Q2.(a) Explain the scope of E-Commerce in detail.
MDU BCA RE 2018, RE 2016, 2016

OR

What is E-Commerce? Explain Scope of E-Commerce in detail. **MDU BCA 2018**

OR

What is E-Commerce? Describe the scope of E-Commerce. **MDU BCA RE 2017, 2017**

Ans. E-Commerce

E-commerce can be defined as a modern business methodology that addresses the needs of organizations, merchants, and consumers to cut costs while improving the quality of goods and services and increasing the speed of service delivery, by using Internet.

OR

E-commerce refers to a wide range of online business activities for products and services. It also pertains to any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact.

OR

Doing business online is known as e-commerce.

OR

E-commerce describes the buying and selling of products, services and information via computer networks including the Internet.

OR

E-commerce is a particular type of e-business initiative that is focused around individual business transactions that use the Internet as medium of exchange, including business to business, as well as business to consumer.

OR

E-commerce is buying and selling, marketing and servicing and delivery and payment of products, service and information over the Internet, intranets, extranets and other networks, between an inter-networked enterprise and its prospects, customers, suppliers and other business partners.

It differs from the traditional electronic commerce in the way that it enables the trading of goods, money and information electronically from computer to computer. Business is done electronically and there is no longer a need for physical currency or goods to conduct business.

The functions included in e-commerce are:

- Buying and selling of products.
- Shipping of products.
- Producing financial statements.

All these functions are without human intervention, which is termed as real 'E' in e-commerce.

E-commerce is a range of online business activities that include explaining products or services and providing a mechanism for customers to buy those products and services from a website or internet and it encompasses online shopping and online purchasing.

Scope of E-Commerce

The potential for e-commerce development is enormous. Now-a-days one can buy products online through some sites like Flipkart, Jabong and Amazon. In the age of e-commerce everything from gym equipment to laptops are available online. E-business is a super set of business

cases. It includes E-Trading, E-Franchising, E-Mailing, E-Engineering etc. Scope of e-commerce can be enumerated as follows:

1. Exchange of digitized information
2. Technology-enabled
3. Customer retention
4. Accounting
5. Supplier integration
6. Support the exchange

1. Exchange of digitized information

The digitized information exchange can represent communications between two parties, coordination of the flow of goods and services, or transmission of electronic orders. These exchanges can be between organizations or individuals.

2. Technology-enabled

E-commerce is about technology-enabled transactions. Web browsers are perhaps the best known of these technology-enabled customer interfaces. However, other interfaces including automated teller machines (ATMs) also fall in the general category of e-commerce. Business once managed transactions with customers and markets strictly through human interaction; in e-commerce, such transactions can be managed using technology.

3. Customer retention

E-commerce enables organizations to get classified and customized market information that helps in retaining

customers through fast order fulfillment and effective customer relationship management (CRM). End-to-End supply chain management in e-commerce provides the opportunity to optimize the overall flow of demand and supply and results in fruitful customer retention.

4. Accounting

Financial accounting, treasury management and asset management are best possible in e-commerce because of integrated database. Financial planning and strategy determination become more convenient in e-commerce.

5. Supplier integration

For lowering inventory-carrying costs and broader availability of material and opportunities, suppliers' network can be integrated through EDI to implement Just-in-time (JIT) inventory management.

6. Support the exchange

E-commerce includes intra- and interorganizational activities that support the exchange. The scope of e-commerce includes all electronically based intra- and interorganizational activities that directly or indirectly support marketplace exchanges. In this sense, we are talking about a phenomenon that affects both how business organizations relate to external parties – customers, suppliers, partners, competitors, and markets – and how they operate internally in managing activities, processes, and systems.

Q2.(b) Explain the impact of e-commerce in detail.
MDU BCA RE 2018, 2018, RE 2016, 2016, RE 2015

Ans. Following are the impacts of e-commerce:

1. Abuse of power
2. Impact on children
3. Encouragement of monopoly practices
4. Impact on employment and labour policy
5. Impact on tax, trade and regulatory policies
6. Loss of security
7. Loss of privacy
8. E-mail monitoring
9. Loss of individuality
10. Improved productivity
11. Cost Reduction
12. Opportunities for new businesses
13. Better inventory-management
14. Better customer service
15. Better interactions

1. Abuse of power

Due to privacy concerns, customers may intentionally provide incorrect information about themselves while shopping or surfing on the internet, thereby creating problems by having wrong information recorded in some databases. Incorrect information can cost a job, opportunity or denial of a bank loan or mortgage. If information is not verified properly, it can lead to drastic results. The verification of information by cross-

referencing can lead to positive consequences for both individuals and the organizations.

