:**

Internet is a means of connecting a computer to any other computer anywhere in the world via dedicated routers and servers. When two computers are connected over the Internet, they can send and receive all kinds of information such as text, graphics, voice, video, and computer programs.

No one owns Internet, although several organizations the world over collaborate in its functioning and development. The high-speed, fiber-optic cables (called backbones) through which the bulk of the Internet data travels are owned by telephone companies in their respective countries.

An intranet comprises a restricted computer network, controlled by and usually reserved for a single organization – like a corporation's private network. Intranets connect anywhere from dozens to thousands of people. They often have their own physical infrastructure, separate from the Internet. Although they tend to offer Internet access, some do not, typically for reasons of privacy, security or lack of need. In comparison, an extranet comprises a restricted computer network that connects two or more intranets. Intranets can be partially sealed off from the extranets they access, allowing for a company to reserve private areas of its intranet from the eyes of other companies. In addition to its strategic necessity, this also has security value since extranets usually run on the global Internet as virtual private networks. This makes extranets especially vulnerable to cyberattacks when compared to intranets. To access either an intranet or extranet, a user generally needs a passcode.

### **Long Answer Type Questions**

#### **1. Define WAP. Explain its importance in e-commerce.**

[WBUT 2006, 2010]

**Answer:**

Wireless Application Protocol or WAP is an open international standard for applications that use wireless communication. Its principal application is to enable access to the Internet from a **mobile phone or PDA** (personal digital assistant)

Mobile internet sites, or WAP sites, are websites written in, or dynamically converted to, WML (Wireless Markup Language) and accessed via the WAP browser. A WAP browser is designed to provide all of the basic services of a computer based web browser but simplified to operate within the restrictions of a mobile phone.

WAP is now the protocol used for the majority of the world's mobile internet sites, known as WAP sites. The Japanese *i-mode* system is currently the only other major competing wireless data protocol. WAP, service providers had limited opportunities to

offer interactive data services. Interactive data applications are required to support now commonplace activities such as:

- email by mobile phone
- stock market prices tracking
- sports results
- news headlines
- music downloads
- EDI transactions

Wireless Application Protocol or WAP is an open international standard for applications that use wireless communication. A WAP browser is designed to provide all of the basic services of a computer based web browser but simplified to operate within the restrictions of a mobile phone. WAP is the protocol used for the majority of the world's mobile internet sites, known as WAP sites. The initial design of WAP was specifically aimed at protocol independence. However the least of different protocols are:

- SMS
- IP over PPP over a circuit switched bearer
- IP over GPRS

WAP transmission layer protocol, WTP, uses its own retransmission mechanisms over UDP to attempt to solve the problem of TCP's inadequacy for high packet loss networks. WAP on top of the **CDMA2000** network has been proven to be the state of the art wireless data infrastructure. WAP Push allow WAP content to be pushed to the mobile handset with minimum user intervention. A WAP Push is a specially encoded message which includes a link to a WAP address. WAP Push is specified on top of WDP; as such, it can be delivered over any WDP supported bearer, such as GPRS or SMS. In most GSM networks there are a wide range of modified processors, however, GPRS activation from the network is not generally supported, so WAP Push messages have to be delivered on top of the SMS bearer. On receiving a WAP Push, a WAP 1.2 or later enabled handset will automatically give the user the option to access the WAP content. The network entity that processes WAP Pushes and delivers them over an IP or SMS bearer is known as a **Push Proxy Gateway**.

The WAP Forum proposed a protocol suite that would allow the interoperability of WAP equipment and software with many different network technologies; the rationale for this was to build a single platform for competing network technologies such as GSM and IS-95 (also known as CDMA) networks.

1. Wireless Application Environment (WAE)
2. Wireless Session Protocol (WSP)
3. Wireless Transaction Protocol (WTP)
4. Wireless Transport Layer Security (WTLS)
5. Wireless Datagram Protocol (WDP)

Any Wireless Data Network should follow the above sequence. The bottom-most protocol in the suite is the WAP Datagram Protocol (WDP), which is an adaptation layer that makes every data network look a bit like UDP to the upper layers by providing unreliable transport of data with two 16-bit port numbers (origin and destination). WDP

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is considered by all the upper layers as one and same protocol, which has several "technical realizations" on top of other "data bearers" such as SMS, USSD, etc. On native IP bearers such as GPRS, UMTS packet-radio service, or PPP on top of a circuit-switched data connection, WDP is in fact exactly UDP.

WTLS provides a public-key cryptography-based security mechanism similar to TLS. Its use is optional. WTP provides transaction support (reliable request/response) that is adapted to the wireless world. WTP supports more effectively than TCP the problem of packet loss, which is common in 2G wireless technologies in most radio conditions, but is misinterpreted by TCP as network congestion. Finally, WSP is best thought of on first approach as a compressed version of HTTP. This protocol suite allows a terminal to emit requests that have an HTTP or HTTPS equivalent to a WAP "gateway"; the gateway translates requests into plain HTTP.

### **2. a) What is internet?**

[WBUT 2007]

**Answer:**

The Internet, sometimes called simply "the Net," is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer. It was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the ARPANet. Today, the Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide. Physically, the Internet uses a portion of the total resources of the currently existing public telecommunication networks. Technically, what distinguishes the Internet is its use of a set of protocols called TCP/IP (for Transmission Control Protocol/Internet Protocol). Two recent adaptations of Internet technology, the intranet and the extranet, also make use of the TCP/IP protocol.

### **b) Discuss about the importance of internet for E-commerce.**

[WBUT 2007]

**Answer:**

The rapid development of technology and internet has diverted company direction to retain customer e-loyalty. Customer loyalty is becoming great interest for companies and customer loyalty has a direct impact on the revenue and profitability of a company. An online shop, internet shop, web shop or online store is "an electronic commerce application used for B2B or B2C, which serves to sell products or services over the internet. As such, an online shop is part of the e-commerce field of the e-business.

Internet helps in connecting today's online savvy shopper with any retail or wholesale merchant. From gathering information, knowledge, News, online shopping is one of the most promising functions of the Internet world. When we think about online shopping, many thoughts come to mind, like checking out merchandise late at night when everybody else is asleep, searching for your favorite and private item to buy, so that no one knows. Online shopping is very popular, it is now possible to compare prices on various items, do research on new items that just hit the market, get the best possible deals, and have products of choice delivered to front doorstep with just a few clicks of computer mouse. People think that online shopping has reached its peak. But the truth is

the time where a whole generation is being introduced to this new trend. The products, electronic gadgets and, the latest video games, DVDs, electronics and gifts are all represented on the Internet through online shopping. Not only do online products feature low prices, but also the selection seems larger than life. This is a great advantage and saves time and sums of money. Online store shopping is being able to use the convenience of the Internet to seek out the lowest prices for items, solutions and services at huge savings with quickness and great savings with reliability. [www.everydaybargain.com](http://www.everydaybargain.com) is one of the online secure one stop shop for all products in the internet To buy the products we should find believable secure store to avoid the cheaters. We can finalize a store is secure based on its performance. [www.everydaybargain.com](http://www.everydaybargain.com) is one of the online secure one stop shop for all products in the internet.

**3. a) What is mobile commerce?**

**b) Describe any four advantages offered by the mobile commerce environment as compared to commerce over a wired network.**

**c) Define the architectural framework of mobile commerce.**

[WBUT 2008]

**Answer:**

**a) Mobile Commerce** is the ability to conduct commerce using a mobile device, such as a mobile phone, a smart phone, a PDA or other mobile equipment such as dashtop mobile devices. Mobile Commerce is defined as follows:

Mobile Commerce is any transaction, involving the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobile access to computer-mediated networks with the help of an electronic device. For example mobile content purchase and delivery consists of the sale of ring-tones, wallpapers and games for mobile phones. The convergence of mobile phones, portable audio players, and video players into a single device is increasing the purchase and delivery of full-length music tracks and video. The download speeds available with 4G networks make it possible to buy a movie on a mobile device in a couple of seconds.

**b) Commerce transpires** as organizations introduce new methods to employ mobile devices to communicate, inform, transact and entertain using text and data via connection to public and private networks. This emergence of mobile commerce will happen even faster than the development of e-commerce. From five to 10 years out, almost all of e-commerce will be on wireless devices according to chief executive and founder of Amazon.com. Consequently, within the next 5-years, one-quarter of all electronic commerce will take place through wireless devices. Forecasts estimate the wireless web to be as large as the wired web of today and worldwide mobile commerce exceeding \$200 billion by 2004.

The potential of m-commerce is considerable for those willing to develop mobile-specific business strategies. Additionally, m-commerce is going to bring about a massive change in the way users consume products and services.

It is key that commerce companies recognize m-commerce as a completely unique service. Cell phone users are more impatient than Internet users. The paradigm here is

## **POPULAR PUBLICATIONS**

not surfing; all services for the mass market have to be pitched at users in such a seamless way that they need not even be aware that they are accessing the net. The advantages of M-commerce are:

Mobile applications typically involve high-speed services being accessed by devices remotely, anywhere, at any time.

1. Introduction of higher data speeds and packeted 'always on' technology will enable mobile devices to be used to receive, send and access a huge range of information and services in real time.
2. Across all e-commerce applications there are barriers to adoption. M-commerce seeks to remove even further the sense of a consumer having to go to the business for products or services, or needing to be skilled in multiple technologies or having to plan whenever they want to access a business using the Internet.
3. Mobile phone-based devices are now permitting visual and data transfer (E.g. emails, multimedia messaging, etc) across spectrums and networks usually preserved for voice traffic alone.
4. Evidence suggests as devices and networks converge with existing technologies (e.g. Internet, mobile phones and video conferencing or TV broadcast systems), consumers are reacting to the technology in a very positive manner.
5. To enable the improvement of customer use of data options m-commerce applications and technology have evolved rapidly. While some features continue to evolve, these are some of the more common advantages of m-commerce over traditional commerce.

c) The use of an architectural framework allows software level data exchange. This is managed in particular through the use of security solutions supporting the TLS protocol, the use of certificates to encrypt the data etc. The framework is enriched by Security certificates to authenticate the e-commerce site to the users.

Second, both the persistence and the availability of data are significant points in the success of mobile applications. The applications are designed in order to prevent remote attacks such as denial of service attacks, which target the availability of resources. Finally the storage security is relative to the business application and its supporting storage infrastructure, a risk mitigation methodology is a sound way to strengthen storage availability, reliability and privacy. This is why storage of and access to stored data are the final two significant points that influence the design of mobile and e-commerce applications.

**4. Describe the functional requirements for online selling and what specialized services and servers perform these functions.** [WBUT 2011]

**Answer:**

Selling on the web is a specialized process. It follows the model called store-front model.

When we talk about functional requirement about a process or task, we broadly indicate the following functions like;

1. Measurable
2. Realistic
3. Completeness
4. Ownership of requirements
5. Walk it through
6. Use pictures and keep talking
7. Bigger is not necessarily better - keep it simple!

The basic requirements of selling on the web comprises of the following:

- A merchant system that provides the merchant's catalogue with products, prices and promotions.
- A transaction system for processing orders and payments and other aspects of the transaction
- A broadband internet connection
- Laptop/PC/Mobile technology
- Target audience to be reached
- Needs and expectations of the target audience
- A clear unambiguous messaging system between the server and the audience
- 24x7 availability of the item to be sold.
- Menu for item selection and booking order
- Secured Payment Gateway and delivery of product

All the above tasks are well taken care of by the Electronic Storefront model and the precise functional requirements are as follows:

- Search for product to be purchased
- Select the product
- Negotiate price
- Place an order indicating total price
- confirm order and the availability
- Make payment using SET Protocol
- Verify and approve the purchase
- Process orders
- Ship the product
- Collect feedback from the seller

**The specialized services and servers perform the functions are:**

A Web server is not a hardware platform; it is a software program. The Web servers e.g. http daemon in UNIX or http service in Windows NT the functions are:

1. Service HTTP requests
2. Provide access control mechanism(ACM)
3. Determine access rights of a particular directories or files on the Web server

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4. Run scripts and external programs to either add functionality to the Web documents or provide real-time access to database and other dynamic data
5. Enable management and administration of both the server functions and the contents of the Web site
6. Log transactions that the user makes
7. Distinguished by: Platforms, performance, security and commerce

However, web servers can be distinguished by:

- **Platform:** Unix platform, Windows NT and others
- **Performance:** various servers speed, etc.
- **Security:** filtering IP address, encrypted data exchange, etc.
- **Commerce:** support online selling and buying (like shopping cart and catalogue services).

### 5. Differentiate among Internet, Intranet and Extranet.

[WBUT 2017]

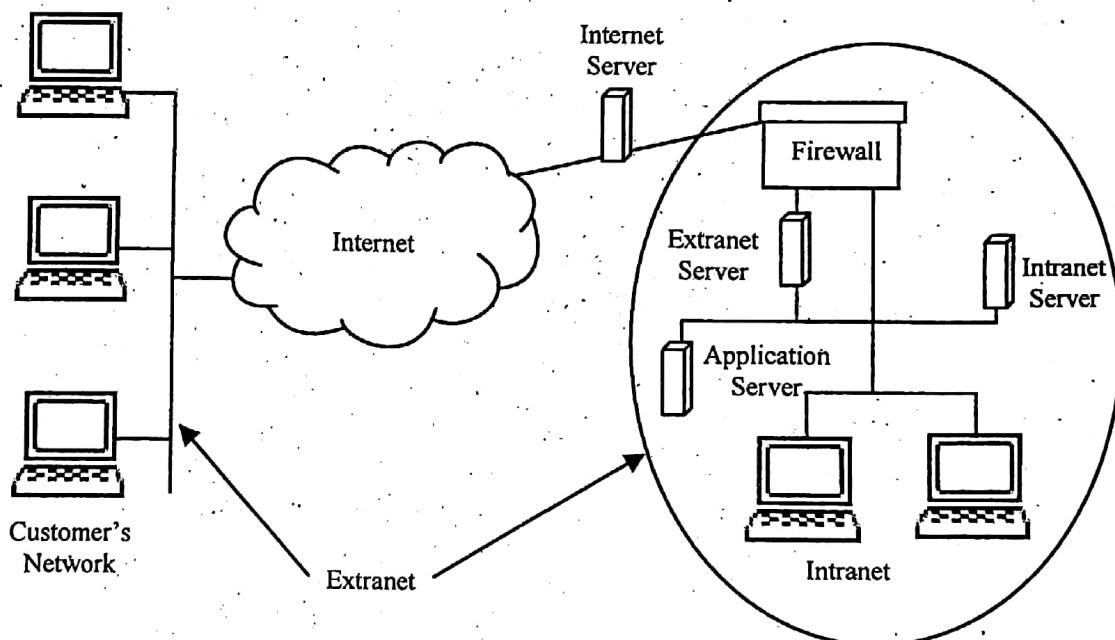
OR,

### Compare and contrast Extranet and Intranet.

[WBUT 2019]

Answer:

#### Network diagram



Internet	Intranet	Extranet
It is a Global system of interconnected computer network.	It is a Private network specific to an organisation.	It is a Private network that uses public network to share information with suppliers and vendors.
Not regulated by any authority.	It is regulated by an organization.	It is regulated by multiple organization.
Thus content in the network is accessible	Thus content in the network is accessible only	The content in the network is accessible to members of

<b>Internet</b>	<b>Intranet</b>	<b>Extranet</b>
<b>everyone connected.</b>	<b>members of organization.</b>	<b>organization &amp; external members with access to network.</b>
<b>It is largest in terms of number of connected devices.</b>	<b>It is small network with minimal number of connected devices.</b>	<b>The number of devices connected is comparable with Intranet.</b>
<b>It is owned by no one.</b>	<b>It is owned by single organization.</b>	<b>It is owned by single/multiple organization.</b>
<b>It is means of sharing information throughout the world.</b>	<b>It is means of sharing sensitive information throughout organization.</b>	<b>It is means of sharing information between members and external members.</b>
<b>Security is dependent of the user of device connected to network.</b>	<b>Security is enforced via a firewall.</b>	<b>Security is enforced via a firewall that separates internet &amp; extranet.</b>
<b>Example: What we are normally using is internet.</b>	<b>Example: TCS using internal network for its business operations.</b>	<b>Example: HP and Intel using network for business related operations.</b>
<b>Users can access Internet anonymously.</b>	<b>Users should have valid username/password to access Intranet.</b>	<b>Users should have valid username/password to access Extranet.</b>
<b>Internet is unregulated and uncensored.</b>	<b>But Intranet is regulated by the organization policies.</b>	<b>Extranet is also regulated by contractual agreements between organizations.</b>

**6. Write short notes on the following:**

**a) Mobile Computing**

[WBUT 2005]

**b) WAP**

[WBUT 2007]

**Answer:**

**a) Mobile Computing:**

**Mobile computing** is a form of human-computer interaction where a computer is expected to be transported during normal usage. Mobile computing has three aspects: mobile communication, mobile hardware and mobile software. The first aspect addresses communication issues in ad-hoc and infrastructure networks as well as communication properties, protocols, data formats and concrete technologies. The second aspect focuses on the hardware, i.e. mobile devices or device components. The third aspect deals with the characteristics and requirements of mobile applications.

**b) WAP: Refer to Question No. 1 of Long Answer Type Questions.**

# **BUSINESS MODELS OF E – COMMERCE**

## **Multiple Choice Type Questions**

1. EBay is an example of a/an ..... E-commerce site. [WBUT 2007, 2009, 2016]  
a) B2C                      b) EDI                      c) C2C                      d) B2B

Answer: (c)

2. The PRLC approach identifies which of the following stages? [WBUT 2007]  
a) Reconstruct      b) Destruct      c) Initiate      d) Both (a) & (b)

Answer: (a)

3. Which Model of E-commerce deals with virtual auction? [WBUT 2008, 2009]  
a) Aggregator model      b) Info-mediary model  
c) Community model      d) Brokerage model

Answer: (d)

4. There are ..... types of Business Transaction models. [WBUT 2010]  
a) one      b) two      c) three      d) four

Answer: (d)

5. i Gov. com is an example of [WBUT 2010, 2013]  
a) B2B      b) B2C      c) B2G      d) C2B

Answer: (c)

6. E-business S/W is best defined to manage [WBUT 2010].  
a) buyer applications      b) seller applications  
c) all of these      d) none of these

Answer: (c)

7. Which of the following is part of the four main types for E-Commerce?

- [WBUT 2017]  
a) B2B      b) B2C      c) C2B      d) All of these

Answer: (d)

8. Which segment do eBay, Amazon and OLX belong to? [WBUT 2019]  
a) B2B      b) B2C      c) C2C      d) C2B

Answer: (c)

9. Which of the following advantages is normally associated with C2C e-commerce? [WBUT 2019]  
a) shorter cycle time  
c) reaches wider audience  
b) reduction in costs  
d) all of these

Answer: (d)

**Short Answer Type Questions**

**1. What is e-governance and how does it work?**

**[WBUT 2005, 2010]**

**OR,**

**Explain E-Governance with suitable examples.**

**[WBUT 2007, 2008, 2009, 2014, 2017, 2018]**

**Answer:**

**1<sup>st</sup> Part:**

e-Governance refers to government's use of information technology to exchange information and services with citizens, businesses, and other arms of government. e-Government may be applied by the legislature, judiciary, or administration, in order to improve internal efficiency, the delivery of public services, or processes of democratic governance. It also refers to the citizen to government interaction including the feed back of policies. The most important anticipated benefits of e-government include improved efficiency, convenience, and better accessibility of public services. In simple terms Electronic Governance can be defined as giving citizens the choice of when and where they access government information and services.

**2<sup>nd</sup> Part:**

Examples of e governance:

**Fighting Corruption Using the Internet in Kenya**

The Information Technology Standards Association (ITSA) of Kenya has launched a pilot project whose aim is to increase public awareness and encourage public participation in fighting corrupt practices. The pilot project will offer a corruption online reporting facility in six towns, two remote locations. The media will form the source points of information which will be routed to the Electronic Graft Management (EGM) Centre. The EGM Centre will filter this information electronically and forward/channel it to the relevant authorities for action.

The complete case study can be consulted at The Center for Digital Discourse and Culture (CDDC).

**E-seva center in Andhra Pradesh State of India**

The goal of e-seva is to simplify the delivery of city services by providing a wide spectrum of citizen friendly services that will save citizens the bother of running around various departments. Services provided include payment of utility bills; reservations of train tickets; getting birth and death certificates, vehicle permits, driving licenses; transport department services etc. Before the launch of the e-seva project, these services were available at separate offices and were normally time-consuming because of slow processing and often large crowds waiting for the services.

The complete case study, as well as other ICT stories, can be consulted at The International Institute for Communication and Development – Knowledge sharing (IICD)

## **POPULAR PUBLICATIONS**

**2. What is an affiliate model? Provide two examples of electronic commerce businesses that use this model.** [WBUT 2008]

**Answer:**

The affiliate (or click-through) model is a popular e-commerce relationship in which an online merchant agrees to pay an affiliate in exchange for providing an advertisement and link to the merchant's site. Each sale generated as a result of a customer "clicking through" from an affiliate to the merchant results in a small commission for the affiliate. The deal provides a stream of cash to affiliates and brings the merchant, which owns the affiliate network, a host of new traffic, cutting customer-acquisition costs and allowing it to target its desired audience. In contrast to the generalized portal, which seeks to drive a high volume of traffic to one site, the affiliate model, provides purchase opportunities wherever people may be surfing. It does this by offering financial incentives (in the form of a percentage of revenue) to affiliated partner sites. The affiliates provide purchase-point click-through to the merchant. It is a pay-for-performance model -- if an affiliate does not generate sales, it represents no cost to the merchant. The affiliate model is inherently well-suited to the web, which explains its popularity. Variations include, banner exchange, pay-per-click, and revenue sharing programs.

Examples of affiliate models are:

barnes and noble  
amazon.com

**3. What is supplier centric B2B electronic commerce?**

[WBUT 2008, 2010]

**Answer:**

Electronic Commerce: B2B

It requires two or more business entities interacting with each other directly or through an intermediary. The intermediaries in B2B may be the market makers and directory service providers that assist in matching the buyers and sellers and striking a deal. The business application of B2B electronic commerce can be utilized to facilitate almost all facets of the interactions among organizations, such as Inventory Management, Channel Management, Distribution Management, Order fulfillment and delivery, and payment management. The B2B electronic commerce can be

1. Supplier-Centric,
2. Buyer-centric
3. Intermediary-centric.

A supplier sets up the electronic commerce market place for various buyer businesses to interact with the supplier at its electronic market place.

- Typically, a dominant supplier in the domain of products sets up such a market place.
- The supplier may provide customized solutions and pricing to fit the needs of buyers' businesses. Usually, differential price structure is dependent upon the volume and loyalty discount.
- Example, Cisco Connection Online (CCO).

**4. Discuss about the potential benefits of B2B e-commerce.**

[WBUT 2008]

**Answer:**

**Benefits of B2B**

1. Outsourcing the unprofitable parts of business
2. Speeding up product development activities – reducing time to market
3. Improved business and market intelligence.
4. Understanding the market better than competitors
5. Cloning business in further markets
6. Improving the speed of communication
7. Facilitating communication between customers and suppliers
8. Reducing wastage through additional sales channels
9. Improved ability to experiment and learn
10. Higher customer retention rates
11. Lower customer acquisition costs
12. Reduced costs can be passed on in favourable pricing.