2. Impact on children

The interactive and multimedia nature of e-commerce technologies provides tremendous opportunities for children to assess resources to attain educational goals. At the same time, it presents unique challenges for protecting the privacy of young children. During their online buying, children may innocently provide information that can lead to receiving undesired material or junk mail. This adds another burden for parents to monitor their children' surfing on the internet.

3. Encouragement of monopoly practices

Since e-commerce transcends geographical boundaries, many big firms with known brands may not only expand their markets, but may also enter into new business activities across the broad spectrum of business activities. This may help to reduce the costs and prices but it would have a greater danger of creating a monopoly of e-commerce by a few corporations or network of corporations.

4. Impact on employment and labour policy

The growth of e-commerce is likely to have both direct and indirect impacts on labour markets as well as the composition of employment. Faster rates of innovation and diffusion may create more knowledge-based products. This will lead to a shift in composition of workers required to produce and deliver a product or service. There would be shift in kind of skills needed.

5. Impact on tax, trade and regulatory policies

E-commerce has a strong impact on taxation and tax policy. It has the potential to undermine the application of domestic and national tax rules. Tax planning for an e-business differs from tax planning for a traditional bricks-and-mortar company.

6. Loss of security

E-commerce has a potential threat to the security of consumers' personal information. When consumers buy online, they typically input a credit card number and other personal information. Unauthorized persons could access this information through flaws in the merchant's computer system. Security refers to integrity of the data storage, processing and transmitting systems. While buying online, people naively believe that their communication is private and secure. But in many case, that is not true and messages are insecure and vulnerable to hackers.

7. Loss of privacy

Privacy is defined as an individual's right to be left alone, free from interference or surveillance from other parties. Privacy has become a key issue as technological advances make it easy for companies to obtain personal information and to monitor online activities of the customers. Most companies collect information about the visitors who visit a company's website. Files such as "cookies" are planted on a computer by the websites that are surfed so that they track down the details of users; the surfing patterns of visitors; develop individual profiles of

online customers. Customers feel that organizations collect too much private information and may attempt to sell it to a third party of potential marketers.

8. E-mail monitoring

The use of e-mail in the workplace produces many conflicting opinions in terms of its use and abuse both by the user and the service provider. This causes confusion with the legal and ethical guidelines that must be followed with this communication medium in order to maintain both the rights of the user (i.e. privacy) and the rights of the service provider (i.e. monitoring). The primary goal of a corporation in monitoring its employee's e-mails is to prevent those that are either offensive or those that compromise the company's best interests. However, providing managers with the means to monitor their employees can result in an abuse of power.

9. Loss of individuality

E-commerce technology is eroding personal privacy because consumers have no control over their personal data that the merchants have captured during their shopping experience. In addition, the record-keeping systems of the merchants are not regulated or restricted. People fear that if the trend of collecting information continues, they may lose their individuality since they would have no control over the information about them.

10. Improved productivity

Using e-commerce, the time required to create, transfer and process a business transaction between the partners is

Importance of e-commerce

- **Easy global reach:** E-commerce enables a business organization to reach out to customers all over the world.
- **Round-the-clock working:** Website is open 24 hours, which allows order, delivery and payment at any time.
- **Production of customized products and services:** Products can be developed and offered to suit the preferences of people residing anywhere in the world.
- **Low cost of acquiring, serving and retaining customers:** The cost of advertising, exchange of information and display is reduced.
- **Knowledge of customer-behaviour:** The buying behavior of customers is recorded on real-time basis.
- **Improving customer services:** Quick response to customers and redressing of customers problems.
- **Easy connections:** Easy to establish networks with suppliers, distributors and retailers.
- **Simple and fast:** E-commerce is essential for making a business process simple and fast.

- **Offers online services:** It provides a big platform to increase customers or clients by offering online products and services.

- **Near the reach:** E-commerce from a marketing perspective, brings the product or the service closer to the customers.

- **Saves time and cost:** E-commerce reduces delivery time and labor cost. Thus it saves the time of both – the vendor and the consumer.

- **Cost effective:** E-commerce is one of the cheapest means of doing business. It is the e-commerce development that has made it possible to reduce the cost of promotion of products and services.