**5. What are the benefits and points of concern in CPD?**

[WBUT 2009]

**Answer:**

The word **CPD** stands for principles of continuing professional development. For successful implementation of E-governance, professionals need to be trained through a regular curriculum.

CDPs integrate diverse perspectives of an urban community into a singular vision for future development. Comparing that vision to current, on the ground realities helps formulate and prioritize the necessary steps that a city should take, including policy reforms, investment strategies and civil society partnership.

**6. What are the key technologies for B2B e-commerce? Explain architectural models of B2B e-commerce.**

[WBUT 2011]

**Answer:**

B2B refers to business to business marketing. Essentially, a B2B trade marketplace is a website that acts like a marketplace where importers, exporters, wholesalers, retailers, traders, distributors and any other business fraternity can get together for the purpose of conducting a business activity.

A B2B trade marketplace has made it astonishingly easy and affordable for sellers to reach buyers anywhere on the planet. That's because a B2B trade marketplace is an access point on the web which acts as a base for employees, suppliers, customers, manufacturers and other companies to access information and a variety of services related to business. Such a marketplace has software designed to conduct business electronically, manage several aspects of the business while providing each member with all the tools they need to do business.

A good B2B trade marketplace has to integrate rich resources with a reliable taskforce that has all the technical know-how to enable members to conduct business, properly and without error. To facilitate this, there must be a host of business friendly tools like lead posting, catalog posting, lead search, business and product search, inquiry, picture loading facility and virtual transaction management.

## POPULAR PUBLICATIONS

The portal should give their customers all the required tools to showcase their products and services effectively. Customers should be able to browse through trade leads, tender offers, put in their biddings for partnerships and franchises, view company profiles, put up buy and sell offers, view and put up products and services. Members must also be allowed to enjoy multiple markets, thus giving them the highest chances of maximum profit. All these facilities must be neatly packaged in a single convenient location. In fact, ease of use is the single most important feature of a good B2B trade marketplace. Security would be a close second.

**7. Briefly describe the e-business models based on the relationship of transaction parties.** [WBUT 2012]

**Answer:**

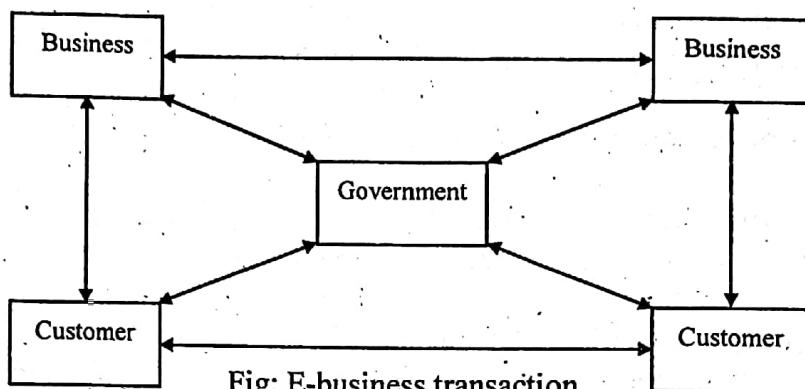


Fig: E-business transaction

- B2C : Sells products or services directly to customers, e.g. amazon.com
- B2B: Sells products or services to other business, or brings multiple buyers and sellers together in a central market place, e.g. Chemdex.com
- B2G: Business selling to local, state and federal agencies, e.g. iGov.com
- C2C : Consumers sell directly to other consumers, e.g. ebay.com
- C2B: Consumers fix price on their own, which business accept or decline. e.g. Priceline.com

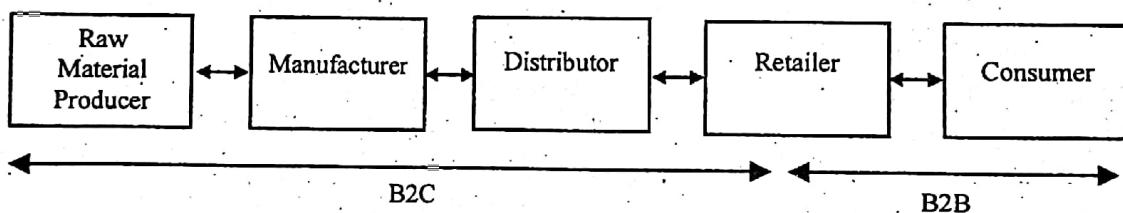


Fig: Relation between B2B and B2C

**8. Give a brief note on the technology requirement for a B2C e-commerce application.** [WBUT 2012]

**Answer:**

Straightforward B2C e-commerce applications are developed to support individual customers, orders, and credit cards, in today's enterprise applications, the technology playing field has narrowed to either a Java/J2EE or Microsoft .NET architecture. Which should include search/browsers, rich shopping cart functionality, product comparison,

promotions, personalization, cross-sells, wish lists, registries, multichannel ordering, rich Internet application (RIA) support, customer data management, marketing tools, and customer self-service. In order to provide all such functionalities the minimum hardware requirements will contain internet connectivity preferably a broadband depending on work volume, a personal computer/laptop/notebook or a Tab with a suitable multi tasking window based operating system which supports Java/J2EE applications and multiple Web Servers and software supporting tools like HTML, DHTML, CSS, ASP, CGI/Perl, Java Servlets, JSP, PHP, VB & Java.

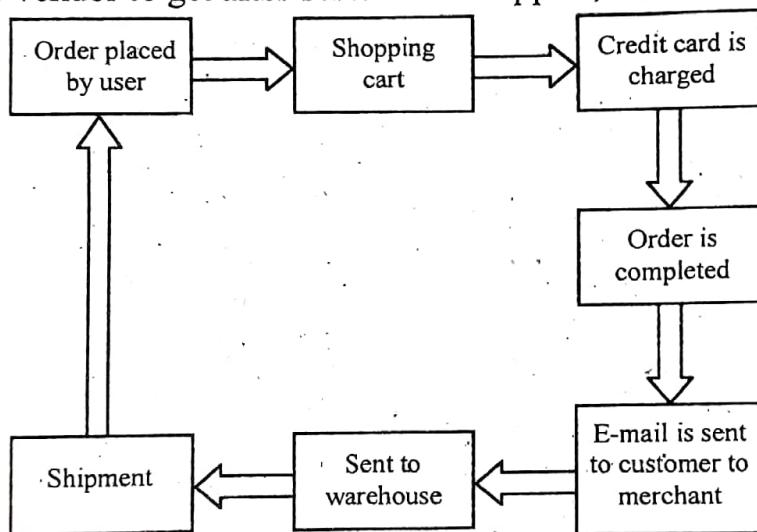
**9. Describe the steps for a B2C process model with necessary diagram.**

[WBUT 2013]

**Answer:**

B2C refers to a business communicating with or selling to an individual rather than a company, it is the model involving business to consumers. B2C is also known as internet retailing or E-Tailing. The B2C process follows the steps over the internet:

- Basic requirement determination.
- Search for available items that can meet the requirement.
- Compare the candidate items with multiple perspectives.
- Place an order.
- Pay the bill.
- Receive the delivered items and inspect them.
- Contact the vendor to get after-service and support, or to return if disappointed.



**10. Distinguish between B2B, B2C and C2B models.**

[WBUT 2014, 2017]

**Answer:**

**B2B (Business to Business)** is a business to establish business relationships with businesses such as McDonald's, we are only able to buy McDonald's and Coca-Cola because of the business partners. Businessmen to establish business partnership is the hope that through what is offered to form a complementary development opportunities, our business can be profitable. Example: maritime network, Direct industry (Finderwal), million net, Alibaba, Tradett, HC network, business network.

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**B2C (Business to Consumer)** is that we often see vendors sell goods directly to the user, for example we go to McDonald's to eat is B2C, because you just a customer. Example: Dangdang, Joyo.

**C2B (Consumer to Business)**, a relatively new concept, meaning by what the customer to choose their own things, the price of what is required, then the business to decide whether to accept the customer's requirements and if the business receiving the customer's requirements, then the transaction is successful; if the merchant does not accept the customer's request, then that transaction to fail.

**The main difference is the object:**

B2B: inter-enterprise EC

B2C: Business to users of EC

C2B: person-to-business EC

EC is the e-commerce

### **Long Answer Type Questions**

**1. Briefly explain different categories of e-commerce.**

[WBUT 2017]

**Answer:**

There are 6 basic types of e-commerce:

1. Business-to-Business (B2B)
2. Business-to-Consumer (B2C)
3. Consumer-to-Consumer (C2C)
4. Consumer-to-Business (C2B).
5. Business-to-Administration (B2A)
6. Consumer-to-Administration (C2A)

#### **1. Business-to-Business (B2B)**

Business-to-Business (B2B) e-commerce encompasses all electronic transactions of goods or services conducted between companies. Producers and traditional commerce wholesalers typically operate with this type of electronic commerce.

#### **2. Business-to-Consumer (B2C)**

The Business-to-Consumer type of e-commerce is distinguished by the establishment of electronic business relationships between businesses and final consumers. It corresponds to the retail section of e-commerce, where traditional retail trade normally operates.

These types of relationships can be easier and more dynamic, but also more sporadic or discontinued. This type of commerce has developed greatly, due to the advent of the web, and there are already many virtual stores and malls on the Internet, which sell all kinds of consumer goods, such as computers, software, books, shoes, cars, food, financial products, digital publications, etc.

When compared to buying retail in traditional commerce, the consumer usually has more information available in terms of informative content and there is also a widespread idea

that you'll be buying cheaper, without jeopardizing an equally personalized customer service, as well as ensuring quick processing and delivery of your order.

**3. Consumer-to-Consumer (C2C)**

Consumer-to-Consumer (C2C) type e-commerce encompasses all electronic transactions of goods or services conducted between consumers. Generally, these transactions are conducted through a third party, which provides the online platform where the transactions are actually carried out.

**4. Consumer-to-Business (C2B)**

In C2B there is a complete reversal of the traditional sense of exchanging goods. This type of e-commerce is very common in crowdsourcing based projects. A large number of individuals make their services or products available for purchase for companies seeking precisely these types of services or products.

Examples of such practices are the sites where designers present several proposals for a company logo and where only one of them is selected and effectively purchased. Another platform that is very common in this type of commerce are the markets that sell royalty-free photographs, images, media and design elements, such as iStockphoto.

**5. Business-to-Administration (B2A)**

This part of e-commerce encompasses all transactions conducted online between companies and public administration. This is an area that involves a large amount and a variety of services, particularly in areas such as fiscal, social security, employment, legal documents and registers, etc. These types of services have increased considerably in recent years with investments made in e-government.

**6. Consumer-to-Administration (C2A)**

The Consumer-to-Administration model encompasses all electronic transactions conducted between individuals and public administration.

Examples of applications include:

- Education – disseminating information, distance learning, etc.
- Social Security – through the distribution of information, making payments, etc.
- Taxes – filing tax returns, payments, etc.
- Health – appointments, information about illnesses, payment of health services, etc.

Both models involving Public Administration (B2A and C2A) are strongly associated to the idea of efficiency and easy usability of the services provided to citizens by the government, with the support of information and communication technologies.

## **E – STRATEGY**

### **Multiple Choice Type Questions**

**1. An EIS considers**

- a) Organizational structure
- c) Strategic control

- b) Crisis management
- d) all of these

[WBUT 2007]

**Answer:** (d)

### **Short Answer Type Questions**

**1. Which of the four market entry strategies in E-commerce is most lucrative and why?**

[WBUT 2008]

**Answer:**

The four main market entry strategies are:

1. The idea of being first on the market.
2. First mover & Differentiation
3. Generic product-market strategy
4. Being on the space and application of Internet

Out of these four strategies the application of internet is the most advantageous technological option before the entrepreneur. The location independent market strategy moves towards easy globalization and at the same time business volume and export program automatically enlarges without walls.

Marketing at a low cost in distributing information and media to a global audience. The interactive nature of Internet marketing, both in terms of instant response and in eliciting response, are unique qualities of the medium. When a company is marketing its products on the web, they have an advantage of creating a space of their own choice, design and thus can make a distinctive presences. A website can have images and can activate them by animation. It can serve as a sales brochure, a product showroom, a financial report, an employment advertisement, or a customer contact point. The objectives of the organizations that does marketing via internet are:

- Attracting visitors to the website.
- Making the site interesting enough so that the visitors stay and explore.
- Convincing visitors to follow the site's link to obtain information.
- Creating an impression consistent with the organization's desired image.
- Building a trusting relationship with the customers.
- Re-in forcing the positive image that the visitor already has about the company.
- Encouraging visitors to return to the site.

# **CONVERGENCE, COLLABORATIVE COMPUTING**

## **Multiple Choice Type Questions**

1. Convergence of content enables companies

[WBUT 2007]

- a) Sophisticated information publishing & browsing tools
- b) To use networked databases
- c) To gather, process, manipulate and distribute information
- d) All of these

Answer: (d)

## **Short Answer Type Questions**

1. What is collaborative computing? State its relevance for success of e-commerce.

[WBUT 2006, 2011]

Answer:

*Collaborative computing* is a term describing a variety of activities where people interact with one another using desktops, laptops, palmtops, and sophisticated digital cellular phones. As computers are best at handling data and representing information, person-to-person communication is enriched by an ability to share, modify, or collaboratively create data and information.

The growth of the Internet and the electronic commerce is developing with a great speed in the last years. In this line, the increase of the competence is bringing a great interest in examining the factors of acceptance and success of a website. Thus, many studies have emphasizing the design of a website as a critical aspect for the achievement of a successfully virtual store. Concretely, the aim of this study is to identify the key factors that influence the degree of success of the websites. Specifically, we focus on the specific elements related to the web design. A heuristic analysis, which is based on the assessments of a multidisciplinary group of experts, was carried out in order to find out and better understand the good and bad practices of two well-known websites. The literature review and the results of the test allowed us to identify the critical aspects related to web design and to offer some managerial implications in order for designers to get an efficient e-commerce website.

Regarding the development of online businesses, a great increase of competence is occurring. In this context, there has been arising a great body of research focused on the factors that affect the success of an e-commerce website. In this line, many studies have identified the web design as a key factor for the development of a good interface for satisfying the consumer needs.

2. What is meant by technological convergence? What are its implications?

[WBUT 2008, 2010]

## **POPULAR PUBLICATIONS**

### **Answer:**

**Technological convergence** is the tendency for different technological systems to evolve towards performing similar tasks. *Convergence* can refer to previously separate technologies such as voice (and telephony features), data (and productivity applications), and video that now share resources and interact with each other, synergistically creating new efficiencies.

**Implications:** Convergent solutions include both fixed-line and mobile technologies. Recent examples of new, convergent services include:

- Using the Internet for voice telephony
- Video On Demand
- Fixed-Mobile Convergence
- Mobile-to-Mobile Convergence
- Location Based Services
- Integrated Products and Bundles

Convergent technologies can integrate the fixed-line with mobile to deliver convergent solutions. Convergent technologies include:

- IP Multimedia Subsystem (IMS)
- Session Initiation Protocol (SIP)
- IPTV
- VOIP
- Voice Call Continuity
- Digital Video Broadcasting - Handheld
- Video On Demand technologies.

## **Long Answer Type Questions**

**1. Write short notes on the following:**

- a) Content Management
- b) Collaborative Computing

[WBUT 2005]

[WBUT 2005]

**Answer:**

**a) Content Management:**

**Content management**, or CM, is the set of processes and technologies that support the collection, managing, and publishing of information in any form or medium. In recent times this information is typically referred to as content or, to be precise, digital content. Digital content may take the form of text, such as documents, multimedia files, such as audio or video files, or any other file type which follows a content lifecycle which requires management. Content management practices and goals vary with mission. News organizations, e-commerce websites, and educational institutions all use content management, but in different ways. This leads to differences in terminology and in the names and number of steps in the process.

For example, an instance of digital content is created by one or more authors. Over time that content may be edited. One or more individuals may provide some editorial oversight thereby approving the content for publication. Publishing may take many forms.

Publishing may be the act of pushing content out to others, or simply granting digital access rights to certain content to a particular person or group of persons. Later that content may be superseded by another form of content and thus retired or removed from use.

**b) Collaborative Computing:**

*Refer to Question No. 1 of Short Answer Type Questions.*

# **CONTENT MANAGEMENT & CALL CENTER**

## **Short Answer Type Questions**

**1. Define content. What is content partnership?**

**[WBUT 2009]**

**Answer:**

Any information that is transmitted to an audience may fall under the heading of content. The term “content,” when used in reference to intellectual property law, refers to information that is provided for an audience, typically within a specific context. Content may vary in topic, scope, specifics, subject matter, and medium. Content may include personal information or public news. A movie is considered content or a news broadcast. Content is both produced by original writers and re-transmitted through various sources. Content may be considered free or may be limited by copyrights and licenses.

The philosophy around content partnerships is the value creation among the partners. The advertiser to the partner who brings the end user. So typically, in the partnership structure the majority of the revenue and the shares are pretty high and should go to partnering companies without violation of IPR.

## **Long Answer Type Questions**

**1. a) What is call center? Discuss about the call center equipment.**

**b) What are the modes of operation of call center?**

**c) What is Customer Premises Equipment (CPE)?**

**[WBUT 2009, 2014, 2019]**

**Answer:**

**a) 1<sup>st</sup> Part: Refer to Question No. 2(b) of Long Answer Type Questions.**

**2<sup>nd</sup> Part:**

In addition to a call centre, collective handling of letters, faxes, and e-mails at one location is known as a **contact centre**.

***Equipments Required in a Call Center are:***

- Well equipped and maintained computers
- Cables
- LAN switches
- Server hardware and software
- Workstation hardware and software
- EPABX
- Multiplexer
- Call centre software
- Database software
- Digital phones

- Analog and digital phone line ports
- Landline telephones
- Cellular telephones
- Conference call equipment
- Satellite telephone
- Agent handsets
- Wall board display
- Auto-attendant mailboxes
- UPS
- Leased line modems

b) There are however two types of mode of working in a call centre. They are:

- ❖ Voice Based
- ❖ Web Based

#### **Voice Based:**

A call centre as told earlier is a place where we basically solve the customer's queries or the problems faced by him. The traditional concept of call centers is all about making and receiving calls. If an agent solves the problems faced by the customer with the help of his voice over the phone then he is said to be working in a **Voice Based** process.

#### **Web Based:**

As time is changing rapidly, so is the technology. With the advent of internet, technology has improved a lot. So nowadays the customers really don't have to depend on the telephony system, in order to have their problems solved. Call centers also recruit people for working in their **web based processes**. These are nothing but the same category of customer service provided but not with the help of the voice or telephone system. This is done with the help of internet via emails. Thousand of people now a days are working for web based processes where they sit in front of the computer in order to receive emails from the customers. Any customer who is not capable of getting connected to a voice based agent over the telephone due to any reason, can email his problem that he is facing currently to an email address provided to him when he purchased the product from the company. This email reaches to the people sitting for the web based process without any telephone connection, and after finding out the correct solution these people send back the reply to the customer via reply emails.

In this case, the advantage is that even if the customer is not getting hold of the agents, working for the voice based part of the same process, he is not left alone without solving the problem. Although no direct contact between the agent and the customer is made, the problem is getting solved in the same fashion as in case of a voice based process.

c) **Customer-premises equipment or customer-provided equipment (CPE)** is any terminal and associated equipment and inside wiring located at a subscriber's premises and connected with a carrier's telecommunication channel(s) at the demarcation point

## POPULAR PUBLICATIONS

("demarc"). The demarc is a point established in a building or complex to separate customer equipment from telephone company equipment. CPE generally refers to telephones, DSL modems or cable modems, or purchased set-top boxes for use with communication service providers' services. Also included are key phone systems and most private branch exchanges. Excluded from CPE are over-voltage protection equipment and pay telephones. Cellular carriers may sometimes internally refer to cellular phones a customer has purchased without a subsidy or from a third party as Customer Provided Equipment.

**DSL or xDSL**, is a family of technologies that provide digital data transmission over the wires of a local telephone network. Typically, the download speed of consumer DSL services ranges from 256 kilobits per second (kbit/s) to 24,000kbit/s, depending on DSL technology, line conditions and service level implemented. On the customer side, the DSL modem is hooked up to a phone line. This converts data from the digital signals used by computers into a voltage signal of a suitable frequency range which is then applied to the phone line.

**Cable modem** is a type of modem that provides access to a data signal sent over the cable television infrastructure. Cable modems are primarily used to deliver broadband Internet access, taking advantage of unused bandwidth on a cable television network.

The term **set-top box** (STB) describes a device that connects to a television and some external source of signal, and turns the signal into content then displayed on the screen. The signal source might be an ethernet cable (see triple play), a satellite dish, a coaxial cable (see cable television); a telephone line (including DSL connections), Broadband over Power Line, or even an ordinary VHF or UHF antenna. Content, in this context, could mean any or all of video, audio, Internet webpages, interactive games, or other possibilities. A set-top box does not necessarily contain a tuner of its own. A box connected to a television (or VCR) set's SCART connector is fed with the baseband television signal from the set's tuner, and can ask the television to display the returned processed signal instead. Before cable-ready TV sets, a set-top box known as a cable converter box was used to receive analog cable TV channels and convert them to video that could be seen on a regular TV.

A **key system** or **key telephone system** is a multiline telephone system typically used in small office environments.

Key systems are noted for their expandability and having individual line selection buttons for each connected phone line, however some features of a private branch exchange such as dialable intercoms may also commonly be present.

A **Private Branch eXchange** (also called **PBX**, **Private Business eXchange** or **PABX** for **Private Automatic Branch eXchange**) is a telephone exchange that serves a particular business or office, as opposed to one a common carrier or telephone company operates for many businesses or for the general public.

Functionally, the PBX performs three main duties:

- Establishing connections (circuits) between the telephone sets of two users. (e.g. mapping a dialed number to a physical phone, ensuring the phone isn't already busy)
- Maintaining such connections as long as the users require them. (i.e., channeling voice signals between the users)
- Providing information for accounting purposes (e.g. metering calls)

**2. Write short notes on the following:**

a) Outsourcing

[WBUT 2007]

b) Call Centre

[WBUT 2007, 2010]

**Answer:**

**a) Outsourcing:**

Outsourcing is the process of shifting/delegating/transferring a service/process/function to a third-parties/external service provider which would otherwise be an in-house function/service/process. Outsourcing happens for two types of services. One is ITO or IT Outsourcing that involves an external service provider to manage a specific application, including all related activities like server management, networks administration, and software development/upgrades. The other is BPO or Business Process Outsourcing which involves a third party who manages the entire business process, such as accounting, financing, customer support or human resources. Outsourcing is different from contracting in the sense that in contracting there is no transfer of control whereas in outsourcing there is transfer of control. So to define outsourcing in the right way one has to compare it with contracting and sort out this important difference in the transfer of control.

**b) Call Centre:**

A call center is a physical place where customer and other telephone calls are handled by an organization, usually with some amount of computer automation. Typically, a call center has the ability to handle a considerable volume of calls at the same time, to screen calls and forward them to someone qualified to handle them, and to log calls. Call centers are used by mail-order catalog organizations, telemarketing companies, computer product help desks, and any large organization that uses the telephone to sell or service products and services.

# **SUPPLY CHAIN MANAGEMENT**

## **Multiple Choice Type Questions**

1. A/an ..... is a network that links selected resources of a company's internet with its customers, suppliers or other business partners. [WBUT 2009]

- a) internet
- b) extranet
- c) VPN
- d) wide area network

**Answer:** (b)

2. Supply Chain Management does not include [WBUT 2012]

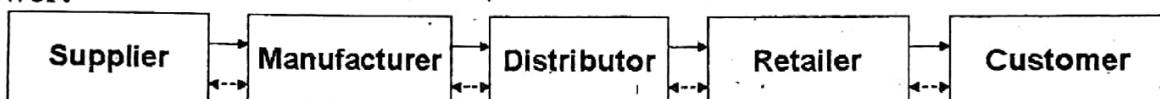
- a) Supplier management
- b) Inventory management
- c) Distribution management
- d) HR management

**Answer:** (d)

## **Short Answer Type Questions**

1. Discuss briefly a successful supply chain management of a car manufacturing company. [WBUT 2006]

**Answer:**



Supply Chain Management is Transformation of Strategy. It is the management of all activities that facilitate the fulfillment of a customer order for a manufactured good to achieve satisfied customers at a reasonable cost.

- Consists of all parties involved, directly or indirectly, in fulfilling a customer request
  - life of a product from 'birth to death'.
  - movement of tangible & intangible inputs

Efficient supply chains are designed for efficiency and low cost by minimizing inventory and maximizing efficiencies in process flow.

Responsive supply chains focus on flexibility and responsive service and are able to react quickly to changing market demand and requirements.

**The barometer of effective SCM is the**

Availability of

- The Right item
- In the Right quantity
- For the Right place
- At the Right time
- In the Right condition
- At the Right price

### **Successful Supply Chain**

- Trust among trading partners
- Effective communications
- Supply chain visibility
- Event-management capability
  - The ability to detect and respond to unplanned events
- Performance metrics.

With this perspective a car manufacturing company like Tata Motors company while launching their Nanao sometimes back in 2009 for advance order bookings with their dealers used linear demand model for production planning of parts and subassemblies with their upstream suppliers for Just-in-time delivery. As of 2010 end the car has launched and stabilized.. For demand analysis the equation  $Q_x = a P^b \times M^c P^d R^e N^f e$  is used to reduce order to delivery cycle time and to ensure no Bullwhip effect in the process. Bullwhip effect is the piling of excess inventory. Where,

$Q_x$  = Quantity demanded of a commodity

$P_x$  = Price of the item

$b$  = Change in quantity depending on price.

$M$  = Consumers income

$c$  = Change in quantity depending on income

$P_R$  = Price of the related item

$d$  = Change in quantity depending on substitutes

$N$  = Number of Buyers

$e$  = Change in qty. demand depending on no of buyers

### **2. Explain CRM and SCM.**

**OR,**

**Briefly discuss about supply chain management.**

**[WBUT 2007, 2011]**

**Answer:**

**Customer relationship management (CRM)** is a widely-implemented strategy for managing a company's interactions with customers, clients and sales prospects. It involves using technology to organize, automate, and synchronize business processes—principally sales activities, but also those for marketing, customer service, and technical support. The overall goals are to find, attract, and win new clients, nurture and retain those the company already has, entice former clients back into the fold, and reduce the costs of marketing and client service. Customer relationship management describes a company-wide business strategy including customer-interface departments as well as other departments.

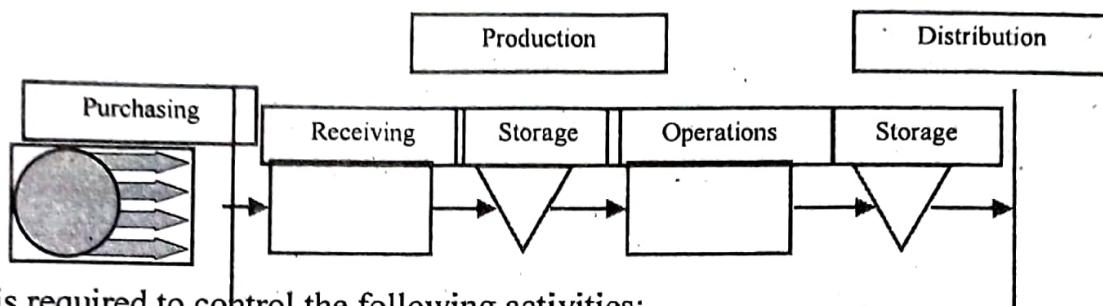
**Supply chain management (SCM)** is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers. Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption (supply chain).

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### 3. Draw supply chain diagram.

[WBUT 2008]

**Answer:**



SCM is required to control the following activities:

- Improve operations
- Increasing levels of outsourcing
- Increasing transportation costs
- Competitive pressures
- Increasing globalization
- Increasing importance of e-commerce
- Complexity of supply chains
- Manage inventories.

### 4. How does Supply Chain Management Portals help E-Commerce in managing supply chain?

[WBUT 2009]

**OR,**

**Explain how a supply chain portal works.**

[WBUT 2010]

**Answer:**

The big advantage of e-commerce is its contribution to reduction in costs. Firstly, the most economical supplier can be located quickly and the cost of processing transactions is reduced. Automobile giants like Ford, GM and Chrysler are setting up joint exchange to buy components from suppliers over the Internet. On the new economy front companies like Dell, Cisco is also doing likewise.

The e-Commerce portals attempt to do is to provide a similar platform for the business processes as would happen normally. For example, a buyer can go to a Website and can search and locate the right products and suppliers. The payment for the goods may be conventional or e-payment systems. From the suppliers point of view, use of portal helps him to reach out to more potential customers.

The major benefits of using horizontal e-commerce portals are with the greater and speedier availability of vendor information, the time for locating and evaluating Suppliers is much reduced.

Better pricing through access to vast supplier base and availing of discounts.

Reducing the cycle time in Supply Chain Management

Lower Inventory contributing to reduce the costs. Overall, it results in substantially lowering the procurement costs. The Goldman Sachs report states that doing business with suppliers on-line could reduce the cost of making a car as much as 14 percent. Industries like automobiles, manufacturing and retail among others have potential to benefit immensely through this approach.

## Need for Quality

The stress on quality over the entire Supply Chain is critical to success especially in the e-commerce arena where the time for transaction is drastically reduced. Ensuring quality in every link of the chain is necessary.

### 5. Distinguish between CRM and SRM.

[WBUT 2009, 2014, 2018]

#### Answer:

CRM stands for customer relationship management, whereas SRM indicates Supplier Relationship Management. SRM is a business process for managing all contracts between an organizational and its suppliers for supplies, materials, or services. There are three basic processes: source, purchase, and settle.

#### SRM - Sources

1. Find vendors
2. Assess capabilities
3. Negotiate terms and conditions
4. Formalize those terms and conditions
5. Make contract

#### SRM - Purchase

1. Request information, quotations, and proposals from would-be suppliers
2. Approve purchase
3. Create an order

#### SRM - Settle

1. Receive goods and services
2. Resolve receivables to order
3. Pay according to terms and policy
4. Cash management
5. Summary of SRM Processes

## Integration of CRM and SRM

SRM examines inventory, determines required items, and automatically creates the order via its connection to the supplier's

CRM Supplier's CRM application interfaces with the purchaser's SRM application to perform the ordering process as cheaply & efficiently as possible.

## Relationship between CRM and SRM

1. Data Exchange
2. Telephone call for message
3. Fax, postal mail, email for message and document
4. Electronic Data Interchange (EDI)
5. Extensible Markup Language (XML)
6. A standard of formats for electronically exchanging common business documents
7. Number of data fields
8. Sending sequence
9. Number of characters in each data field

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10. Standards with various versions
11. Point-to-point network, value-added network, or Internet
12. XML schema
13. A new markup language by World Wide Web Consortium (W3C)
14. A superior means for organizations to exchange documents for computer processing
15. Service description.

### **Long Answer Type Questions**

1. a) What do you mean by supply chain of ecommerce? [WBUT 2005]
- b) Why is supply chain management vital for e commerce?
- c) Explain the role played by e-supply chain planning tools in managing the supply chain of an e business. [WBUT 2005, 2010, 2011]
- d) How does supply chain management portals help e commerce in managing supply chain? [WBUT 2005]

**Answer:**

a) A **supply chain** is a system of organizations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials and components into a finished product that is delivered to the end customer. In the traditional supply chain, buying and selling materials means establishing long term relationships with vendors, distributors and retailers, with multiple inventory sites, long lead-times and fixed margins. In case of Ecommerce, companies can now buy and sell across a wide spectrum of emerging Internet enabled marketplaces.

b) Key supply chain activities include:

- Production planning
- Purchasing
- Materials management
- Distribution
- Customer service
- Sales forecasting.

These processes are critical to the success of any operation whether they are manufacturers, wholesalers, or service providers.

The performance measures for an Effective Supply Chain are two-fold a) Non-Financial Performance Measures and b) Financial Performance Measures. Among the Non-Financial Measures are i) Cycle Time ii) Customer Service Level iii) Inventory Levels. Among the Financial Measures, the main ones are i) cost of raw material ii) Inventory Costs and iii) Transportation. In the highly competitive environment today, cost reduction assumes a major importance.

c) The supply chain planning tools help in the following ways:

Strategic network design  
Demand planning  
Distribution planning  
Inventory planning  
Replenishment planning  
Manufacturing planning

d) Electronic exchange of information leads to reduction of errors and increased efficiency of the work processes. In practice, the exchange of information between companies is not as easy as it seems. Many different systems and standards are used, the number of peer-to-peer relations with other companies in the network is usually too large to manage, most systems are not open for easy exchange of information with other systems, and most companies are very reluctant to share information with other companies in the first place. A portal looks like a good solution to overcome these problems. A Supply Chain Portal is a web-based technical platform that integrates organizations, trading partners, and e-Market places to create real-time global visibility and decision making control over the virtual supply chain. The SC Portal is a gateway to information, applications, global data and defines common processes across a company's virtual trading community. Standardized interactions with one portal are easier to manage than are many peer-to-peer relations. The portal can take the role of a trusted party. What is needed to accomplish portal effectiveness is a review of the business processes when dealing with other companies.

**2. Write short notes on the following:**

a) SCE framework

[WBUT 2008, 2009, 2010]

b) SCM and its role in B2B E-commerce.

[WBUT 2008]

**Answer:**

a) **SCE framework:**

SCM covers all aspects of a business. From the stage of raw materials to the end user, each and every aspect of the cycle is covered by the management system- be it sourcing, product designing, production planning, order processing, inventory management, transportation and warehousing and customer service. However the entire SCE concept is based on two models via which execution is done.

They are:

- Push Model
- Pull Model

The push model is based on the fact that the product flow initiates from the manufacturer and comes to the customer via the intermediaries like the distributor, and the retailer. The schematic diagram is as follows.

- Push Model

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### **Push Model**

#### **Manufacturer**

1. Sets up a market research team for initial demand knowledge.
2. Checks inventory to see if the new product can be accommodated into the existing product stock level.
3. Manual sales order and invoice preparation.
4. Properly manages the shipping processes.

#### **Retail Distribution Center**

1. Checks the current stock level and see whether the new product can be accommodated.
2. Sets up a market research team for further pushing of the product into the market.
3. Deals, promotions and forward buying.
4. Manual purchase orders preparation for purchasing from the manufacturer, and information entry into the system.
5. Manual sales order preparation for selling to the retailer and information entry into the system.
6. Properly manages the shipping processes.

#### **Retailer**

1. Shows the product to the customer to create interest level and thus promoting the product.
2. Collecting feedback of the product from the customers.
3. Manual entry of items to be re-ordered.
4. Re ordering the item in case it is accepted by the customer.
5. Purchase orders preparation and invoicing.
6. Properly manages the shipping processes.

The pull model mainly generates from the customer and gradually reaches to the manufacturer via the distributor. Initially the company develops a sample of the product with the help of the research and development and delivers it to the market. The product sample is tested by the customers and they are asked to give specifications so that the "product customization" is possible. The product is thus pulled from the customers as per their choices. The schematic of the model development is described as follows.

#### **Retail Store**

1. Data collection from the customers about their preferences at the point of sale by them is more easy because they are in the direct contact with the customer.
2. Checking of the stock level inventory to see whether the product can be accommodated in the external as well as in the internal inventory
3. Informing the distributor about the specification of the product so that it can be forwarded to the manufacturer.
4. Preparing the manual purchase order for buying from the distributor.
5. Properly manages the shipping processes.

### **Distribution center**

1. Collects data from all the retailers underneath.
2. In case the distributor is channel partner of the manufacturer, the purchase order has to be prepared for buying from the manufacturer.
3. Checking the stock level to see the accommodation of the product to be manufacturer.
4. Passing the collective information to the respective manufacturer.
5. Properly manages the shipping processes.

### **Manufacturer**

1. Checks the Demand of the product based on data collection from the initial marketing team.
2. Checks the demand of the product from the retailers and the distributors.
3. Assesses the demand of the product through sample marketing.
4. Prepares a short cycle manufacturing.
5. Properly manages the shipping processes.

#### **b) SCM and its role in B2B E-commerce:**

**Supply chain management (SCM)** is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers. Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption (supply chain).

Before Internet, B2B transactions called just trade or procurement process. Total inter-firm trade: Total flow of value among firms. B2B commerce: All types of computer-enabled inter-firm trade

B2B e-commerce (Internet-based B2B commerce): That portion of B2B commerce that is enabled by the Internet.

The swift growth of the business to consumer e-tailing model induced many to believe that the benefits of online transacting could be acquired only through selling things online. Brick-and-mortar enterprises were frightened by pure-play (internet only) companies into hasty moves to establish virtual real estate.

E-commerce is selling things online, and is externally focused. Think Amazon.com. E-business means using the internet and online technologies to create operating efficiencies, and therefore increase value to the customer. It is internally focused. Think swift integration of planning, sourcing, manufacturing, management, execution, and selling using IT infrastructure.

## **E – PAYMENT MECHANISM**

### **Multiple Choice Type Questions**

1. .... is a credit card-sized device with an embedded microchip to provide electronic memory and processing capability. It can store the user's financial facts, health insurance data, credit card numbers and network identification codes anti passwords. [WBUT 2007]

- a) Electronic Cash
- b) Electronic Wallet
- c) Debit Card
- d) Smart Card

Answer: (d)

2. SET stands for [WBUT 2008, 2009, 2014, 2015, 2017, 2018]

- a) secure electrical transmission
- b) secure electronic telecommunication
- c) secure electronic transaction
- d) none of these

Answer: (c)

3. In electronic cash payment [WBUT 2009, 2014, 2018]

- I. a customer withdraws 'coins' in various denominations signed by the bank
- II. the bank has a database of issued coins
- III. the bank has a database of spent coins
- IV. the bank cannot trace a customer

- a) I, II
- b) I, II, III
- c) I, II, III, IV
- d) II, III, IV

Answer: (c)

4. The e-cash is generally stored in the customer's computer in the form of an

[WBUT 2010]

- a) e-chain
- b) e-money
- c) e-wallet
- d) none of these

Answer: (c)

5. What does EFT stand for?

[WBUT 2013]

- a) Electronic Finance and Transfer
- b) Electronic Fund Transport
- c) Efficient Funds Transfer
- d) Electronic Funds Transfer

Answer: (d)

6. Which of the following card contains a microprocessor and a storage unit?

[WBUT 2015]

- a) Smart Card
- b) Debit Card
- c) Credit Card
- d) None of these

Answer: (a)

7. Credit Card payment is under

[WBUT 2016]

- a) B2B e-commerce
- b) C2C e-commerce
- c) B2C e-commerce
- d) none of these

Answer: (d)

### **Short Answer Type Questions**

**1. What is a SET protocol?****[WBUT 2005, 2009, 2012]****Answer:**

SET (*Secure Electronic Transaction*) is a protocol that was developed by Visa and MasterCard and that uses the SSL standard. It enables credit card holders to pay for purchases while protecting their personal information, which includes both their account details and their purchasing habits. People today pay for online purchases by sending their credit card details to the merchant. A protocol such as SSL or TLS keeps the card details safe from eavesdroppers, but does nothing to protect merchants from dishonest customers or vice-versa. SET addresses this situation by requiring cardholders and merchants to register before they may engage in transactions. A cardholder registers by contacting a certificate authority, supplying security details and the public half of his proposed signature key. Registration allows the authorities to vet an applicant, who if approved receives a certificate confirming that his signature key is valid. All orders and confirmations bear digital signatures, which provide authentication and could potentially help to resolve disputes.

**2. What is an online payment? Explain the features that should be incorporated in online payment system.****[WBUT 2006]****Answer:****To transfer money over the Internet**

- Methods of traditional payment
- Check, credit card, or cash
- Methods of electronic payment
- Electronic cash, software wallets, smart cards, and credit/debit cards
- Scrip is digital cash minted by third-party organizations

**Requirements for e-payments**

- Atomicity
  - Money is not lost or created during a transfer
- Good atomicity
  - Money and goods are exchanged atomically
- Non-repudiation
  - No party can deny its role in the transaction
  - Digital signatures

**Types of E-payments**

- E-cash
- Electronic wallets
- Smart card
- Credit card

**3. Compare charge card with credit card.**

**[WBUT 2007, 2010]**

**Answer:**

Charge cards and credit cards are not the same thing, though the names are sometimes interchanged. A charge card is actually a type of credit card that requires one to pay his balance in full at the end of each billing cycle instead of making payments on the balance over several months. A credit card, on the other hand, allows to have a revolving balance that he can pay off over a period of time. Some charge cards don't have a preset credit limit, giving a limitless amount of credit. Credit cards do have a credit limit and there are penalties when one goes over credit limit. For example, one will pay an over-the-limit fee and sometimes pay a higher interest rate for exceeding the credit limit on the revolving credit card. A customer typically needs to have excellent credit to get a charge card. Few banks issue charge cards. In fact, American Express issues most charge cards. One won't pay any interest on a charge card balance because one is not allowed to carry a balance beyond the grace period. However, one will face a late fee if the full balance isn't paid by the due date, the late fee could be a flat fee or a percentage of the balance. Credit cards also have a late fee that's charged when one doesn't make the minimum payment by the due date. Charge cards don't have an interest rate, but credit cards do have an interest rate. In fact, the credit card interest rate is one of the most important credit card features since the interest rate directly influences how much one will pay for carrying a balance on the credit card. One can avoid paying interest on a credit card by paying the balance in full before the grace period ends. Charge cards usually have an annual fee that could be waived in the first year. Annual fees vary depending on the card but could be as high as \$500. Some credit cards also have an annual fee, but it's easy to find a credit card that doesn't have an annual fee. One can't do every type of transaction with a charge card. For example, one typically can't transfer balances or make cash advances on a charge card.

**4. How do SET transactions work? Explain with proper diagram.[WBUT 2007, 2014]**

**OR,**

**Discuss SET with suitable block diagram.**

**[WBUT 2008]**

**Answer:**

**Secure Electronic Transaction (SET)** is an open encryption and security specification designed to protect credit card transactions on the Internet. It describes how to securely process credit card transactions. SET supports real time transaction processing. It is actually a industry backed standard developed by master-card and visa. This standard was developed with the help of GTE, IBM, Netscape and Verizon. SET transactions can be carried out either through web or through e-mails. SET is not itself a payment system. Rather, it's a set of security protocols and formats enabling users to employ the existing credit card payment infrastructure on an open network, such as the Internet, in a secure fashion.

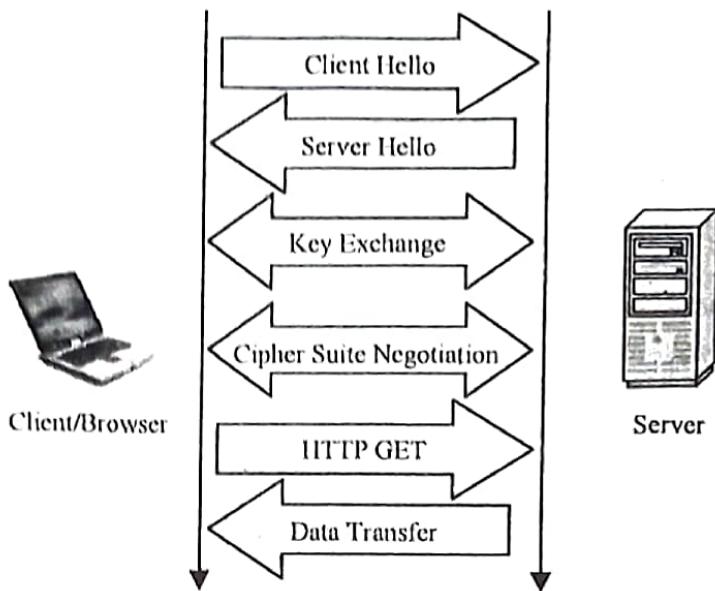
In essence, SET consists of two services:

- Providing a secure communications channel among all parties involved in a transaction.
- Providing trust by the use of X.509v3 digital certificates.

- Ensuring privacy because the information is only available to parties in a transaction when and where necessary.

SET is a dynamic, automated scheme that allows a customer with a credit card to order items over the Internet from merchants, in a secure fashion. A typical scenario goes like this:

1. ***The customer opens an account:*** The customer obtains a credit card account, such as MasterCard or Visa, with a bank that supports electronic payment and SET.
2. ***The customer receives a certificate:*** After suitable verification of identity, the customer receives an X.509v3 digital certificate, which is signed by the bank. The certificate verifies the customer's RSA public key and its expiration date. It also establishes a relationship, guaranteed by the bank, between the customer's key pair and his or her credit card. ***Merchants Have Their Own Certificates.*** A merchant who accepts a certain brand of card must be in possession of two certificates for two public keys owned by the merchant: one for signing messages, and one for key exchange. The merchant also needs a copy of the payment gateway's public-key certificate.
3. ***The customer places an order:*** This is a process that may involve the customer first browsing through the merchant's web site to select items and determine the price. The customer then sends a list of the items to be purchased from the merchant, who returns an order form containing the list of items, their individual prices, a total price, and an order number.
4. ***The merchant is verified:*** In addition to the order form, the merchant sends a copy of its certificate, so that the customer can verify that he or she is dealing with a valid store. This also shows that the merchant has acknowledged the request of the customer.
5. ***The order and payment are sent:*** The customer sends both an order and payment information to the merchant, along with the customer's certificate. The order confirms the purchase of the items in the order form. The payment contains credit card details. The payment information is encrypted in such a way that it cannot be read by the merchant. The customer's certificate enables the merchant to verify the customer.
6. ***The merchant requests payment authorization:*** The merchant sends the payment information to the payment gateway, requesting authorization that the customer's available credit is sufficient for this purchase.
7. ***The payment gateways authorize the payment:*** The credit card number received from the merchant is used by the payment gateway to verify the details of the customer with the help of the issuer, and accordingly accepts or rejects the payment.
8. ***The merchant confirms the order:*** The merchant sends confirmation of the order to the customer.
9. ***The merchant provides the goods or service:*** The merchant ships the goods or provides the service to the customer.
10. ***The merchant requests payment:*** This request is sent to the payment gateway, which handles all of the payment processing.