- **No time barrier:** E-commerce removes the time barrier in selling the products. One can log on to the internet even at midnight and can sell the products at a single click of mouse.

- **User convenient:** E-commerce provides convenience to customers by providing them on-time alerts and informing them about new products.

- **Helps in price reduction:** E-commerce helps in price reduction by providing transparent information flows and dynamic price determination through online bidding and auctions.

Functions of E-commerce

There are four important functions of e-commerce:

- **Communication:** Communication is the first most important function of e-commerce. It aims at quick delivery of information and documents to facilitate business transactions. For example: E-mail etc.

- **Process Management:** As a second function of e-commerce, it covers the automation and improvements of business processes. For example: networking two computers together.

- **Service Management:** Service management is an important function of e-commerce. It is the application of technology to improve the quality of service.

- **Transaction Capabilities:** Transaction capabilities refer to providing the ability to buy or sell on Internet or some other online services. For example: Flipkart.com etc.

Q2.(d) What are the advantages and disadvantages of e-commerce? Explain.

Ans. Advantages of E-Commerce

Following are the advantages of e-commerce:

1. **Economy**

   By any standard, e-commerce is economical. Unlike the brick-and-mortar (traditional) environment, there is no rental of physical store space, insurance or infrastructure investment.

2. **Global reach**

   The internet can be accessed by anyone at anytime and from anywhere in the world. Thus, the market reach of a company goes beyond its geographic location and time horizon to transact business with customers from all over the world.

3. **Information sharing and convenience**

   Electronic marketplaces improve information sharing between merchants and customers and promote quick deliveries. Customers and merchants save money, experience no traffic jams, and do not have to carry heavy shopping bags.

4. **Round-the-clock operation**

   E-commerce enables both business houses and customers to engage in business contracts 24 x 7. This opportunity has increased real-time business operations and customer connectivity to business.

5. **Cost effectiveness**

   Business organizations evaluate the cost effectiveness of every product before making any investment on that. E-commerce helps in lowering the various costs that contribute to the total costs of the business such as processing cost, procurement cost, purchasing cost, selling and marketing cost.

6. **Better customer service**

   E-commerce means better and quicker customer service. Web-based customer service makes customers happy. Customers have direct access to their accounts over the internet. The overnight package delivery services, tracking of the package online are the other examples of better customer service.

7. **Disintermediation**

   Using e-commerce, the business organizations can directly approach the customers and suppliers, cutting down the intermediaries, number of levels in the process as well as the cost. Thus, e-commerce facilitates businesses to operate under a disintermediated environment by providing direct communication between customers and business organizations.

8. **Interrelated business partners**

   The value chain in e-commerce consisting of suppliers, contractors and regulatory agencies is fed by an integrated trade partnership. Developing an electronic community improves the competitive position of business

through low pricing, reduced inventory-carrying cost and broader availability of materials.

9. Strong information base

E-commerce facilitates the dissemination of information to wipe off any information gap. Information related to customer behaviour, inventory management, brand preference, repeat purchase trends helps organizations in developing strategies to survive and grow.

10. Improved customer relations

By providing customized products and services to customers and fulfilling several other demands, e-commerce can help in building a strong customer relation that helps in retaining customers for a long period. Thus, e-commerce helps in building a base of loyal customers by improving the customer relations.

11. Customization

Digital products are highly customizable. They are easy to reorganize, revise, or edit. With information about consumer tastes and preferences, products can be differentiated and customized to match the individual needs.

12. Reduced cost of acquiring, serving and retaining customers

It is relatively cheaper to acquire new customers with the help of e-commerce. Through e-commerce, it is also possible to retain customer loyalty with minimal investments.

13. Easy to build an extended enterprise

E-commerce provides an effective and less expensive way to extend your enterprise. Tools like Enterprise Resource Planning (ERP), Supply Chain Management (SCM) and Customer Relationship Management (CRM) can easily be deployed over internet. It provides an improved efficiency in time needed to market, customer loyalty, on-time delivery and increases the profits as well.

Disadvantages of e-commerce

Following are the disadvantages of e-commerce:

1. Hidden costs

Often, there are various hidden costs associated with the products. For example: online purchases are often accompanied by high shipping and re-stocking fees. There are many e-commerce companies that overcharge the customers for shipping and handling.