**5. Compare Charge card and Credit card.**

[WBUT 2008, 2009, 2010]

**Answer:**

Many people use the terms credit card and charge card interchangeably, but there are important differences. In general, a credit card lets one make purchases for which you are billed later. Most credit card accounts allow one to carry a balance from one billing cycle to the next; however, one have to pay interest on that balance. Usually, one have to pay at least a certain amount of one's balance each time one receive a bill.

A charge card is a specific kind of credit card. The balance on a charge card account is payable in full when the statement is received and cannot be rolled over from one billing to the next. Because one cannot carry a balance, a charge card doesn't have a periodic or annual percentage rate, so there is no rate for a charge card issuer to disclose.

**6. Distinguish between SSL and SET protocol.**

[WBUT 2011, 2013]

**Answer:**

**SET:** SET involves interaction among credit card holders, merchants, issuing banks, payment processing organizations, and public-key certificate authorities. SET is a complex specification defined in three "books" issued in May 1997, and running to nearly 1,000 pages. SET incorporates important features needed for secure credit-card transactions over the Internet:

**Confidentiality of information:** Cardholder account and payment information is secured as it travels across the network. An interesting and important feature of SET is that it prevents the merchant from learning the cardholder's credit card number; this is provided only to the issuing bank. Conventional encryption by DES is used to provide confidentiality.

**Integrity of data:** Payment information sent from cardholders to merchants includes order information, personal data, and payment instructions. SET guarantees that these message contents are not altered in transit. RSA digital signatures, using SHA-1 hash

codes, provide message integrity. Certain messages are also protected by the message authentication code HMAC, using SHA-1.

**Cardholder account authentication:** SET enables merchants to verify that a cardholder is a legitimate user of a valid card account number. SET uses X.509v3 digital certificates with RSA signatures for this purpose.

**Merchant authentication:** SET enables cardholders to verify that a merchant has a relationship with a financial institution allowing it to accept payment cards. SET uses X.509v3 digital certificates with RSA signatures for this purpose.

It is an internet protocol for secure, end to end exchange of information between a browser and a web server. It is sandwiched between the TCP/IP and the application layer. It was developed by Netscape corporation in 1994. It is supported by all major browsers in the WWW. Conceptually, SSL is visualized as an additional layer in the TCP/IP protocol suite. It provides security in two ways, in terms of confidentiality and authenticity at an application level. TCP/IP provides reliable packet transfer but SSL provides secure packet transfer. The SSL is preceded by the TCP/IP and the data link layer, which means that applications that use SSL will automatically avail the services of TCP/IP and DLL. Since SSL resides above the TCP/IP layer, so it can ensure secure communication between numerous application level protocols on the internet. However, SSL only secures web sessions and not the e-mail or file transfer sessions. This is one of the reasons why confidential information like credit card numbers is not exchanged via e-mail. In case of SSL, since the packet data is encrypted, so it can be viewed by the viewer while in transit, but cannot be deciphered. The SSL ensures secure data transfer, but it is not responsible for security of data residing in the web client or server. Thus only the application layer data is encrypted by SSL. Logically, SSL acts as a pipe between the web browser and a server.

SSL performs two functions. Firstly it authenticates the web sites and secondly it ensures secure data transmission between the web server and the client. This is achieved by using either symmetric encryption or asymmetric encryption.

## **7. Describe the electronic payment system for E-Commerce.**

**[WBUT 2018]**

**Answer:**

In e-commerce **payment system** facilitates the acceptance of **electronic payment** for online transactions. Also known as a sample of **Electronic Data Interchange (EDI)**, e-commerce **payment systems** have become increasingly popular due to the widespread use of the internet-based shopping and banking.

### **Types of Electronic payment System:**

#### **a) Affecting the consumers:**

Credit cards, Debit Cards, ATMs (Automated Teller Machines), Stored value cards, E-Banking.

#### **b) Enabling online commerce:**

Digital Cash, E-Cash, Smart cards (or Electronic Purse and encrypted Credit cards).

**Advantages of Utilizing an Electronic Payment System**

Many large global organizations are reaping the benefits from employing an electronic payment system, which include:

- **Day Sales Outstanding (DSO) Improvements:** For suppliers, an electronic payment system can immediately improve DSO numbers by allowing them to electronically receive and process payments from commercial customers.
- **Processing Cost Reduction:** A feature-rich electronic payment system lowers associate process time by automatically initiating and processing payments.
- **Minimize Overdue Payments:** A best-in-class electronic payment system accelerates credit and collections by giving customers, collections groups and internal customer service departments greater visibility into payment status.
- **Simplify Dispute Management:** With an electronic payment system, companies enjoy improved data accuracy and automated disbursement, receipt and payment processing to streamline vendor dispute management.
- **Increased Compliance:** An electronic payment system makes it easier to track and monitor data to ensure adherence to complex compliance regulations and all business rules.
- **Enhanced Security:** An electronic payment system is highly secure, safeguarding cardholder data and preventing payment fraud better than paper-based payments can achieve.
- **Improved Workflow Efficiencies:** Increased automation is a key feature of a robust electronic payment system, enabling less reliance on time-consuming and costly manual business processes.
- **Greater Visibility into Financial Supply Chain:** With access to reports and comprehensive corporate financial history, an electronic payment system gives management and other authorized users easy access to snapshots and detailed reports to improve decision-making and process efficiency.

**Long Answer Type Questions**

1. a) **What is e cash? Explain in brief the steps involved in the operation of e-cash by an individual.** [WBUT 2005, 2010]

b) **What are the security requirements for safe E-payments?**

**OR,**

**What are the requirements for e-payment mechanism?** [WBUT 2005, 2010, 2011]

**Answer:**

a) **Electronic** refers to money or scrip which is only exchanged electronically. It is a electronic counterpart of real cash. E-cash is used over the Internet, email, or personal computer to other workstations in the form of secured payments of "cash" that is virtually untraceable to the user. It is backed by real currency from real banks.

The following steps need to be performed:

1. The customer opens an account with the bank (the currency server), and maintains enough cash (real cash) there to proceed further.

2. The customer has software known as e cash software at his place which he uses to generate "e-cash". Before that he needs to determine what are the denominations of the e-cash he needs. Then he uses his s/w to generate a random number and a blinding factor. The blinding factor is very secret to the customer and only he knows it.
  3. The customer sends the random no+ blinding factor to the bank, which in turn
  4. Signs the document digitally, and gives it back to the customer. This digitally signed document is now authenticated by the bank and can be termed as "notes". The bank is unable to see the blinding factor; it only sees the random number generated.
  5. When the digitally signed document containing the random no +blinding factor reaches to the customer, he takes of the blinding factor and uses the rest as a "note". It is authenticated by the bank so it is valid. Now the customer sends the document to the merchant.
  6. The merchant receives the random numbers digitally signed by the bank which authenticates the validity of the customer. He then contacts the bank, who has a database for storing the customer's e-cash. It first enquires the random numbers in the e-cash, authenticates the digital signature (the digital signature was computed with the help of the private key of the bank), and the merchant receives real cash against the document from the account of the customer in the bank.
  7. No one can cheat in this system. The customer can't say he hasn't send the random numbers because the blinding factor was included which was very specific to him (**Non repudiation**). The bank cannot **cheat** on the customer's money because it is unaware of the **blinding factor**. The merchant cannot **cheat** because he cannot forget the **bank's digital signature**.
  8. There is a question of double spending here. The bank maintains a database of spent notes of the customer. When a customer issues bank notes, it is issued to that person's **unique license**. When he gives it to someone else, it is transferred to the other person's license. Each time the currency **changes hands**, the owner adds a tiny bit of information to the bank note based on the bank note's **serial number and his license**. If someone tries to spend the money twice, the bank would be able to understand who the cheater is. **Thus double spending is checked.**
- b) The customer security while sending credit card information including name, card number and expiry date through Internet. Most of the companies use SSL (Secured Socket layer) protocol to provide security and privacy. Visa and MasterCard have jointly developed a more secure protocol, called SET (Secure Electronic Transmission). Typical Electronic payment systems are EC- Electronic credit card, EFT, debit card, stored-value card, and e-check. Four essential security requirements for safe e-payments are Authentication, Encryption, Integrity, and Non repudiation. SET (Secure Electronic Transmission) is theoretically a perfect protocol.
- 1) Implicit acknowledgment of mailbox delivery of the EDI Interchange to the recipient.
  - 2) Explicit acknowledgment that the receiver has authenticated the sender and verified the integrity of the sent EDI Interchange.

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- 3) Guarantees non-repudiation of receipt when the signed receipt is digitally signed by the receiving trading partner, and successfully verified by the sender.
- 4) Provide information in the signed receipt so it can be used for tracking, logging, and reconciliation purposes.

The re-transmission timer, and retry count to detect lost Interchanges should be configurable.

## **2. Describe the method of payments using card system and elaborate on the payment threats and ways of combating it. [WBUT 2006, 2011]**

**Answer:**

### **To transfer money over the Internet**

- Methods of traditional payment
  - Check, credit card, or cash
- Methods of electronic payment
  - Electronic cash, software wallets, smart cards, and credit/debit cards
  - Scrip is digital cash minted by third-party organizations

### **Requirements for e-payments**

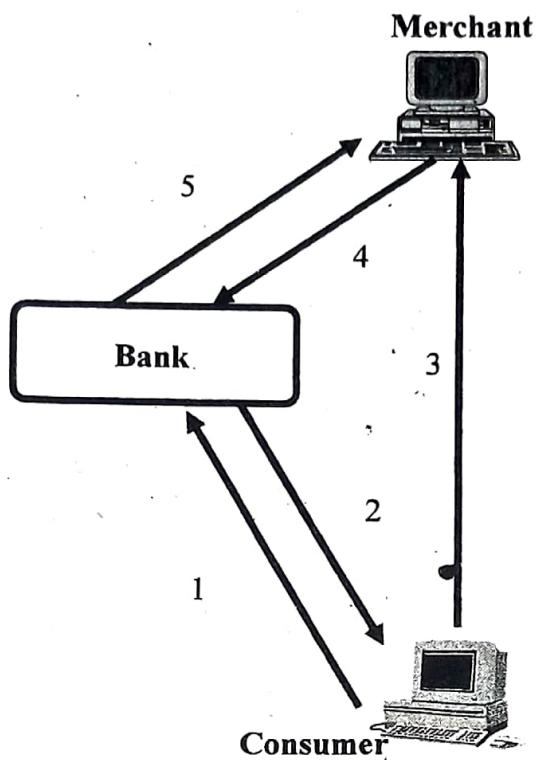
- Atomicity
  - Money is not lost or created during a transfer
- Good atomicity
  - Money and goods are exchanged atomically
- Non-repudiation
  - No party can deny its role in the transaction
  - Digital signatures

### **Types of E-payments**

- E-cash
- Electronic wallets
- Smart card
- Credit card.

### ***E-cash Concept***

1. Consumer buys e-cash from Bank
2. Bank sends e-cash bits to consumer (after charging that amount plus fee)
3. Consumer sends e-cash to merchant
4. Merchant checks with Bank that e-cash is valid (check for forgery or fraud)
5. Bank verifies that e-cash is valid
6. Parties complete transaction: e.g., merchant present e-cash to issuing bank for deposit once goods or services are delivered



*Consumer still has (invalid) e-cash*

#### Electronic Cash Security

- Complex cryptographic algorithms prevent double spending
  - Anonymity is preserved unless double spending is attempted
- Serial numbers can allow tracing to prevent money laundering
  - Does not prevent double spending, since the merchant or consumer could be at fault

#### 3. a) What is Digital Cash or E-Cash?

[WBUT 2018]

**Answer:**

*Refer to Question No. 1(a) (1<sup>st</sup> Part) of Long Answer Type Questions.*

#### b) Describe the methods of payments using card system and elaborate on the payment threats and ways of combating it.

[WBUT 2018]

**Answer:**

The different types of e-commerce payments using card system in use today are:

- The most popular form of payment for e-commerce transactions is through **Credit Cards**. It is simple to use; the customer has to just enter their credit card number and date of expiry in the appropriate area on the seller's web page. To improve the security system, increased security measures, such as the use of a card verification number (CVN), have been introduced to on-line credit card payments. The CVN system helps detect fraud by comparing the CVN number with the cardholder's information.
- **Debit Cards** are the second largest e-commerce payment medium in India. Customers who want to spend online within their financial limits prefer to pay with

their Debit cards. With the debit card, the customer can only pay for purchased goods with the money that is already there in his/her bank account as opposed to the credit card where the amounts that the buyer spends are billed to him/her and payments are made at the end of the billing period.

- **Smart Card** is a plastic card embedded with a microprocessor that has the customer's personal information stored in it and can be loaded with funds to make online transactions and instant payment of bills. The money that is loaded in the smart card reduces as per the usage by the customer and has to be reloaded from his/her bank account.
- **E-Wallet** is a prepaid account that allows the customer to store multiple credit cards, debit card and bank account numbers in a secure environment. This eliminates the need to key in account information every time while making payments. Once the customer has registered and created E-Wallet profile, he/she can make payments faster.

**Disadvantages of using card system:**

***The Risk of Fraud***

Electronic payment systems are not immune to the risk of fraud. The system uses a particularly vulnerable protocol to establish the identity of the person authorizing a payment. Passwords and security questions aren't foolproof in determining the identity of a person. So long as the password and the answers to the security questions are correct, the system doesn't care who's on the other side. If someone gains access to your password or the answers to your security question, they will have gained access to your money and can steal it from you.

***The Risk of Tax Evasion***

The law requires that businesses declare their financial transactions and provide paper records of them so that tax compliance can be verified. The problem with electronic systems is that they don't fit very cleanly into this paradigm and so they can make the process of tax collection very frustrating for the Internal Revenue Service. It is at the business's discretion to disclose payments received or made via electronic payment systems in a fiscal period, and the IRS has no way of knowing if it's telling the truth or not. That makes it pretty easy to evade taxation.

***The Risk of Payment Conflicts***

One of the idiosyncrasies of electronic payment systems is that the payments aren't handled by humans but by an automated electronic system. The system is prone to errors, particularly when it has to handle large amounts of payments on a frequent basis with many recipients involved. It's important to constantly check your pay slip after every pay period ends in order to ensure everything makes sense. Failure to do this may result in payment conflicts caused by technical glitches and anomalies.

The several measures that can be taken in order to ensure security are:

**1. EMV Compliance:**

EMV, also known as a chip card or a smart card, has become the global standard for credit and debit cards that's based on microchip technology that was developed by Europay, MasterCard© and Visa© to enable acceptance of secure payment transactions. The microchip technology contains better security features than those available for the long-used magnetic stripe credit and debit cards. The chip enables cryptographic processing, helping to keep data safe from identity thieves and those hoping to commit fraudulent transactions with the credit card information they steal. By migrating to acceptance of EMV cards only, companies will be able to further protect yourself. While not everyone in the U.S. has EMV cards yet, there is growing acceptance of this new technology as consumers and businesses that use credit cards appreciate the additional security offered.

**2. PCI Standards:**

The Payment Card Industry (PCI) Data Security Standard was put into place to protect consumers and businesses by creating a certain regulatory framework that provides a universal standard for how to handle, use, and store credit card information. These standards came about in response to the numerous data breaches among large and small retailers and were developed in order to help companies detect, react, and prevent future data breaches. Non-compliance not only leads to large fines from credit card association members like Visa and MasterCard, but it also puts the business in a vulnerable position for greater security threats.

**3. Tokenization**

This security measure provides a way to not have to collect or store any sensitive information on the operating system. Instead, only minimal information is sent like authorization codes and transaction IDs. Tokenization takes the sensitive data and replaces it with a randomly generated string of characters that can then be linked back to the original data only by an authorized party. Not only does this work well with PCI compliance, which states that one should not store any data on the system, but it also makes the business less vulnerable to criminals that want to get that information.

**4. End-to-end Encryption and Secure Sockets Layer (SSL) Protocol:**

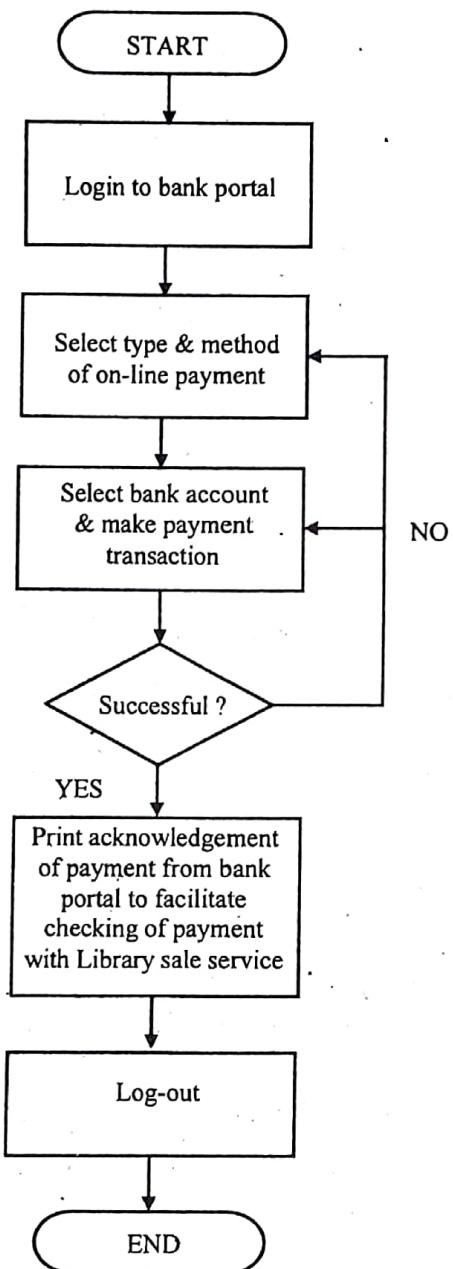
This security method helps to ensure that all data remains secure as it goes from a card reader or other processing form to its destination. The finish line is typically the processor who confirms and accepts the payment so that it can pass the funds onto the business for that transaction. In addition to encryption keys, mobile and online payment systems should include Secure Sockets Layer (SSL) protocol, which helps add further layers to the security wall to keep hackers away from sensitive data.

**5. Biometrics:**

This security method relies on biological identification measures that are unique to a particular individual, such as fingerprint scanning, iris/retina scanning, facial imaging,

vein patterns, voice recognition, finger/hand geometry, DNA matching, and ear, gait, and/or odor recognition. While criminals will try tactics like fake fingers, they will find it difficult to get a person's biometric data in order to even copy it. Fingerprint recognition is already used among many banks and payment companies, including PayPal, Capital One, and Apple Pay, which means many people are already accustomed to using this security method.

c) Draw a flow chart showing transaction flow in E-Cash system. [WBUT 2018]  
Answer:



d) What is E-Cash? What are its advantages and disadvantages? [WBUT 2018]  
Answer:

1<sup>st</sup> Part: Refer to Question No. 1(a) (1<sup>st</sup> Part) of Long Answer Type Questions.

**2<sup>nd</sup> Part:**

**Advantages:**

- Anonymity and non-traceability can be maintained with e-cash.
- User ids are kept highly confidential.
- There are hardly any issues regarding "double spending".
- Real-time checking of all transactions makes the possibility of multiple expenditures negligible.
- There is no requirement of additional secure hardware.
- The existing POS (point of sale) hardware can be updated and used.

**Disadvantages:**

- There are communication overheads; security and anonymity cost become a bottleneck of the system. This can happen at times during real-time verifications.
- The bank has to maintain massive, detailed, and confidential databases.
- The bank needs to synchronize its server every time transaction is made. It would be insanely impractical to maintain.

**4. Write short notes on the following:**

- a) E-cash [WBUT 2005]  
b) Online Payment [WBUT 2009]  
c) Smart Card [WBUT 2009, 2015, 2017, 2018]  
d) Credit card and RuPay card [WBUT 2017]

**Answer:**

**a) E-cash:**

*Refer to Question No. 1(a) of Long Answer Type Questions.*

**b) Online Payment:**

*Refer to Question No. 2 of Short Answer Type Questions.*

**c) Smart Card:**

A **smart card**, **chip card**, or **integrated circuit card (ICC)**, is any pocket-sized card with embedded integrated circuits. There are two broad categories of ICCs. Memory cards contain only non-volatile memory storage components, and perhaps dedicated security logic. Microprocessor cards contain volatile memory and microprocessor components. The card is made of plastic, generally polyvinyl chloride, but sometimes acrylonitrile butadiene styrene or polycarbonate. Smart cards may also provide strong security authentication for single sign-on (SSO) within large organizations.

**d) Credit Cards:**

A **credit card** is a small plastic card issued to users as a system of payment. It allows its holder to buy goods and services based on the holder's promise to pay for these goods and services. The issuer of the card creates a revolving account and grants a line of credit to the consumer (or the user) from which the user can borrow money for payment to a merchant or as a cash advance to the user. Holders of a valid credit card have the

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authorization to purchase goods and services up to a predetermined amount, called a credit limit. The vendor receives essential credit card information from the cardholder, the bank issuing the card actually reimburses the vendor, and eventually the cardholder repays the bank through regular monthly payments. If the entire balance is not paid in full, the credit card issuer can legally charge interest fees on the unpaid portion.

### **RuPay card:**

RuPay is a combination of two words – Rupee and Payment. It is very similar to international cards such as Visa/Master. It was launched by the National Payments Corporation of India (NPCI) and this was done with the intention of integration of payment systems in the country. It has also tied up with Discover Financial Services firm for promoting this. RuPay debit cards are similar any other debit cards that one might hold now. Users can access them in the 1.45 lakh ATMs and 8.75 lakh POS terminals across the country.

It will also be accepted on 10,000 e-commerce websites. All major public sector banks, including SBI, have started issuing these cards to all their customers. The card also comes with a high end technology chip named EMV (Europay, Master Card and Visa) especially for high end transactions. It also has an embedded micro processor circuit with information about the card holder. Some of the benefits are

Lower transaction cost – International transactions lead to higher transaction costs. Such costs can be reduced by using RuPay cards since processing will be done within the country. Also, transactions will be faster.

SMS alerts – Users will get alerts for every transaction made through this card.

Reduced processing fees – Processing fees for RuPay cards compared with regular debit/credit cards will be considerably lower.

# **E – MARKETING**

## **Multiple Choice Type Questions**

**1. Industry Consortium is an example of**

- a) Independent type e-market place
- c) Purchase oriented e-market place

Answer: (d)

[WBUT 2007, 2009]

- b) Sales oriented e-market place
- d) Third party operated e-market place

**2. In the ..... phase, a business relies on CRM software tools and databases to help the company proactively identify and reward its most loyal and profitable customers to expand their business via targeted marketing and relationship marketing programs.**

- a) acquire
- b) enhance

- c) retain

- d) all of these

Answer: (c)

[WBUT 2013]

**3. Online Marketing consist of \_\_\_\_\_ Models.**

- a) six
- b) two

- c) four

[WBUT 2014]

- d) three

Answer: (c)

**4. Example of Vertical Market**

- a) real estate
- b) banking

- c) E-Mall

[WBUT 2014]

- d) both (a) and (b)

Answer: (d)

**5. ..... marketing is the internet version of word-of-mouth marketing.**

[WBUT 2016]

- a) Viral
- b) Visceral
- c) Virtual

- d) Virile

Answer: (c)

## **Short Answer Type Questions**

**1. Discuss, in brief, what do you mean by electronic market? [WBUT 2005, 2011]**

OR,

**What is electronic market?**

[WBUT 2006, 2007, 2011, 2015, 2018]

OR,

**Discuss on e-market.**

[WBUT 2012]

**Answer:**

Electronic markets are the foundation of electronic commerce. They potentially integrate advertising, product ordering, delivery of digitizable products, and payment systems. An electronic marketplace (or electronic market system) is inter organizational information system that allows the participating buyers and sellers to exchange information about prices and product offerings. The firm operating the system is referred to as the intermediary, which may be a market participant - a buyer or seller, an independent third party, or a multi-firm consortium (Bakos, 1991). E-markets provide an

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electronic, or on-line, method to facilitate transactions between buyers and sellers that potentially provides support for all of the steps in the entire order fulfillment process. The business process model from a consumer's perspective consists of activities that can be grouped into three phases: pre purchase determination, purchase consummation, and post purchase interaction (Kalakota and Whinston, 1996). Each of these phases can be supported electronically in a complete e-market, but e-markets today generally support only the pre purchase determination activities, although they are moving toward more purchase consummation.

### **2. Name some of the advantages of E-marketing over normal marketing.**

[WBUT 2005, 2011]

**Answer:**

The advantages of e-marketing over normal marketing are:

- Reduction in cost through automation and use of electronic media
- Faster response to both marketers and customers
- Increased ability to measure and collect data
- Increased interactivity
- Global audience
- Convenience
- Effectiveness measurements
- Accountability
- Scope
- Adaptivity and closed loop marketing
- 24 hour out there on stage
- Instant purchase functionality.

### **3. What is quality management?**

[WBUT 2011]

**Answer:**

Quality management takes place before, during and after the creation and deployment of the new software. Charts will be made and the software will be tested against business expectations, such as whether the software processes data and stores it correctly, or retrieves and displays correct information to the user. End users will provide feedback and comments about the user-friendliness of the software and any glitches they may experience. Quality assurance involves monitoring the financial costs of building the software, such as the hours put in by programmers, networking staff and the project management team. The project manager will measure the successfulness of the software creation project by analyzing final reports.

### **4. a) What are the reasons behind the growing importance of e-advertisement?**

### **b) What are the different types of web-advertising?**

[WBUT 2012]

**Answer:**

a) **Advertising** is a form of communication for marketing and most commonly, the desired result is to drive consumer behavior with respect to a commercial offering. Online

advertising is a promotional activity through Internet and World Wide Web. Usage of www is increasing in a lightning speed and it is the most popular medium to put up any kind of promotional activities. Marketing messages can be delivered to attract customers. Online ads are delivered by an ad server. Commercial advertising media can include billboards, web banners, mobile telephone screens, shopping carts, web pop-ups, skywriting.

b) Online advertisements include contextual ads that appear on search engine results pages, banner ads, in text ads, Rich Media Ads, Social network advertising, online classified advertising, advertising networks and e-mail marketing which also includes e-mail spams.

**5. How do reverse auctions differ from regular auctions? How do reverse auctions work in e-market place?** [WBUT 2013, 2018]

**Answer:**

**1<sup>st</sup> Part:**

A type of auction in which sellers bid for the prices at which they are willing to sell their goods and services. In a regular auction, a seller puts up an item and buyers place bids until the close of the auction, at which time the item goes to the highest bidder. In a reverse auction, the buyer puts up a request for a required good or service. Sellers then place bids for the amount they are willing to be paid for the good or service, and at the end of the auction the seller with the lowest amount wins.

**2<sup>nd</sup> Part:**

Reverse Auction is a tool available for the procurement in improving its function as well as its effectiveness. It can be defined as specialized auction that allows the organization to procure goods from the sources by featuring decreasing incremental bidding.

In other words it is exactly opposite to the common auction that we see against which the goods are sold. It is a process, reverse to the common auction (forward auction) and as such it is called as reverse auction.

Reverse auctions, as the name implies, are not run like traditional auctions. In most auctions, a seller offers a good or service. Bidders offer prices and compete with one another in a way that drives the price up. At the end of the auction, the highest bidder wins the item. With reverse auctions, things are different. First, the buyer is the one who starts the auction. The buyer creates a description of his particular needs. He also decides the exact specifications for these items along with his requirements & terms & conditions, & the same is called as RFQs. Next, the sellers are the ones who place bids during the auction. Prescreening of suppliers is essential to have responsible established competitors who offer desired quality products. Their bid is based on how much they would charge to fulfill the buyer's needs. An online auction service provider conducts the process through a secure website where an electronic solicitation is issued with unique & special requirements. Suppliers (vendors) are required to pre register with the auction service provider & receive training in how to participate. All bidders must agree to abide by the terms & conditions of the auction service. All participating vendors are notified

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start time & closing time of auction. Bidders submit their price remotely from their offices. Bidders names are masked & they can see prices real time to know status of their bid. Then, the competition between the sellers ends up driving the prices down, instead of up, so the buyer pays less. Buyer also watches the bidding process from his office. Identity of bidders is available only to auction service & buyer. Finally, the buyer chooses the winning bidder. The winner is not necessarily the highest or the lowest bidder but is selected by the buyer on the basis of a number of factors. Price is often an important one. With reverse auctions, the buyer simply posts his request online, invitations to pre-selected vendors are distributed automatically by email, interested sellers place their bids, and the buyer can compare prices, qualifications, and other factors at a glance.

### **Long Answer Type Questions**

- 1. What is tele marketing & online marketing? How e-commerce differs from m-commerce?** [WBUT 2015]

**Answer:**

**1<sup>st</sup> part:**

**Telemarketing** sometimes known as inside sales, or **telesales**. It is a method of direct **marketing** in which a salesperson solicits prospective customers to buy products or services, either over the phone or through a subsequent face to face or **Web** conferencing prior arrangement scheduled during the call. Telemarketing, as it was the case with telephone operators, is one of the fields known to be occupied mostly by women although no scientific evidence supports this statement.

**Online marketing** refers to the techniques available to a business to **market**, promote and advertise their products, services or brand on the WWW or online advertising, is any tool, strategy or method of getting the company name out to the public. There are two main sub channels of **online marketing** that utilize different angles to help a business promote themselves **online**. However, online marketing is an essential part of running a successful business in today's digital world.

**2<sup>nd</sup> part:**

Let us first define the terms E-Commerce and M-commerce and then establish the difference.

**E-Commerce:** It is in use since 1970's. Any kind of commercial transaction that is concluded, over the internet using electronic system is known as e-commerce. it is available only in those places where there is internet along with electricity.

**M-commerce:** It is in use since 1990's. M-commerce refers to the commercial activities which are transacted with the help of wireless computing devices such as cell phone or laptops. Broad due to its portability

Buyers do not agree to wait in queue for a long time just to buy a single article. However, traditional commerce demands that, but every next person uses the latest mode of trading i.e. **electronic commerce (e-commerce)** and **mobile commerce (m-commerce)**. The former refers to the buying and selling of products and services with the use of electronic

systems such as the internet. The latter is an extension over the former, in which the commercial activities are conducted, through telecommunication devices.

**2. Write short notes on the following:**

- a) E- logistic
- b) Vertical Market

[WBUT 2011]  
[WBUT 2014]

**Answer:**

**a) E-Logistic:**

E-Logistics represents the foundation for improved business processes. It is concerned with the redesigning of warehousing and product distribution methods using technology of e-business and the entire process is software based. E-Logistics allows customers to track the real time shipping status of the product. Companies can even extend E-logistics to retail unit level along with the other facilities. They can track the inventory movement in retail stores through vendor managed inventory systems. The information can be used to improve product distribution to the stores as well as to enhance collaborative planning among the members of the supply chain. It enables all suppliers in the supply chain to identify and co-ordinate data transfers with each other. It also allows real time visibility, seamless channel linkage and collaborative solutions in the supply chain.

**Examples of E-Logistics**

- electronic links to government agencies for import/export documents
- online filing for registration of new drugs.

In the future, the company may outsource most of their e-logistics activity to distribution companies like FEDEX AND UPS, so that they can focus on the own element of value addition in the value chain.

**Benefits of E-Logistics**

The several benefits of E-Logistics are as follows:

- It is the most new form of logistics. The web permits improvements in both procurement and fulfillment particularly in terms of stock availability and on time delivery with the help of E-Logistics. It helps to procure raw materials faster and in an efficient way and delivery from the supplier to the company or to the warehouse, and then from the warehouse to the retailer and finally to the customer in a better and much efficient way.
- At the warehouse and distribution level, E-Logistics provide facilities for inventory control at the individual shipment or even item level. The distribution and the warehouse centers must have the flexibility to meet the diverse requirements of the customers. Also inventory visibility and information transparency are major areas of importance in E-Logistics.
- E-Logistics also improves the delivery of goods and services at reduced costs through the development of methods for supply chain management including advances in the data management and increasingly sophisticated planning and scheduling systems.

E-Logistics enables organizations to see the overall status of the different phases of logistics at a time and can be accessed by all users.

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### b) Vertical Market:

A vertical market is where vendors offer salable items and services specific to an industry and trade. It is differentiated from a horizontal market, in which vendors offer a broad range of goods and services to a large group of customers with a wide range of needs, such as businesses as a whole. The single defining characteristic of the participants in a vertical market is competition within a well-defined segment.

The activities of participants in a vertical market is similar with the aim in solving the similar problems. These markets are typically competitive, due to the overlapping focuses of the products and services that are offered to the customers.

Precisely A vertical market is a particular industry or group of enterprises in which similar products or services are developed and marketed using similar methods (and to whom goods and services can be sold).

Vertical market software is software aimed at addressing the needs of any given business within a discernible vertical market. It can be contrasted with horizontal market software such as word processors and spreadsheet programs that can be used in a cross-section of industries. Some common examples of vertical markets are:

1. Banking
2. Education
3. Oil and Gas
4. Fast-Moving Consumer Goods (FMCG)
5. Food and beverage
6. Healthcare
7. Insurance
8. Real estate

# **ELECTRONIC DATA INTERCHANGE (EDI)**

## **Multiple Choice Type Questions**

- 1. Which one of the following are components of EDI systems? [WBUT 2007]**
- a) Standards
  - b) Software
  - c) Communication Networks
  - d) All of these
- Answer:** (d)
- 2. Asymmetric encryption uses [WBUT 2007, 2009]**
- a) Public Key
  - b) Private Key
  - c) Both of these
  - d) None of these
- Answer:** (c)
- 3. RSA algorithm deals with [WBUT 2008, 2009, 2015, 2017]**
- a) Cyber law
  - b) encryption
  - c) EDI
  - d) digital signature
- Answer:** (b)
- 4. The full form of VADS is [WBUT 2008]**
- a) Virtual Added Data Service
  - b) Value Added Data Service
  - c) Virtual Area Data Services
  - d) Virtual Added Digital Services
- Answer:** (b)
- 5. EDI is used for [WBUT 2008]**
- a) Regular repeat transaction
  - b) Credit transaction
  - c) Cash transaction
  - d) Irregular repeat transaction
- Answer:** (a)
- 6. Which one of the following is not a component of EDI system? [WBUT 2008]**
- a) Software
  - b) Standards
  - c) Communication Networks
  - d) None of these
- Answer:** (d)
- 7. Which one is not an EDI standard? [WBUT 2008, 2009]**
- a) ODETTE
  - b) TRADACOMES
  - c) ANSI X12
  - d) ANSI 24
- Answer:** (d)
- 8. A key is a [WBUT 2008, 2009]**
- a) Value
  - b) Logic
  - c) Function
  - d) All of these
- Answer:** (a)
- 9. Public key encryption method is a system [WBUT 2009]**
- a) which uses a set of public keys one for each participant in e-commerce
  - b) in which each person who wants to communicate has two keys; a private key known to him only and a public key which is publicized to enable others to send message to him
  - c) which uses the RSA coding system

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d) which is a standard for use in e-commerce

Answer: (b)

10. EDI requires

[WBUT 2009]

- a) representation of common business documents in computer readable form
- b) data entry operators by receivers
- c) special value added networks
- d) special hardware at co-operating business premises

Answer: (a)

11. EDI standard example is

[WBUT 2010]

- a) X12
- b) X.435

c) UN/EDIFACT

d) DISH

Answer: (c)

12. Symmetric encryption involves

[WBUT 2010]

- a) Public key
- b) Private key

c) both of these

d) none of these

Answer: (d)

13. .... occurs when one business transmits computer-readable data in a standard format to another business.

[WBUT 2010]

- a) EFT
- b) VAN

c) EDI

d) LAN

Answer: (c)

14. In RSA algorithm ..... numbers are involved.

[WBUT 2010]

- a) odd
- b) even

c) prime

d) All of these

Answer: (c)

15. Kerberos is a popular

[WBUT 2012]

- a) 1st party protocol
- c) 3rd party protocol

b) 2nd party protocol

d) 4th party protocol

Answer: (c)

16. Data Encryption Standard (DES) uses

[WBUT 2012]

- a) 32 bit encryption key
- c) 64 bit encryption key

b) 56 bit encryption key

d) 128 bit encryption key

Answer: (c)

17. Which one is not a security tool available to protect e-commerce websites from external or internal threats?

[WBUT 2012]

- a) Buffering
- c) Virtual Private Network

b) Network Security Protocol

d) Tunneling

Answer: (a)

18. EDI stands for

[WBUT 2013, 2014, 2017]

- a) Electronic Digital Interchange
- c) Electronic Data Interface

b) Engineering Digital Interaction

d) Electronic Data Interchange

Answer: (d)

19. x.509 certificate is an example of [WBUT 2014]  
 a) public key certificate  
 b) private key certificate  
 c) both (a) and (b)  
 d) none of these

Answer: (a)

20. International Data Encryption Algorithm (IDEA) uses [WBUT 2014]  
 a) 127 Bit key for encryption  
 b) 128 Bit key for encryption  
 c) 129 Bit key for encryption  
 d) none of these

Answer: (b)

21. EDI requires [WBUT 2014, 2018]  
 a) Representation of common business documents in computer readable form  
 b) data entry operators by receivers  
 c) special value added networks  
 d) special hardware at co-operating business premises

Answer: (c)

22. The number of rounds in DES is [WBUT 2015]  
 a) 8                              b) 16                              c) 32                              d) 64

Answer: (b)

23. In public key encryption if A wants to sent an encrypted message [WBUT 2015]  
 a) A encrypts message using his private key  
 b) A encrypts message using B's private key  
 c) A encrypts message using B's public key  
 d) A encrypts message using his public key

Answer: (c)

24. Which one of these is a protocol for secure messaging? [WBUT 2017]  
 a) PGP                              b) PEM                              c) S/MIME                              d) All of these

Answer: (a)

25. SHA is more secure than MD5 by the factor of [WBUT 2018]  
 a)  $2^{16}$                               b)  $2^{64}$                               c)  $2^2$                                       d)  $2^{32}$

Answer: (c)

26. If  $Z = 160$  and  $\Xi = 7$ , then for what value of D,  $(ED \bmod Z = 1)$  will be satisfied? [WBUT 2018]  
 a) 33                                      b) 22                                      c) 45                                      d) 23

Answer: (d)

27. Use the SHIFT CIPHER with key = 17 to encrypt the message "WBUT". The [WBUT 2018]  
 cipher text will be  
 a) XCVU                                      b) NSLK                                      c) ALSEC                                      d) KLMPN

Answer: (b)

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28. EDIFACT is a standard

[WBUT 2019]

- a) for representing business forms used in e-commerce
- b) for e-mail transaction for e-commerce
- c) for ftp in e-commerce
- d) protocol used in e-commerce

Answer: (a)

### **Short Answer Type Questions**

1. Briefly explain the benefits of EDI.

[WBUT 2006, 2009, 2011]

Answer:

The benefits of EDI are:

- Remove document re-keying.
- reduced labour costs.
- elimination of human keying errors.
- faster document processing.
- instant document retrieval.
- removal of reliance on the postal service.
- Eliminate paper.
- Reduce lead times and stockholding.
- Increase the quality of the trading relationship.
- Competitive edge.

2. Define EDI and discuss its various essential elements.

[WBUT 2006, 2007, 2009, 2010, 2011]

Discuss EDIFACT std.

[WBUT 2006, 2007, 2009, 2010]

Answer:

**EDI: Refer to Question No. 1(a) of Long Answer Type Questions.**

The basic components of EDI are:

**EDI Translation Management Software:** Software used to convert the document one company's application's format into the agreed upon standard format. For optimum performance the translation software should be on the same platform as the business application.

**VAN** - stands for Value Added Network. A network to which you can connect to transmit data from one computer systems to another. One network can act as a gateway to another.

**EDI Standards:** A number of different standards bodies exist to develop standard formats for EDI. The EDIFACT (EDI for Administration, Commerce and Trade) committee worked out a common data dictionary and syntax rules so standards in different industries and countries can base standards development on the same building blocks.

Electronic Data Interchange is intended to handle all aspects of business transactions such as ordering, acknowledgements, pricing, status, scheduling, shipping, receiving, invoices,

payments, and financial reporting. Since different companies may follow a different way of implementation of data, an uniformity among them is essential. To achieve this uniformity, a standard was needed. Company specific data gets transformed into this standard and gets transmitted to the receiver. The receiver on receiving the data in the standard format, can transform it into its own company specific data. The EDIFACT (EDI for Administration, Commerce and Trade) committee worked out a common data dictionary and syntax rules so standards in different industries and countries can base standards development on the same building blocks.

**3. How is the communication of EDI Messages established?**

[WBUT 2006, 2008]

**Answer:**

In the most basic form, a VAN (value-added network) acts as a regional post office. They receive transactions, examine the 'from' and the 'to' information, and route the transaction to the final recipient. VANs provide a number of additional services, e.g. retransmitting documents, providing third party audit information, acting as a gateway for different transmission methods, and handling telecommunications support. Because of these and other services VANs provide, businesses frequently use a VAN even when both trading partners are using Internet-based protocols. Healthcare clearinghouses perform many of the same functions as a VAN, but have additional legal restrictions that govern VANs also provide an advantage with certificate replacement in AS2 transmissions. Because each node in a traditionally business-related AS2 transmission usually involves a security certificate, routing a large number of partners through a VAN can make certificate replacement much easier. Value Added Networks

Value Added Networks are the go-between in EDI communications.

The VAN is responsible for routing, storing and delivering EDI messages. They also provide delivery reports

Depending on the VAN type, messages may need extra envelopes or may be routed using intelligent \*VANs which are able to read the EDI message itself.

VANs may be operated by various entities:

- telecom companies;
- industry group consortia;
- a large company interacting with its suppliers/vendors.

**4. Given 2 prime nos. p =17, Q =29, Find out N, E, D in RSA encryption process.**

[WBUT 2006, 2008, 2009, 2010]

**Answer:**

The algorithm can be described as follows:

- Generate two large prime numbers  $p$  and  $q$
- Let  $n = pq$
- Let  $m = (p - 1)(q - 1)$
- Choose a small number  $e$  which is co prime to  $m$
- Find  $d$ , so that  $de \% m = 1$
- Publish  $e$  and  $n$  as the public key.

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Keep  $d$  and  $n$  as the secret key.

### **Encryption**

$$C = P^e \% n$$

### **Decryption**

$$P = C^d \% n$$

Now,

$$p = 17$$

$$q = 29$$

$$n = p * q = 17 * 29 = 493$$

$$\phi(n) = (17-1)(29-1) = 16 * 28 = 448$$

$e = 2$  (since 2 and 493 are co-prime having only 1 as the gcd)

$$d = 1 + xm/e$$

when  $x = 1$ ,  $d = 249$

### **5. Distinguish between private key and public key.**

[WBUT 2007]

#### **Answer:**

Public key encryption refers to a type of cipher or code architecture known as public key cryptography that utilizes two keys, or a key pair), to encrypt and decrypt data. One of the two keys is a public key, which anyone can use to encrypt a message for the owner of that key. The encrypted message is sent and the recipient uses his or her private key to decrypt it. This is the basis of public and private key encryption.

### **6. Describe the impact of EDI on the supply chain management of a manufacturing plant.**

[WBUT 2008, 2010]

#### **Answer:**

A supply chain is an integrated system wherein a number of business entities such as suppliers, manufacturers, distributors, and retailers work together to deliver goods and/or services promptly at a competitive price. A well-managed supply chain strives to streamline (link) procurement, production, transportation, storage, and distribution activities. This is an old problem faced by managers. However, the interest in supply chain management these days has some new aspects. The two most prominent aspects are as follows: a greater emphasis on establishing and maintaining effective information links between the entities and a greater effort on reducing response time between any two entities. Inter-organizational systems (ios) have been adopted by many organizations to achieve these goals. One inter-organizational system that has gained wide popularity is electronic data interchange (EDI). A manufacturer can be responsive to the customers' needs by delivering products promptly when demanded by the customer. Measures such as throughput time and lead time have been used in the past as indicators of responsiveness to customers. Also, on-time delivery is only one of many measures that could be used to evaluate the impact of EDI. Unpredictability of demand from the customer makes the production process and the supply chain vulnerable because it allows only a short period of time to respond to market turbulences; the more uncertain the environment, the more difficult it is to meet delivery expectations. An uncertain environment necessitates the frequent exchange of information among trading partners so

that activities can be prioritized according to recent changes. This uncertainty in demand also has a direct impact on the production schedule. An organization that caters to uncertain demand from the customer will exhibit high production instability due to changing needs for worker skills, frequent changes in setups, product routings, and so on. However, uncertainty in demand is only one of the sources that can cause production instability. Other sources include, but are not limited to, seasonality of demand, unreliable suppliers, machine breakdowns, implementation of new technology and/or software, production schedule changes to satisfy important customers, inefficient inventory management, poor coordination among departments, and so on. These sources can increase production instability and are expected to have a negative impact on delivery performance. It is observed that in the context of adoption and use of EDI in an organization, size of the organization can play an important role. Suppliers who are dependent on the large organizations had to adopt EDI. EDI provides integration among the elements of the supply chain through timely exchange of information. In order for a supply chain to be responsive, pertinent information needs to be quickly shared and disseminated across the supply chain. Therefore the use of EDI is expected to improve delivery performance. According to experts, Inter-organizational systems (ios), such as EDI systems, are intended not only to bridge the information asymmetry but also to foster integration and alliances. Therefore, if two organizations are operating under the same level of production instability, the one with the higher degree of ED use is expected to have superior delivery performance.

### 7. Explain the RSA Algorithm.

[WBUT 2010, 2011]

Given, 2 prime numbers P=37, Q=61.

Find out N,E,D in RSA encryption process.

[WBUT 2010]

**Answer:**

1<sup>st</sup> Part: Refer to Question No. 2 (Last Part) of Long Answer Type Questions.

### 2<sup>nd</sup> Part:

$$p = 37$$

$$q = 61$$

$$n = p \times q = 37 \times 61 = 2257$$

$$\phi(n) = (37-1)(61-1) = 36 \times 60 = 2160$$

e = 2 (since 2 and 2257 are co-prime having only 1 as the gcd)

$$d = 1 + xm/e$$

$$\text{When } x = 1, d = 1081.$$

### 7. Given, 2 prime numbers P = 31, Q = 41. Find out N, E, D, encryption key and decryption key in RSA encryption process.

[WBUT 2018]

**Answer:**

$$P = 31, Q = 41$$

$$\therefore n = 31 \times 41 = 1271$$

$$\phi(n) = 30 \times 40 = 1200 = m \text{ (say)}$$

$\therefore$  We choose e = 2 (since 2 and 1271 are co-prime having only 1 as the gcd)

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$$d = 1 + xm/e$$

When  $x = 1$ ,  $d = 601$

$\therefore$  encryption key  $=(n, e) = (1271, 2)$

$\therefore$  decryption key  $=(n, d) = (1271, 601)$

### **Long Answer Type Questions**

1. a) What is EDI? [WBUT 2005, 2007, 2009, 2011]
- b) What role does it play in ecommerce? How does it function? [WBUT 2005, 2009, 2011]
- c) What are EDI Standards? [WBUT 2005]
- d) Describe how RSA and DES algorithms can be used for EDI security? [WBUT 2005, 2010]

**Answer:**

a) ***Electronic data interchange (EDI)*** is the structured transmission of data between organizations by electronic means. It is used to transfer electronic documents or business data from one computer system to another computer system, i.e. from one trading partner to another trading partner without human intervention. EDI replaces the faxing and mailing of paper documents. EDI documents use specific computer record formats that are based on widely accepted standards.

b) EDI can combine with e-commerce. EDI provides a fast and efficient way to exchange information. The advantages of implementing EDI within the Internet environment, is that trading partners can be more efficiently and effectively communicated with, it reduces the amount of errors, and therefore improves cost effectiveness. It allows businesses to trade with larger enterprises that require EDI as a communication medium. Plus Internet EDI is relatively inexpensive, and does not carry with it the ongoing costs of other forms of EDI transmission. This can enable big and small companies to save potentially millions of dollars. Instead of mailing out catalogues and brochures, companies can send emails, and advise clients of discounts, and allow them to download information from the Internet.

The sender creates the application file using their own Business Application System. The file is then translated into an EDI standard format, and transmitted either through a value added network or direct connection. The receiver takes the transaction set and translates the file from the EDI standard format to a file that is usable by their own Business Application System. Thus the cycle of EDI continues.

c) Electronic Data Interchange is intended to handle all aspects of business transactions such as ordering, acknowledgements, pricing, status, scheduling, shipping, receiving, invoices, payments, and financial reporting. Since different companies may follow a different way of implementation of data, an uniformity among them is essential. To achieve this uniformity, a standard was needed. Company specific data gets transformed

into this standard and gets transmitted to the receiver. The receiver on receiving the data in the standard format, can transform it into its own company specific data.

d) Electronic data interchange (EDI) is an automated method of placing electronic transactions securely if an EDI Interchange takes place, it encrypts with one key, and can't be decrypted with a different key. The key used in most symmetric encryption algorithms with n bit stream long. The use of symmetric encryption between trading partners does not need to develop and exchange secret encryption algorithms with one another. Instead, each trading partner can use the same encryption algorithm, and only exchange the shared, secret key. If a trading partner has n trading partners, then n secret keys must be maintained, one for each trading partner. Symmetric encryption schemes also have the problem that origin or destination authenticity (non-repudiation of origin, and receipt) can't be proved. Since both parties share the secret encryption key, any EDI Interchange encrypted with a symmetric key, could have been sent by either of the trading partners. In DES it is RECOMMENDED that key sizes of 40 bits, 75 bits, and 128 bits for incoming and outgoing EDI messages.

The RSA algorithm is an asymmetric key cryptographic algorithm. It is used for encrypting plain text into a cipher text and decrypting a cipher text into a plaintext. This algorithm involves multiplying two large prime numbers on which additional operations are done to derive a set of two numbers that form the private and the public key. Both these keys are important for encryption and decryption. A, the sender sends the plaintext by encrypting it with the public key of receiver B, who in turn, decrypts the message on receipt with his private key. RSA is important because it enables digital signatures which can be used to authenticate electronic documents in the same way as handwritten documents.

## 2. Explain RSA and DES algorithm and its importance in security.

[WBUT 2007, 2010]

### Answer:

EDI (Electronic Data Interchange). It is becoming increasingly important as an easy mechanism for companies to buy, sell, and trade information. ANSI has approved a set of EDI standards known as the *X12 standards*. EDI enables trading partners to be faster and secured communication. EDI transactions can be exchanged between two companies anywhere in the world very fast. EDI acts at the execution and settlement phases of a trade cycle. For the EDI business to be conducted, prior agreements between the seller and the buyer is very important. The following steps are to be considered:

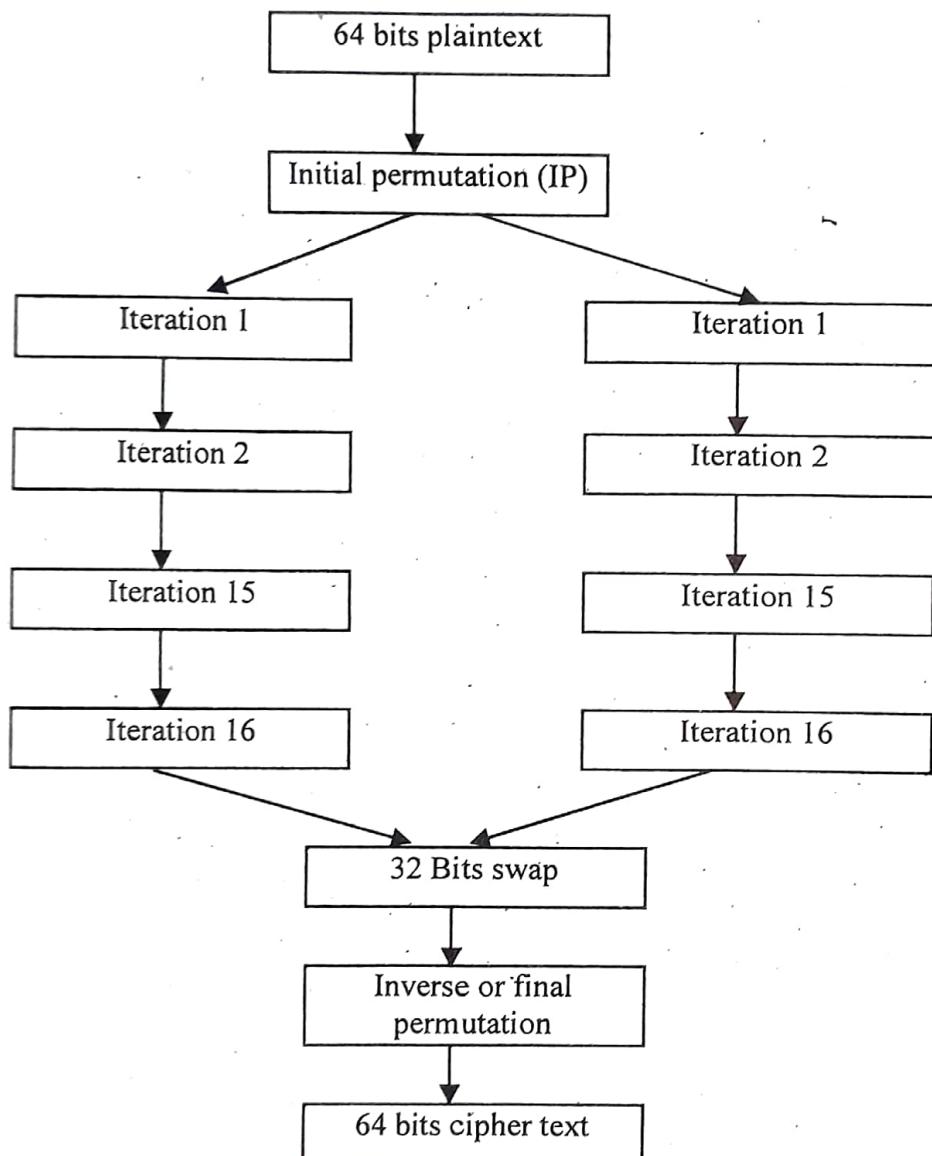
- The customer sends an order to the seller. Say that document is known as OD (Order document).
- The seller sends a receipt of order. Say that document is known as the OR (order receipt).
- The seller sends the goods to the customer along with a delivery note. Say that document is known as DN (delivery note).
- The customer upon receiving the goods gives a receipt note (RN).
- The seller sends him the invoice.

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The customer makes the payment as per the invoice. All these above mentioned OD, OR, DN, RN are part of the EDI system installed in each other' computer. Everything is predefined so that the transactions follow smoothly.

However, to make the steps secured the different encryption standards are practiced. The symmetric cryptographic standard is DES and the asymmetric standard is known as RSA. Let us now describe both the algorithms with a suitable examples as follows:

**DES:** DES is a block cipher. It encrypts data in blocks of size 64 bits each. That is, 64 bits of plain text goes as the input to DES, which produces 64 bits cipher text. The same algorithm key are used for encryption and decryption, with minor differences. The length of the key is 56 bits and there are 19 stages involved in the process. Actually, the initial key consists of 64 bits. However before the DES process even starts, every 8<sup>th</sup> bit of the key is discarded to produce a 56 bit key. This means the bit positions 8,16,24,32,40,48,56 and 64 are discarded.



DES is based on the two fundamental attributes of cryptography: substitution and transposition. DES consists of 16 steps each one of which is known as rounds. Each round performs the steps of substitution and transposition. The broad level steps in DES are as follows:

- In the first step, the 64 bit plain text block is handed over to an Initial Permutation (IP) function.
- The IP is performed on the plain text.
- Next, the IP produces two halves of the permuted block: say Left Plain Text (LPT) and Right Plain Text (RPT).
- Now, each of LPT and RPT goes through 16 rounds of encryption process, each with its own keys.
- In the end, LPT and RPT re-joined, and a Final Permutation (FP) is performed on the combined block.
- The result of this process produces 64 bits cipher text.

DES is a secret key symmetric cryptosystem. If DES is used for communication, then the sender as well as the receiver must know the same secret key which is used to both encrypt and decrypt the message. As we know that DES works on the 64 bit blocks with 56 bit key, its operation is relatively fast and works well for bulk documents or encryption.

**RSA:** The RSA algorithm is the most popular and proven asymmetric key cryptographic algorithm. It is used for encrypting plain text into a cipher text and decrypting a cipher text into a plaintext. The RSA algorithm itself is a quite simple algorithm, however the real challenge in case of a RSA is the selection and generation of the public and private key. This algorithm involves multiplying two large prime numbers on which additional operations are done to derive a set of two numbers which form the private and the public key. Both these keys are important for encryption and decryption. The basic fundamental of public key cryptography remains the same. A, the sender sends the plaintext by encrypting it with the public key of receiver B, who in turn, decrypts the message on receipt with his private key. RSA is important because it enables digital signatures which can be used to authenticate electronic documents in the same way as handwritten documents. The RSA is used in a wide variety of products, platforms and industries around the world. It is currently being incorporated in the browsers of WWW like netscape, and thus giving it a wider audience.

The algorithm can be described as follows:

**Receiver's Set-Up:**

- Choose 500-digit primes p and q (each 2 more than a multiple of 3).
  - $p = 5, q = 11$
- Let  $n = pq$ .
  - $n = 55$
- Let  $s = (1/3)(2(p - 1)(q - 1) + 1)$ .

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- $s = (1/3)(2 \cdot 4 \cdot 10 + 1) = 27$
- Publish n.
- Keep p, q, and s secret.

### ***Encrypting a Message:***

- Break the message into chunks.
  - H I C H R I S ...
- Translate each chunk into an integer M ( $0 \leq M < n$ ) by any convenient method.
- 8 9 3 8 18 9 19 ... (alphabetic sequence value A=1, B=2, C=3 and so on)
- Divide  $M^3$  by n. E(M) is the remainder.
- M = 8, n = 55
- $8^3 = 512 = 9 \times 55 + 17$
- E(8) = 17

### ***Decrypting a Cipher-text C***

- Divide  $C^s$  by n. D(C) is the remainder.
- $C = 17, n = 55, s = 27$
- $17^{27} = 1,667,711,322,168,688,287,513,535,727,415,473$   
 $= 30,322,024,039,430,696,136,609,740,498,463 \times 55 + 8$
- $D(17) = 8$
- Translate D(C) into letters i.e. H

### **Why Is It Secure?**

- To find  $M = D(C)$ , you seem to need  $s$ .
- To find  $s$ , you seem to need  $p$  and  $q$ .
- All the cryptanalyst has is  $n = pq$ .
- How hard is it to factor a 1000-digit number  $n$ ?

With the grade school method, doing 1,000,000,000 steps per second, it would take  $\dots 10^{483}$  years.

### **3. Write short notes on the following:**

- a) VPN  
b) Value Added Network (VAN)

[WBUT 2008, 2009, 2011]

[WBUT 2015, 2016]

**Answer:**

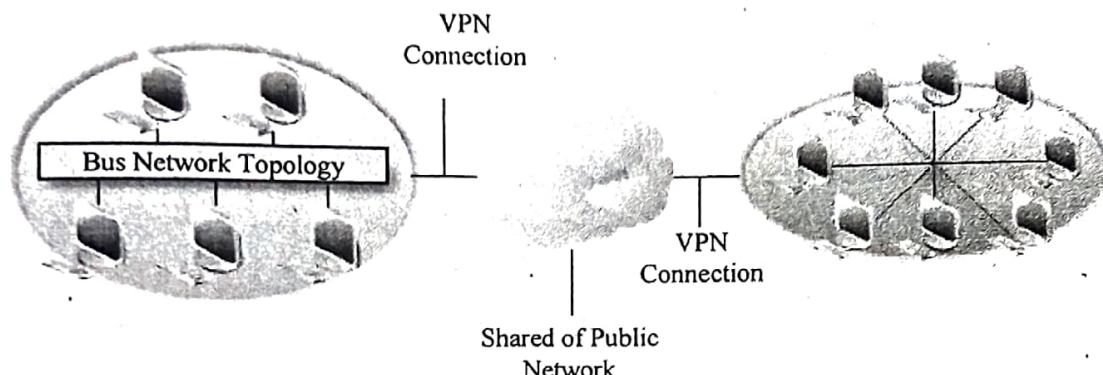
**a) VPN:**

VPN stands for virtual private network. A virtual private network (VPN) is a technology that creates a safe and encrypted connection over a less secure network, such as the internet. Virtual Private network is a way to extend a private network using a public network such as internet. The name only suggests that it is Virtual "private network" i.e.

user can be the part of local network sitting at a remote location. It makes use of tunneling protocols to establish a secure connection.

Virtual private network extends a private network across public networks. VPN allows users working at home or office to connect in a secure fashion to a remote corporate server using the routing infrastructure provided by a public inter-network (such as the Internet). From the user's perspective, the VPN is a point-to-point connection between the user's computer and a corporate server. The nature of the intermediate inter-network is irrelevant to the user because it appears as if the data is being sent over a dedicated private link.

### Virtual Private Network



There are three kinds of VPN. These are - Remote access VPN, Intranet VPN and Extranet VPN.

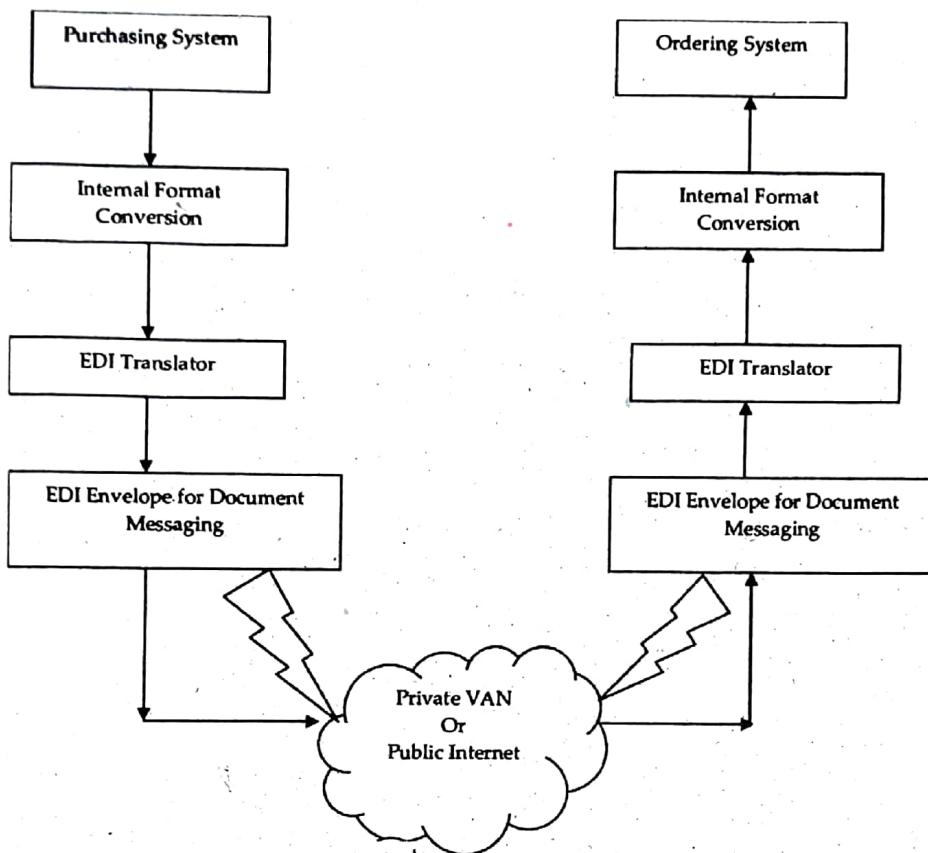
The main benefit of a VPN is the potential for significant cost savings compared to traditional leased lines or dial up networking. These savings come with a certain (in amount of risk, however, particularly when using the public Internet as the delivery mechanism for VPN data).

The performance of a VPN will be more unpredictable and generally slower than dedicated lines due to public Net traffic. Likewise, many more points of failure can affect a Net-based VPN than in a closed private system. Utilizing any public network for communications naturally raises new security concerns not present when using more controlled environments like point-to-point leased lines.

#### b) Value Added Network (VAN):

A value-added network (VAN) is a private network provider hired by a company to facilitate electronic data interchange (EDI) or provide other network services. Before the arrival of the World Wide Web, some companies hired value-added networks to move data from their company to other companies. After the WWW many companies found it more cost-efficient to move their data over the Internet instead of paying the monthly rental and per-character charges found in typical VAN contracts. In response, contemporary value-added network providers now focus on offering EDI translation, encryption, secure e-mail, management reporting, and other extra services for their customers.

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# **RISK OF E – COMMERCE**

## **Multiple Choice Type Questions**

- 1. A stateful inspection firewall can act at [WBUT 2008]**
- a) The session level
  - b) The application level
  - c) The network level
  - d) All of these
- Answer:** (d)
- 2. When the receiver wants to be sure that the contents of the message have not been tampered with, ..... is the key factor. [WBUT 2008]**
- a) Confidentiality
  - b) Authentication
  - c) Authorization
  - d) Integrity
- Answer:** (b)
- 3. Digital signature does not give us [WBUT 2008]**
- a) confidentiality
  - b) authenticity
  - c) integrity
  - d) acquisition
- Answer:** (d)
- 4. By security in e-Commerce we mean [WBUT 2009]**
- a) protecting and organization's data resource from unauthorized access
  - b) preventing disasters from happening
  - c) authenticating messages received by an organization
  - d) protecting messages sent on the internet from being read and understood by unauthorized persons/organizations
- Answer:** (a)
- 5. A firewall may be implemented in [WBUT 2009]**
- a) routers which connect intranet to internet
  - b) bridges used in an intranet
  - c) expensive modem
  - d) user's application programs
- Answer:** (a)
- 6. Firewalls operate by [WBUT 2010]**
- a) using a proxy server during Internet access
  - b) isolating Intranet from Extranet
  - c) screening packets to/from the Network and provide controllable filtering of network traffic
  - d) none of these
- Answer:** (c)
- 7. Trojan horse is a program that performs not only a desired task but also includes unexpected malicious functions. [WBUT 2010]**
- a) True
  - b) False
- Answer:** (a)

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8. Firewalls operate by

- a) using a proxy server during Internet access
- b) isolating Intranet from Extranet
- c) screening packets to/from the Network and provide controllable filtering of network traffic
- d) none of these

[WBUT 2010, 2016]

Answer: (c)

9. Pretty Good Privacy (PGP) is an implementation of public-key cryptography based on

a) RSA

b) DES

c) DSA

d) RPC

[WBUT 2012]

Answer: (a)

10. Which one is not a security threat to the e-commerce websites?

a) Spoofing

b) Sniffing

c) Spooling

d) Hacking

Answer: (c)

11. A hardened firewall host on an Intranet is

[WBUT 2015]

a) a software which runs in any of the computers in the intranet

b) a software which runs on a special reserved computer on the intranet

c) a stripped down computer connected to the intranet

d) a mainframe connected to the intranet to ensure security

Answer: (b)

12. 'Flood Attack' by attackers happens on

[WBUT 2015, 2016, 2019]

a) router

b) hub

c) switch

d) server

Answer: (d)

13. Mechanism to protect private networks from outside attacks is

[WBUT 2017]

a) Firewall

b) Antivirus

c) Digital signature

d) Formatting

Answer: (a)

14. A firewall may be implemented in

[WBUT 2018]

a) routers which connect intranet to internet

b) bridges used in an intranet

c) expensive modem

d) user's application programs

Answer: (a)

15. Which of the following defences is used to address security issues that can occur in e-commerce?

[WBUT 2019]

a) authentication

b) authorization

c) auditing

d) all of these

Answer: (d)

**Short Answer Type Questions**

**1. What are the threats of Ecommerce?**

[WBUT 2005]

**Answer:**

Threats related to e-commerce

1. Website defacement
2. DoS (Denial of Service) attacks
3. Customer phishing
4. Customer information theft.

**2. Discuss the dependence of e-commerce on networking of computers. Hence bring out the security issues that must be addressed for commerce over net to be reliable.**

**OR,**

**What are the security issues of e-commerce?**

[WBUT 2006, 2011]

**Answer:**

A large component of today's e-commerce driven economy is the networking infrastructure that supports the Electronic transactions. It requires both hardware and software. The minimum requirements are:

- Computer system
- Modem
- PSTN connectivity
- ISP
- OS
- Web Browser

Operating systems like Windows XP provides built-in support for networking connectivity and for safely connecting one or multiple computers at home to the Internet. For home network connectivity and connectivity to the Internet, configuration is either automatic or just a few clicks to make the set-up ready.

Distributed networked applications that are being deployed in enterprise settings, increasingly rely on a large number of heterogeneous hardware and software components for providing end-to-end services. In such settings, the issue of problem diagnosis becomes vitally important; in order to minimize system outages and improve system availability Problem determination approaches in current distributed environments are often ad hoc in nature. Is the service X dependent on another service Y or resource Z? If such a dependency exists, what is the strength of the dependency? Using this information, when a problem is observed at a particular service point, the root cause may be tracked down to a resource on which this service is dependent.

Internet may be defined as the network of the networks. It is also known as a distributed system. The information residing on different computers around the world can be easily linked together using hyperlinks (a method of organizing information on the system by linking documents from one to another). A wide variety of services are provided like; e-mail, newsgroup, file transfer, multimedia displays, live broadcasting, home shopping opportunities, access to the latest news, and much more. It is also known as a **distributed**

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**system.** The information residing on different computers around the world can be easily linked together using hyperlinks, a method of organizing information on the system by linking documents from one to another. A wide variety of services are provided like; e-mail, newsgroup, file transfer, multimedia displays, live broadcasting, home shopping opportunities, access to the latest news, and much more.

### **3. What is spoofing?**

[WBUT 2007]

**Answer:**

A technique used to gain unauthorized access to computers, whereby the intruder sends messages to a computer with an IP address indicating that the message is coming from a trusted host. To engage in IP spoofing, a hacker must first use a variety of techniques to find an IP address of a trusted host and then modify the packet headers so that it appears that the packets are coming from that host. Newer routers and firewall arrangements can offer protection against IP spoofing.

There are many kinds of spoofing techniques which are used by the people to hack the systems or to get the critical information by showing it as legitimate process.

Different type of spoofing:

- (1) IP spoofing.
- (2) Content spoofing.
- (3) Caller ID spoofing.
- (4) Email spoofing.
- (5) Phishing.

It would be difficult to explain all of them but for a general idea I will explain the content spoofing.

**CONTENT SPOOFING:** In this spoofing method which is generally used by the hackers in order to hack the sensitive data and information the hacker uses a special type of method in which the content shown to the users are shown legitimate but actually the contents are fake and the user processes all the information.

With the help of DHTML (Dynamic Hyper Text Markup Language) the hacker design dangerous content spoofing, they design forms, log-in applications. And when the user enters the sensitive data such as passwords, bank account numbers, credit cards etc the hackers easily get that information.

Some times what the hackers do to hack some good sites and change the contents and link it to an established website and when access that site all of the users information can be hacked by them.

### **4. Define Cryptography.**

[WBUT 2007, 2011, 2015, 2017]

**Answer:**

*Refer to Question No. 4(d) of Long Answer Type Questions.*

### **5. Describe what a denial of service attack is and how it affects electronic commerce.**

[WBUT 2008, 2009]

**Answer:**

A denial of service (DOS) attack is an incident in which a user or organization is deprived of the services of a resource they would normally expect to have. Typically, the loss of service is the inability of a particular network service, such as e-mail, to be available or the temporary loss of all network connectivity and services. In a denial-of-service (DOS) attack, an attacker attempts to prevent legitimate users from accessing information or services like accessing email, websites, online accounts (banking, etc.), or other services that rely on the affected computer. The most common and obvious type of DOS attack occurs when an attacker "floods" a network with information. When a user types a URL for a particular website into his browser, he is sending a request to that site's computer server to view the page. The server can only process a certain number of requests at once, so if an attacker overloads the server with requests, it can't process this user's request. This is a "denial of service" because he can't access that site. Another method of DOS is when an attacker uses spam email messages to launch a similar attack on an user's email account. Whether user has an email account supplied by his employer or one available through a free service such as Yahoo or Hotmail, he is assigned a specific quota, which limits the amount of data he can have in his account at any given time. By sending many, or large, email messages to the account, an attacker can consume his quota, preventing him from receiving legitimate messages. All these will definitely have a negative effect on electronic commerce because the entire setup of these types of businesses is online. In the world of e-commerce, a customer's allegiance is fleeting. If a site is inaccessible or unresponsive, an alternate virtual shop front is only a few clicks away. Companies reliant on Internet traffic and e-purchases are at particular risk from DoS attacks. The Web site is the engine that drives e-commerce, and customers are won or lost on the basis of the site's availability and speed. So the DOS attacks hurt an e-business by affecting its Internet presence in some way.

**6. Compare and construct symmetric and asymmetric key cryptographic techniques. [WBUT 2011]**

**Answer:**

Cryptography is a process of using electronic security systems, methods, and schemes, that protect data by altering it in a way so that only the intended recipient is able to extract the original information. It uses two mechanism known as encryption and decryption.

There are however two types of cryptographies. The private key cryptography and the public key cryptography.

***Private key or symmetric key cryptography:***

This type of cryptography involves the usage of a shared key for both encryption and decryption by the sender and the receiver respectively. For each pair of sender and receiver, there is a shared key. One sender may have a set of shared key with say "n" receivers. The shared key must be distributed to both the parties very securely before the transmission occurs and should be kept secret for the particular pair of sender and receiver. This type of cryptography is also known as the private key cryptography.

***Difficulties:***

- Key distribution among the two communicating parties if difficult.
- The exchange is done over the internet which is a highly insecure network so the privacy of the shared key is questionable.
- The entire technique depends on the shared key, so if a hacker manages to obtain it, the confidentiality is gone.
- For big companies having thousand customers, it is very difficult to take this approach, because in this case they have to maintain a database of 1000 duplicate keys, one for each customer.

***Public key or Asymmetric key cryptography:***

This type of cryptography involves the usage of a pair of private keys and public keys. Here in this case both the sender and the receiver generates a pair of private key and a public key respectively. One thing is to be remembered here that any document encrypted with the public key of user X can only be decrypted by the private key of the user X and vice versa. So before the transmission between the sender and the receiver occurs, the private key gets known to each parties i.e. the sender knows the public key of the receiver and the receiver knows the public key of the sender.

***The steps of the public key cryptography can be lined up as follows:***

- The sender A wants to send a plaintext  $P$  to receiver B. B has a pair of keys, one public key  $E_B$  which is available publicly, and a private key  $D_B$ , which is known to him only encrypts  $P$  with the public key  $E_B$  of B to generate cipher text  $C = E_{EB}(P)$ , and sends the result to B.
- The receiver on receiving the document, decrypts the message with the help of his own private key  $D_B$ , which is known to him but not to the sender off-course. Thus the original plain text of the message is obtained,  $P = E_{DB}(C)$ . If anyone hacks the message on the way, he won't be able to decrypt it because even though he know the receiver's public key (as it is public) he doesn't know the private key of the receiver and the message can be only decrypted with the help of the corresponding private key of the receiver.
- One point needs to be noted that since the original message  $P$  is retrieved from the cipher text by the decryption operation, it is implied that  $P = E_{DB}(E_{EB}(P))$ .

The algorithms: the entire processes of encryption and decryption depends on how secured the transactions are going to be, and the security of the above processes depends upon the power of the algorithms used for them. There are however two algorithms mainly used for the above mentioned processes of encryption and decryption. They are:

- RSA algorithm
- DES algorithm.

In short the symmetric key cryptography shares a single key between receiver and sender where as asymmetric key cryptography uses public and private key. Both the systems are secured but the symmetric key is easy to operate and maintain over asymmetric key cryptography.

**7. What do you mean by Denial of Service Attacks?**

[WBUT 2014]

**Answer:**

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.

A DoS attack can be done in a several ways. The basic types of DoS attack include:

1. Flooding the network to prevent legitimate network traffic.
2. Disrupting the connections between two machines, thus preventing access to a service.
3. Preventing a particular individual from accessing a service.
4. Disrupting a service to a specific system or individual.
5. Disrupting the state of information, such resetting of TCP sessions.

Another variant of the DoS is the smurf attack. This involves emails with automatic responses. If someone emails hundreds of email messages with a fake return email address to hundreds of people in an organization with an autoresponder on in their email, the initial sent messages can become thousands sent to the fake email address. If that fake email address actually belongs to someone, this can overwhelm that person's account.

DoS attacks can cause the following problems:

1. Ineffective services
2. Inaccessible services
3. Interruption of network traffic
4. Connection interference

**Long Answer Type Questions**

1. a) What is firewall? [WBUT 2005, 2007, 2008, 2009, 2010, 2011, 2014, 2015, 2016]

b) State the functions of firewall in ecommerce.

[WBUT 2005, 2007, 2008, 2009, 2010, 2011, 2014, 2016]

c) What are Digital Signatures? How do they differ from Digital certificates?

[WBUT 2005, 2008, 2009, 2010, 2011, 2013, 2014]

d) Explain in brief how data security is achieved through the Digital Signature?

[WBUT 2005, 2007, 2009]

**Answer:**

a) Firewall is a system designed to prevent unauthorized access to or from a private network. Firewalls can be implemented in both hardware and software, or a combination of both. Firewalls are frequently used to prevent unauthorized Internet users from accessing private networks connected to the Internet, especially *intranets*. All messages

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entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria.

**b)** The different functions of a firewall are:

Blocking Incoming Traffic depending on Source

Blocking based on website Content

Allocates Internal Resources

Blocking Selected Outgoing Traffic

Make reports on all network traffic, network activity.

**c) 1<sup>st</sup> Part:**

It is a method used for sender authentication with the help of public key cryptography. The basic idea behind the digital signature is “if A is the sender of a message and B is the receiver, A encrypts the message with A’s private key and sends the encrypted message to B who decrypts it with A’s public key.” Initially this might create confusion because according to public key cryptography, any document encrypted with sender’s private key can be decrypted with sender’s public key. So it is understood that any one who has access to the sender’s public key can open the message sent by the sender. However, it is to be remembered that the purpose of the digital signature is nothing else but authentication. If receiver B receives an encrypted message that is encrypted by the private key of sender A, then he decrypts the message using the public key of A, which he knows. If the decryption is successful, then B is assured that the message comes from A.. because no one else knows the private key of A. It is to be noted that any message encrypted by the private key of A can only be opened by the public key of A and VICE VERSA. So the intention behind the digital signatures is not to hide the contents i.e. confidentiality but authentication which is proving and identifying A as the sender). Another purpose known as non repudiation (i.e. A can refuse that he has not sent the message as the message is already encrypted by the private key of A, which is supposed to be known to her only) is also served by the usage of digital signatures. If any third party, say C, attacks the message, on the way of transmission, he can use A’s public key to decrypt the message and read it but it can not change the contents and further encrypt it because he doesn’t know the private key of A. Thus the security of digital signatures is ensured.

**2<sup>nd</sup> Part:**

Digital Certificates are the electronic counterparts to driver licenses, passports and membership cards. Whereas digital signature, is a method used for sender authentication with the help of public key cryptography. The special feature of a digital certificate is that it must be issued by a trusted authority (like the passport is issued by the government) otherwise no one else can trust the issued digital certificate. The certificate can be used to verify that a public key belongs to an individual. In DS, the sender A encrypts a message by its private key. If receiver B receives an encrypted message that is encrypted by the private key of sender A, then he decrypts the message using the public key of A, which he knows. If the decryption is successful, then B is assured that the message comes from

A., because no one else knows the private key of A. It is to be noted that any message encrypted by the private key of A can only be opened by the public key of A and VICE VERSA. So the sole intention behind the digital signatures is not to hide the contents i.e. confidentiality but authentication which is proving and identifying the sender. A Digital Certificate is issued by a Certification Authority (CA) and signed with the CA's private key. So to use digital certificates, one needs to know what is digital signature because one of the essential component of DC is digital signature. So DC's are implementations of DS. On the other hand, DS is a fundamental method to prove authentication among the recipients with the help of PKI. They do not implement the Digital Certificates. The motive of DC is to identify and verify public key of the sender, but the main motive of Digital Signature is to authenticate the message coming from sender.

d) Digital signatures are created and verified by cryptography. A fundamental process known as the hash functions is used to both create and verify the digital signatures. A hash function is an algorithm that creates a digital representation or "fingerprint" in the form of a hash value or hash result that is of standard length. This finger print is also known as the message digest. This fingerprint is smaller than the message but is substantially unique to the message. As a result, any change to this message, produces a different result, even when the same hash function is used. So hash functions are used to create digital signatures. The process of creation and verification is described below:  
 The sender A wishes to send the message M to receiver B. B possesses the public key of A.

A takes M and runs a hash algorithm over it to produce a hash result say H1.

H1 is then encrypted by the private key of A. say it becomes H1PR

This H1PR becomes the digital signature of A and is attached with the message M and sent to B.

B receives M with H1PR and separates them into M and H1PR.

He does two processes to verify the digital signature. Firstly, he decrypts H1PR with the public key of A (which B already possesses) and obtains H1.

Secondly, he takes M, and runs the same hash algorithm (which was earlier used by A to create H1) over M to produce another hash result called H2.

B now matches H1 with H2. Since they are the hash results of same message M, then they must much. If they do, then the digital signature is valid and customer validity is authenticated.

**2. a) Write the differences between symmetric key cryptography and asymmetric key cryptography.** [WBUT 2005, 2006, 2009, 2012]

**b) What are key requirements of Message digest?**

[WBUT 2006]

**Answer:**

a) When using symmetric algorithms, both parties share the same key for en- and decryption. To provide privacy, this key needs to be kept secret. Once somebody else gets to know the key, it is not safe any more. Symmetric algorithms have the advantage of not consuming too much computing power. A few well-known examples are: DES, Triple-DES (3DES), IDEA, CAST5, BLOWFISH, TWOFISH.

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Asymmetric algorithms use pairs of keys. One is used for encryption and the other one for decryption. The decryption key is typically kept secretly, therefore called "private key" or "secret key", while the encryption key is spread to all who might want to send encrypted messages, therefore called "public key". Everybody having the public key is able to send encrypted messages to the owner of the secret key. The secret key can't be reconstructed from the public key. The idea of asymmetric algorithms was first published 1976 by Diffie and Hellmann.

Asymmetric algorithms seem to be ideally suited for real-world use: As the secret key does not have to be shared, the risk of getting known is much smaller. Every user only needs to keep one secret key in secrecy and a collection of public keys that only need to be protected against being changed. With symmetric keys, every pair of users would need to have an own shared secret key. Well-known asymmetric algorithms are RSA, DSA, ELGAMAL.

However, asymmetric algorithms are much slower than symmetric ones. Therefore, in many applications, a combination of both is being used. The asymmetric keys are used for authentication and after this have been successfully done; one or more symmetric keys are generated and exchanged using the asymmetric encryption. This way the advantages of both algorithms can be used. Typical examples of this procedure are the RSA/IDEA combination of PGP2 or the DSA/BLOWFISH used by GnuPG.

**b)** The requirements of a message digest are as follows:

1. The MD must be capable of verifying the integrity of the data.
2. It should be such that it is not easily tampered on the way from the sender to the receiver.
3. No one should be able to understand anything about the original message externally from the fingerprint (message digest) only, if the hash algorithm is not run over it.
4. The message digest should be such that it is easily obtained from the original message by running hash algorithm over the message.
5. The message digest should be such that the original message is not easily obtained from it without running the hash algorithm.
6. For one particular message, if same algorithm is run, the message digest should be the same every time.
7. For two messages, even if the same algorithm is run over, must produce different message digests.

**3. a) What are the typical contents of Digital certificate? What are the common causes for revoking a Digital certificate?** [WBUT 2006, 20111, 2013]

**b) What is key wrapping? How is it useful?** [WBUT 2006, 2010]

**Answer:**

**a) Various Fields of the Digital Certificate**

<u>PUBLIC KEY OF THE USER</u>
NAME OF THE OWNER
EXPIRATION DATE
NAME OF THE ISSUER

SERIAL NUMBER
DIGITAL SIGNATURE OF THE ISSUER

**Rest Part: Refer to Question No. 1(c) (2<sup>nd</sup> Part) of Long Answer Type Questions.**

b) **Key wrapping:** Key Wrap constructions are a class of symmetric encryption algorithms designed to encapsulate (encrypt) cryptographic key material. The Key Wrap algorithms are intended for applications such as (a) protecting keys while in entrusted storage, or (b) transmitting keys over entrusted communications networks. The constructions are typically built from standard primitives such as block ciphers and cryptographic hash functions.

Key Wrap may be considered as a form of key encapsulation algorithm, although it should not be confused with the more commonly-known *asymmetric* (public-key) Key Encapsulation algorithms (e.g., PSEC-KEM). Key Wrap algorithms can be used in a similar application: to securely transport a session key by encrypting it under a long-term encryption key.

**Key management** is the provisions made in a cryptography system design that are related to generation, exchange, storage, safeguarding, use, vetting, and replacement of keys. It includes cryptographic protocol design, key servers, user procedures, and other relevant protocols. Key management concerns keys at the user level, either between users or systems. This is in contrast to key scheduling; key scheduling typically refers to the internal handling of key material within the operation of a cipher. Successful key management is critical to the security of a cryptosystem. In practice it is arguably the most difficult aspect of cryptography because it involves system policy, user training, organizational and departmental interactions, and coordination between all of these elements.

#### 4. Write short notes on the following:

- a) Software Piracy [WBUT 2005, 2007, 2010]
- b) Intrusion Detection System [WBUT 2005, 2010]
- c) Digital signatures and digital certificates [WBUT 2005, 2006, 2009, 2014, 2016, 2017, 2018] [WBUT 2006, 2007, 2011]
- d) Secure channel and cryptography [WBUT 2006]
- e) Message Digest [WBUT 2006, 2008]
- f) Firewall in E-commerce [WBUT 2010]
- 
- [WBUT 2015, 2017]

**Answer:**

#### a) Software Piracy:

Software piracy refers to the unauthorized duplication and use of computer software. Software developers work hard to develop solid software programs. If those applications are pirated and stolen, the software developers will often be unable to generate the revenue required to continue supporting and expanding those applications. The effects of software piracy impact the entire global economy. Software is intellectual property, and is protected by copyright laws in most countries. Most software licenses grant users the

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permission to use the software, but the license holder does not "own" the software -- they simply own a license to "use" the software. Pirating software, circumventing the copy protection, and not properly licensing the software is illegal in most of the world. And in most countries, it is illegal to violate or circumvent software copyrights. Unfortunately, due to the global nature of the Internet, it is often difficult to enforce those copyright laws. If the pirate or offender is located in a country that does not respect copyright laws, it can be difficult to enforce penalties against software pirates.

### **b) Intrusion Detection System:**

An **intrusion detection system (IDS)** is a device or software application that monitors network and/or system activities for malicious activities or policy violations and produces reports to a Management Station.<sup>1</sup> An intrusion detection system (IDS) inspects all inbound and outbound network activity and identifies suspicious patterns that may indicate a network or system attack from someone attempting to break into or compromise a system. There are several ways to categorize an IDS:

- **misuse detection vs. anomaly detection:** in misuse detection, the IDS analyzes the information it gathers and compares it to large databases of attack signatures. Essentially, the IDS looks for a specific attack that has already been documented. Like a virus detection system, misuse detection software is only as good as the database of attack signatures that it uses to compare packets against. In anomaly detection, the system administrator defines the baseline, or normal, state of the networks traffic load, breakdown, protocol, and typical packet size. The anomaly detector monitors network segments to compare their state to the normal baseline and look for anomalies.
- **network-based vs. host-based systems:** in a network-based system, or NIDS, the individual packets flowing through a network are analyzed. The NIDS can detect malicious packets that are designed to be overlooked by a firewalls simplistic filtering rules. In a host-based system, the IDS examines at the activity on each individual computer or host.
- **passive system vs. reactive system:** in a passive system, the IDS detects a potential security breach, logs the information and signals an alert. In a reactive system, the IDS responds to the suspicious activity by logging off a user or by reprogramming the firewall to block network traffic from the suspected malicious source.

### **c) Digital signatures:**

*Refer to Question Number 1(d) of Long Answer Type Questions.*

### **Digital certificates:**

*Refer to 2<sup>nd</sup> part of Question Number 1(c) of Long Answer Type Question.*

**A Digital Certificate is issued by a Certification Authority (CA) and signed with the CA's private key.**

A Digital Certificate typically contains the:

- Owner's public key

- Owner's name
- Expiration date of the public key
- Name of the issuer (the CA that issued the Digital Certificate)
- Serial number of the Digital Certificate
- Digital signature of the issuer

**d) Secure channel:**

Secure Channel is known as Schannel, is a security support provider (SSP) that contains a set of security protocols that provide identity authentication and secure, private communication through encryption. Schannel is primarily used for Internet applications that require secure Hypertext Transfer Protocol (HTTP) communications. In cryptography, a **secure channel** is a way of transferring data that is resistant to interception and tampering. A **confidential channel** is a way of transferring data that is resistant to interception, but not necessarily resistant to tampering. An **authentic channel** is a way of transferring data that is resistant to tampering but not necessarily resistant to interception. There are no perfectly secure channels in the real world.

**Cryptography:**

Cryptography is the science of information security. Cryptography includes techniques such as microdots, merging words with images, and other ways to hide information in storage or transit. However, in today's computer-centric world, cryptography is most often associated with scrambling plaintext (ordinary text, sometimes referred to as cleartext) into ciphertext (a process called encryption), then back again (known as decryption). Individuals who practice this field are known as cryptographers.

**e) Message Digest:**

A message digest is a number which is created algorithmically from a file and represents that file uniquely. If the file changes, the message digest will change. In addition to allowing us to determine if a file has changed, message digests can also help to identify duplicate files. E.g. On many Unix systems, the `md5` command will generate a message digest. Two programs which generate and manage message digests to protect system security are Tripwire and AIDE. Other Uses of Message Digests are:

Peer-to-peer file sharing programs like eMule use message digests to protect users from downloading duplicate files and to help identify multiple sources of the same file. Some of the Message Digest Algorithms are:

- CRC-32
- MD5
- RIPEMD-160
- SHA
- HAVAL

A message digest will sometimes be referred to as a checksum or a hash.

**f) Firewall in E-commerce:**

**Refer to Question No. 1(a) & (b) of Long Answer Type Questions.**

# **ENTERPRISE RESOURCE PLANNING (ERP)**

## **Multiple Choice Type Questions**

1. Some modules of ERP packages are [WBUT 2007, 2010]  
a) Finance  
b) Sales and Distribution  
c) Quality Management  
d) all of these  
**Answer:** (d)
2. A Sales and Distribution module contains which one of the following sub-modules? [WBUT 2007]  
a) Master Data Management  
b) Shipping  
c) Both (a) and (b)  
d) None of these  
**Answer:** (c)
3. Investment Management is a sub-system of which module? [WBUT 2007, 2008, 2010]  
a) Sales and Distribution  
b) Quality Management  
c) Finance  
d) Plant Maintenance  
**Answer:** (c)

## **Short Answer Type Questions**

1. Justify why the following may be considered as hidden costs of ERP:  
a) Customization  
b) Training  
c) Integration & testing  
d) Consultants. [WBUT 2006]

**Answer:**

Those who have ERP packages in operation must agree that certain costs are more commonly overlooked and we termed them as hidden costs which ultimately results in budget overrun.

**Customization** - Add-ons are only the beginning of the integration costs of ERP. Much more costly and something to be avoided if at all possible, is actual customization of the core ERP software itself.

**Training** - Training is the near-unanimous choice of experienced ERP implementers as the most underestimated budget item. Training expenses are high because workers almost invariably have to learn a new set of processes, not just a new software interface.

**Integration and testing** - Testing the links between ERP packages and other corporate software links that have to be built on a case-by-case basis is another underestimated cost. It is better to run a real purchase order through the system from order entry through dispatch and payment receipts.

**Consultants** - When users fail to plan for disengagement, consulting fees run wild. To avoid this, companies should identify objectives for which its consulting partners must

aim when training internal staff. Everyone will go back after their day job. But consultants can't go home but continue to reports to pull information out of the new ERP system and augmentation plans for a year at least which is also a substantial hidden cost for the project.

**2. What are the direct benefits of ERP systems?**

[WBUT 2007]

**Answer:**

The direct benefits of ERP systems are:

- Help reduce operating costs
- Facilitate Day-to-Day Management.
- Support Strategic Planning
- Increased Cost Effectiveness
- Enhanced Work Efficiency
- Integration of Business Functions
- Improved International Operations

**3. What do you mean by knowledge engineering and business process redesign?**

[WBUT 2009]

**Answer:**

Knowledge management (KM) within modern or virtual enterprises is an emerging area for investigations, as well as for the development and deployment of commercially available systems. The information serves as a narrative knowledge base to be organized and managed. The mechanisms add value by automatically constructing category hierarchies and hypertext indices/links that characterize a set of related documents. By their very nature, text analysis techniques such as these provide their value through a shallow syntactic or surface-level processing of a document or text base. Nonetheless, these significant capabilities are now commercially available to enterprises that want to begin to manage their text-based knowledge assets.

Much work in KM remains to be done that builds on results from knowledge engineering, reasoning and problem-solving mechanisms, and other aspects of intelligent systems. Here classic problems in knowledge acquisition, representation and operation must be addressed, as they must by commercial KM systems. As noted above, commercial KM system can employ weak models to great success in acquiring and representing (via hypertext links) interrelated text documents that can be distributed and navigated through Web browsers and repository servers. But there is little use of knowledge engineering, reasoning or intelligent systems techniques in commercial KM tools. In contrast, our effort builds from these techniques. At the same time, the level of formalization or structure of the knowledge source restricts the mechanisms available to manipulate it, provide services and solve problems.

The domain of "business process redesign" or BPR involves the transformation of enterprise processes, information infrastructure, work situations and surrounding resources into more optimal configurations. BPR is in many ways a precursor of KM in enterprises from historical, organizational and technological perspectives. We use our

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existing enterprise process ontology and domain expertise as the starting point for representing knowledge about BPR. Subsequently, we choose to acquire and represent knowledge of BPR from case studies found on the Web.

By combining formalized knowledge representations for enterprise processes with Web technologies, we make a move towards the development of intelligent support tools for managing BPR knowledge over the Web. Our goal is to acquire and represent a knowledge web for BPR and managed by a prototype knowledge web management system (KWMS). The knowledge web is the target knowledge base we wish to acquire and represent; the environment for operation and managing this knowledge works as a KWMS

### **4. What is BPR? Explain with an example.**

[WBUT 2009]

**Answer:**

*Refer to Question No. 7(c) of Long Answer Type Questions.*

### **Long Answer Type Questions**

- |  |                                      |
|--|--------------------------------------|
| <b>1. a) What is ERP?</b>  | <b>[WBUT 2005, 2009, 2010, 2014]</b> |
| <b>b) What is Business Process Redesign?</b>                     | <b>[WBUT 2005, 2010]</b>             |
| <b>c) Why is it necessary to do BPR before implementing ERP?</b> | <b>[WBUT 2005, 2010]</b>             |
| <b>d) What is a data warehouse? Explain its utility.</b>         | <b>[WBUT 2005, 2009]</b>             |
| <b>e) What is ERP and ecommerce related to each other?</b>       | <b>[WBUT 2005, 2010]</b>             |

**Answer:**

a) ERP, which is an abbreviation for Enterprise Resource Planning, is principally an integration of business management practices and modern technology. Information Technology (IT) integrates with the core business processes of a corporate house to streamline and accomplish specific business objectives. Consequently, ERP is an amalgamation of three most important components; Business Management Practices, Information Technology and Specific Business Objectives. In simpler words, an ERP is a massive software architecture that supports the streaming and distribution of geographically scattered enterprise wide information across all the functional units of a business house. It provides the business management executives with a comprehensive overview of the complete business execution which in turn influences their decisions in a productive way.

b) Business Process Redesign may be defined as the critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures.

c) Processes, organization, structure and information technologies are the key components of BPR, which automates business processes across the enterprise and provides an organization with a well-designed and well-managed information system. The organization must reengineer business processes before implementing ERP. The reason for that is the organization needs to analyze current processes, identify non-value

adding activities and redesign the process to create value for the customer, and then develop in-house applications or modify an ERP system package to suit the organizations requirements. In this case, employees will develop a good sense of process orientation and ownership. This would also be a customized solution keeping with line of the organization's structure, culture, existing IT resources, employee needs and disruption to routine work during the change programmer likely to be the least. It could have a high probability of implementation.

d) A data warehouse is a central repository for all or significant parts of the data that an enterprise's various business systems collect. Typically, a data warehouse is housed on an enterprise mainframe server. Data from various online transaction processing (OLTP ) applications and other sources is selectively extracted and organized on the data warehouse database for use by analytical applications and user queries.

There are a number of ways that one can use a data warehouse

- To make important decisions.
- To compete over time.
- To learn about the mistakes they made in the past.
- To market their products.
- A data warehouse is a tool that can allow companies to measure their success and failures.
- They can measure marketing strategies and other important information.
- To create a security system that covers all the data.

e) By extending the existing ERP system to support e-commerce, organizations not only leverage their investment in the ERP solution, but can speed the development of their e-commerce capabilities. One of the most interesting aspects of the ERP market is its evolutionary movement away from core ERP functionality to a more value-added set of functions. These new functions — e-commerce, analytical applications, customer relationship management (CRM) — all use the existing ERP infrastructure as a staging ground for new business models and processes. E-commerce has a number of important factors that make knowing what's happening in the extended ERP environment. The five axes of e-commerce are: high degrees of customization, instantaneous results, competitive pricing, competitive services, and a personalized experience. The integrative capabilities of ERP software make some of these e-commerce processes possible. However, a new way of looking at the analytical requirements of the enterprise; is required, one that takes into account these new business models and customer expectations. Every part of the corporate body has direct responsibility for the success of the whole. So, first and foremost, the integration within the ERP system — and the analytical applications it provides should be properly maintained. Every single part of the enterprise must be tied in as tightly as possible, including legacy applications and field operations. In near future, the requirement for analytical applications with the aid of ERP, specific to e-commerce will only grow as the Web's influence on commercial culture increases. For those "dot com" companies born into an e-commerce model, the transition to e-commerce analysis should be relatively smooth with proper application with ERP.

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**2. a) "Installing an ERP software package and implementing an ERP system is not same." – Explain.**

**b) Why do ERP projects fail sometimes?**

[WBUT 2006]

**Answer:**

a) Installing an ERP software and implementing an ERP system are widely different. To explain the differences let us categories as follows:

1. **Hardware and Software Installation:** This involves making sure that an adequate computer network is in place, and installing the ERP software on the server and workstations. A temporary training area is also highly recommended to make the learning process as efficient as possible. This usually includes at least two workstations connected to the network with access to a printer. The ERP Advisor should be able to connect a laptop computer to network in this training area.
2. **Software Shakedown by Process:** The new system will need company specific data in order to test the Future Flowchart business processes. Data from the company's legacy system may be electronically converted or manually entered into the new system. Key members of the Core Group and the ERP Advisor need to simulate all the business processes defined by the Future Flowchart using the new ERP software tools. The software system shakedown tests each business process to confirm that the tools will function as planned. As the desired result is confirmed for each business process the ERP tool, procedure and ownership is documented in the ERP blueprint.
3. **Conference Room Pilot Training:** With each business process having been tested and confirmed, the ERP Blueprint now defines the individual *owners* of each process. These operators can now be trained on the functions that are relevant to their specific area of responsibility.
4. **Activate System and Measure Results:** When the system is functional and the users are trained then it is time to begin using the new system. As mentioned previously, metrics should be established for measuring anticipated improvements in specific areas.

b) There are two distinct schools of thought about the approach to implementation of ERP. The first approach is often called as a "**Big Bang**" approach as it involves implementation of all modules of ERP all at the same time. The other approach is a "**Phased approach**" in which different phases for ERP implementation are defined with each phase taking over a few modules at a time. There are advantages and limitations of each of these approaches.

The big bang approach ensures that the entire organization migrates from the existing legacy system to the ERP on the same day. All modules of the new system are tested and accuracy is confirmed before the "go live" date in the big bang approach. This means data migration from the existing legacy system to the new ERP system is a one time task involving carrying forward the balances from different transactions.

**3. a) In today's world it is not practical to have**

- i) **an ERP system without e-commerce**
- ii) **an e-commerce system without ERP.**

[WBUT 2006, 2010]

**Comment on (i) and (ii).**

**Answer:**

Nowadays, most enterprises are willing to incorporate the development of e-Business. Over the last few years, e-commerce has become a common activity for many enterprises. Some of them dived into this challenge without taking into account the cultural changes that the situation involved, as well as the infrastructure necessary to continue with the initial project. But to set it up properly, it is necessary to rely on the good organization of the information and the processes. It is a challenge due to the fact that most companies do not have their own systems department to give support to solve their particular needs.

Electronic commerce (EC or e-commerce) describes the process of buying, selling, transferring, or exchanging products, services, or information via computer networks, including the Internet. Now the question is how the integrated network will be built to perform E-commerce activity? The answer is implementation of ERP. ERP is the generic form and application specific packages are like SAP or Bann

Similarly it is to be argued that where ERP packages are already in operation the network for communication is ready. Electronic transactions can be performed without any modifications. In such a situation E-commerce transaction are value added services only.

**b) "A proper BPR exercise helps in ERP implementation." Comment.**

[WBUT 2006, 2010]

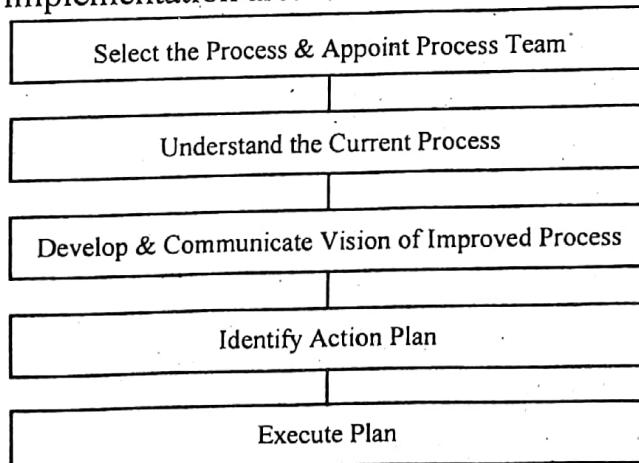
**Answer:**

According to Hammer & Champy, 1993, reengineering is the fundamental rethinking and redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed. BPR is not Automation, not Downsizing nor Outsourcing. However, in Retail, Service, Manufacturing, Support and all processes are subject to potential reengineering in the following areas:

BPR seeks improvements of

1. Cost
2. Quality
3. Service
4. Speed

The key steps of BPR implementation are:



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As a part of a BPR process communicate the revised process with vision of change

- Promote individual development by indicating options that are available
- Indicate actions required and those responsible
- Tackle any actions that need resolution
- Direct communication to reinforce new patterns of desired behavior.

Identify the action plan as follows:

- Remove no-value-added activities
- Standardize Process and Automate Where Possible
- Up-grade Equipment
- Plan/schedule the changes
- Construct in-house metrics and targets
- Introduce and firmly establish a feedback system
- Audit, Audit, Audit
- Qualify/certify the process
- Perform periodic qualification reviews
- Define and eliminate process problems
- Evaluate the change impact on the business and on customers
- Benchmark the process
- Provide advanced team training.

As part of a concluding remark on proper BPR implementation the following salient points are worth mentioning:

- Reengineering is a fundamental rethinking and redesign of business processes to achieve dramatic improvements
- BPR has emerged from key management traditions such as scientific management and systems thinking
- Rules and symbols play an integral part of all BPR initiatives.

**4. a) What is Business Integration and how do the ERP systems achieve it?**

**b) What are the factors that are critical for the success of the ERP implementation?**

**c) What is BPR and how is BPR connected to ERP?**

**OR,**

**Explain the concept of Business process reengineering and its relationship with the productivity paradox and ERP.**

**[WBUT 2008, 2011]**

**Answer:**

**a) i) Business integration refers to the processes of combining different business and management systems so that they may interact with one another and thus be used to enhance an enterprise business strategy. Business integration will make the business processes more efficient and cost-effective.**

**ii) An ERP system is analogous to the internal technological hub of a company. When fully implemented as an integrated suite, it can be thought of as a company's central repository. The five major processes in a typical ERP system are: finance, logistics, manufacturing, human resources and sales/marketing. The focus of ERP systems is on the efficiency and effectiveness of the internal process. It offers a way to streamline and align business processes, increase operational efficiencies and bring order out of chaos. ERP is**

a structured approach to optimizing a company's internal value chain. The software, if implemented fully across an entire enterprise, connects the various components of the enterprise through a logical transmission and sharing of data. When customers and suppliers request information that have been fully integrated throughout the value chain or when executives require integrated strategies and tactics in areas such as manufacturing, inventory, procurement and accounting, ERP systems collate the data for analysis and transform the data into useful information that companies can use to support business decision-making. ERP systems, if implemented successfully, enhance and redesign business processes to eliminate non-value-added activities and allow companies to focus on core and truly value-added activities.

b) The world of technology publicized lawsuits against ERP software vendors because of their failed implementations. In some extreme cases, these companies sue because they couldn't ship product or their entire business shut down because the software did not work correctly.

So how does one increase the likelihood of ERP success and ERP benefits realization? Many assume success or failure is the fault of the software you purchase, but in reality, 95% of a project's success or failure is in the hands of the company implementing the software; not the software vendor. Here are just a few ERP implementation critical success factors.

1. Focus on business processes and requirements first. Too often, companies get tied up in the technical capabilities or platforms that a particular software supports. None of this really matters. What really matters is how you want your business operations to run and what your key business requirements are. Once you have this defined, you can engage in a more effective ERP software selection process.
2. Focus on achieving a healthy ERP ROI (Return on Investment), including post-implementation performance measurement. This requires doing more than just developing a high-level business case to get approval from upper management or your board of directors. It also entails establishing key performance measures, setting baselines and targets for those measures, and tracking performance after go-live. This is the only way to maximize the business benefits of ERP .
3. **Strong project management and resource commitment:** At the end of the day, your company owns the success or failure of a large ERP project, so you should manage it accordingly. This includes ensuring you have a strong project manager and your "A-players" from the business to support and participate in the project.
4. **Commitment from company executives:** Any project without support from its top-management will fail. Support from a CIO or IT Director is fine, but it's not enough. No matter how well-run a project is, problems arise (such as conflicting business needs), so the CEO and your entire C-level staff needs to be on board to drive some of these.
5. **Take time to plan up front:** An ERP vendor's motive is to close a deal as soon as possible. Yours should be to make sure it gets done right. Too often, companies jump right in to a project without validating the software vendor's understanding of business requirements or their project plan. The more time you spend ensuring these things are done right at the beginning of the project, the less time you'll spend fixing problems later

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on.

**6. Ensure adequate training and change management:** ERP systems involve big change for people, and the system will not do you any good if people do not understand how to use it effectively. Therefore, spending time and money on training, change management, job design, etc. is crucial to any ERP project.

**7. Make sure you understand why you're implementing ERP:** This is arguably the most important one. It's easy to see that many big companies are running SAP or Oracle and maybe you should too, but it's harder to consider that maybe you don't need an ERP system at all. Perhaps process improvement, organizational redesign, or targeted best-of-breed technology will meet your business objectives at a lower cost. By clearly understanding your business objectives and what you're trying to accomplish with an ERP system, you will be able to make a more appropriate decision on which route to take, which may or may not involve ERP.

By ensuring you have these 7 critical success factors in place, your organization will be much more likely to maximize the business benefits of ERP. Click here to learn more about our ERP webcasts, white papers, podcasts, and other thought leadership in the ERP space.

**c) Business Process** can be defined as A group of logically related tasks that use the firm's resources to provide customer-oriented results in support of the organization's objectives. Business process redesign (BPR) examines the efficiency and effectiveness of processes. It ensures that they deliver the highest quality goods and services, in the most productive way, at the most competitive prices. BPR helps companies to beat their competition, as well as to become more innovative.

Key functional issues of ERP projects are:

1. Need analysis
2. Process re-engineering
3. Back-filling staffs & Training
4. Recruiting and retaining staff
5. Conference room pilot (CRP)
6. Reporting
7. Gaps analysis
8. Setting expectations
9. Obtaining user buy-in and acceptance
10. Validation of data and systems
11. Communications
12. Process documentation
13. Audit of data and system

So to accomplish the task of point number '2 → Re-engineering' has to be performed. To conduct the re-engineering process the tool is BPR.

**5. a) Define ERP. How can information be integrated using ERP?**

**b) What are the reasons for the growth of ERP market? What are the advantages of ERP system?**

[WBUT 2009]

**Answer:**

a)

1. 1960's - Systems Just for Inventory Control
2. 1970's - MRP – Material Requirement Planning
3. (Inventory with material planning & procurement)
4. 1980's - MRP II – Manufacturing Resources Planning
5. (Extended MRP to shop floor & distribution Mgmt.)
6. Mid 1990's - ERP – Enterprise Resource Planning
7. (Covering all the activities of an Enterprise)
8. 2000 onwards – ERP II – Collaborative Commerce
9. (Extending ERP to external business entities)

An ERP or Enterprise Resource Planning system integrates information and business processes to enable information entered once to be shared throughout the organization. The key functional issues of implementations are:

1. Needs analysis
2. Process engineering
3. Back-filling staffs
4. Training
5. Recruiting and retaining staff
6. Conference room pilot (CRP)
7. Reporting
8. Gaps analysis
9. Setting expectations
10. Obtaining user buy-in and acceptance
11. Validation of data and systems
12. Communications
13. Process documentation
14. Audit of data and system

**Key Technical Issues**

1. Sizing the system
2. Recruiting the talent
3. Holding the line on modifications
4. Conversion of data
5. Interfaces
6. Report development
7. Change management and problem tracking
8. Desktop requirements
9. Network issues
10. Distributed versus centralized production
11. Help Desk and ongoing support
12. Planned upgrades and revisions
13. Production budgets

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### **Post-Implementation Issues**

- Most problems end up being process issues and incorrect usage of the system
- Gearing up for round two – the upgrade path to the next ERP release.

### **b) Reasons for growth in ERP market:**

ERP market in India steadily growing for the last few years. According to observation made by some experts in the field, the ERP market started showing solid organic growth since 2004 as IT spending improved.

1. There is also a trend to replace customized system with standard application packages, like an ERP system.
2. The number of employees using the ERP system is increasing and the ERP clients who have started with the basic modules are going for subsequent applications.
3. Majority of Indian manufacturers are small by global standards, requiring easy-to-use ERP solutions to meet their specific process requirements, including localization.
4. Manufacturers in India are increasingly implementing ERP solutions to ensure that decision makers have the required information visibility across the value chain.
5. ERP helps to keep up with the competitive pressures and to achieve better ROI.
6. Cycle {The act or process of reducing} time reduction work fast by ERP which results in inventory reduction.
7. Order fulfillment {To bring into actuality; effect} improvement day by day by using ERP.
8. ERP also helps to support business growth requirements. Businesses are coming up with new products/product lines, and new customers, using multiple languages and currencies in different countries. ERP packages are integrated with such facilities that they can fulfill these requirements.

### ***Advantages of ERP system: The benefits of ERP systems are as follows:***

- Increase integration/communication between departments.
- Increase profitability while maintaining product quality.
- Increase value-added relationships
- Increase customer service/handle customer expectation
- Decrease total costs: order processing, material handling, distribution, direct labor, overhead, etc.
- Reason to re-engineer business processes.

## **6. Explain the concept of 'Business content' in SAP Business Warehouse.**

**[WBUT 2011]**

### **Answer:**

From the historical perspective SAP refers to four different business scenarios

1. Historical truth
2. Current scenario
3. Time dependency
4. Comparability

Historical truth doesn't reflect subsequent changes. Subsequent changes are taken care by the transactional data. Historical truth scenario involves tracking performance over time. The purpose of analysis, interpretation, and reporting is important to a company in guaranteeing its competitive edge, optimizing processes, and enabling it to react quickly and in line with the market. The core component of SAP Business Information Warehouse (**SAP BW**) provides data warehousing functionality, a business intelligence platform, and a suite of business intelligence tools that enable businesses to attain these goals.

All external data sources can be integrated, transformed, and consolidated in SAP BW from productive SAP applications. SAP BW provides flexible reporting and analysis tools to evaluate and interpret data and facilitate in data distribution. The Business Intelligence platform serves as the technological infrastructure and offers various analytical technologies and functions. The Business Explorer allows a broad spectrum of users access to information in the SAP BW using the Enterprise Portal, the Intranet (Web application design or mobile technologies).

**7. Write short notes on the following:**

- a) SAP
- b) EAI
- c) BAAN

[WBUT 2006, 2009]  
[WBUT 2008, 2009]  
[WBUT 2009]

**Answer:**

**a) SAP:**

SAP, started in 1972 by five former IBM employees in Mannheim, Germany, states that it is the world's largest inter-enterprise software company and the world's fourth-largest independent software supplier, overall.

The original name for SAP was *German: Systeme, Anwendungen, Produkte*, German for "Systems Applications and Products." The original SAP idea was to provide customers with the ability to interact with a common corporate database for a comprehensive range of applications. Gradually, the applications have been assembled and today many corporations, including IBM and Microsoft, are using SAP products to run their own businesses.

SAP applications, built around their latest R/3 system, provide the capability to manage financial, asset, and cost accounting, production operations and materials, personnel, plants, and archived documents. The R/3 system runs on a number of platforms including Windows 2000 and uses the client/server model. The latest version of R/3 includes a comprehensive Internet-enabled package. SAP has recently recast its product offerings under a comprehensive Web interface, called mySAP.com, and added new e-business applications, including CRM and SCM.

**b) EAI:**

Enterprise Application Integration refers to various techniques that are used to make information systems work together in the large enterprise. For example, when companies acquire other companies, disparate systems have to be integrated. Within a company, newly developed systems must work with legacy systems, and separate systems

## **POPULAR PUBLICATIONS**

developed independently in the past must often be tied together to provide required information and services. When information systems are integrated, business intelligence can be gleaned across the entire enterprise.

EAI software may function as a central distribution hub, providing data and command conversions where necessary between applications. It is also a major component of a business process management suite. EAI may involve developing a new total view of an enterprise's business and its applications, seeing how existing applications fit into the new view, and then devising ways to efficiently reuse what already exists while adding new applications and data.

### **c) BAAN:**

Baan, a software company that was an early specialist in enterprise-wide applications. Founded in the Netherlands in 1978 by Jan and Paul Baan, Baan became a major ERP vendor operating in more than 80 countries. Its products support Unix, Windows NT/2000 and AS/400 platforms. In 2003, the Baan division was purchased by SSA Global Technologies, which immediately integrated the Baan applications into its own supply chain and lifecycle management portfolio. SSA Baan ERP retained its long-running name lineage until Infor Global Solutions acquired SSA at the end of 2006.

Baan software is famous for its Dynamic Enterprise Modeler (DEM), technical architecture and its 4GL language. Baan 4GL and Tools nowadays is still considered to be one of the most efficient and productive database application development platforms. Baan became a real threat to market leader SAP after winning a large Boeing deal in 1994. In June 2003, after Allen Yurko stepped down; Invensys sold its Baan unit to SSA Global Technologies Upon acquiring the Baan software, SSA renamed Baan as SSA ERP LN. In August 2005, SSA Global released a new version of Baan, named SSA ERP LN 6.1. Today Baan ERP software is still used by thousands of companies in the world, the majority on version BaanIVc4 and ERP LN and it is still best in class ERP for mainly manufacturing sector. Infor (Global solutions) with its product line have one of the biggest customer bases - 70.000 customers.