2. Network unreliability

Network reliability problems arise in e-commerce because of many factors such as:

- ***Long response time due to increased network traffic or increased bandwidth.***
- ***Equipment failure in the network connection provider or ISP.***
- ***Accidental problems caused by nature such as floods, earthquakes that affect the communication line.***

Q3.(a) Explain different type of E-commerce.

MDU BCA RE 2017

OR

Explain different type of E-commerce system.

MDU BCA 2017

Ans. Different types of E-Commerce are the following:

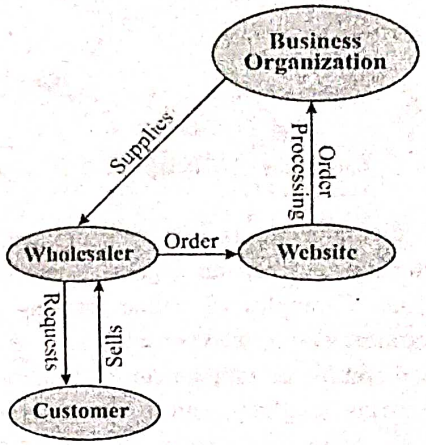
1. Business-to-Business (B2B)
2. Business-to-Consumer (B2C)
3. Business-to-Employee (B2E)
4. Business-to-Government (B2G)
5. Government-to-Citizen (G2C)
6. Consumer-to-Consumer (C2C)

1. Business-to-Business (B2B)

B2B e-commerce is any business process between two companies that uses Web based network technology. It can include functions that provide the exchange of information, facilitate business transactions and completely integrate the shared business processes for a company.

In simple words, B2B is doing business between companies such as manufacturers selling to distributors and wholesalers selling to retailers. B2B also involves interaction between businesses by chain process or with new trading partners, maintaining information flow among all parties involved in the process.

For example, Dell deals in computers and other associated accessories online but it does not make up all these products. So, in order to deal in those products, first step is to purchase them from unlike businesses i.e. the producers of those products.

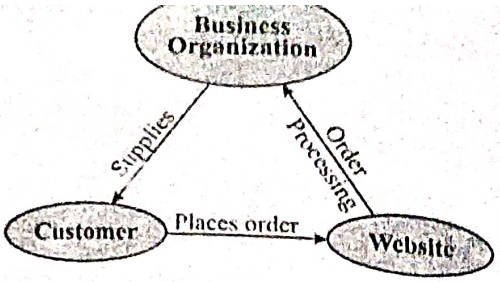


B2B e-commerce is also called e-marketplace or B2B exchanges. This Web-based e-commerce is gradually replacing older paper based system and it is faster, cheaper and easier to modify and expand according to the changing market dynamics.

2. Business-to-Consumer (B2C)

Business-to-consumer e-commerce is the commerce between companies and consumers. It involves customers gathering information, purchasing tangible goods or other information goods such as software over an electronic network.

B2C is the direct trade between the company and consumers. It provides direct selling through online.



B2C e-commerce is the trading and transactional relationship between an organization's website and an end user. Examples of online retailing companies are www.amazon.com, www.onsale.com and many more. In these, e-commerce supplements the traditional commerce by offering products and services through electronic channels. Many e-commerce sites and companies include availability of physical space, availability of returns and availability of customer services in these physical stores.

Common applications of B2C e-commerce are in the areas of purchasing products and information and personal finance management, which pertain to the management of personal investments and finances with the use of online banking tools. B2C e-commerce reduces transaction costs by increasing consumer access to information and allowing the consumers to find and select the most competitive price for a product or a service.

3. Business-to-Employee (B2E)

Business-to-employee (B2E) electronic commerce uses an intra-business network which allows companies to provide products and/or services to their employees. Typically, companies use B2E networks to automate employee-related corporate processes.

4. Business-to-Government (B2G)

Business-to-government e-commerce or B2G is generally defined as commerce between companies and the public sector.

It refers to the use of the Internet for public procurement, licensing procedures, and other government-related operations.

For example: Business pay taxes, file reports, or sell goods and services to Govt. agencies.

B2G is a variation of B2B model. B2G e-businesses create a market space for sellers wishing to do business with government agencies. B2G e-commerce provides information on government contracting and brings suppliers and government agencies together. B2G website is used by the government to exchange information and trade with various organizations across the world.

5. Government-to-Citizen (G2C)

Government to Citizen refers to all dealings between citizens and the government.

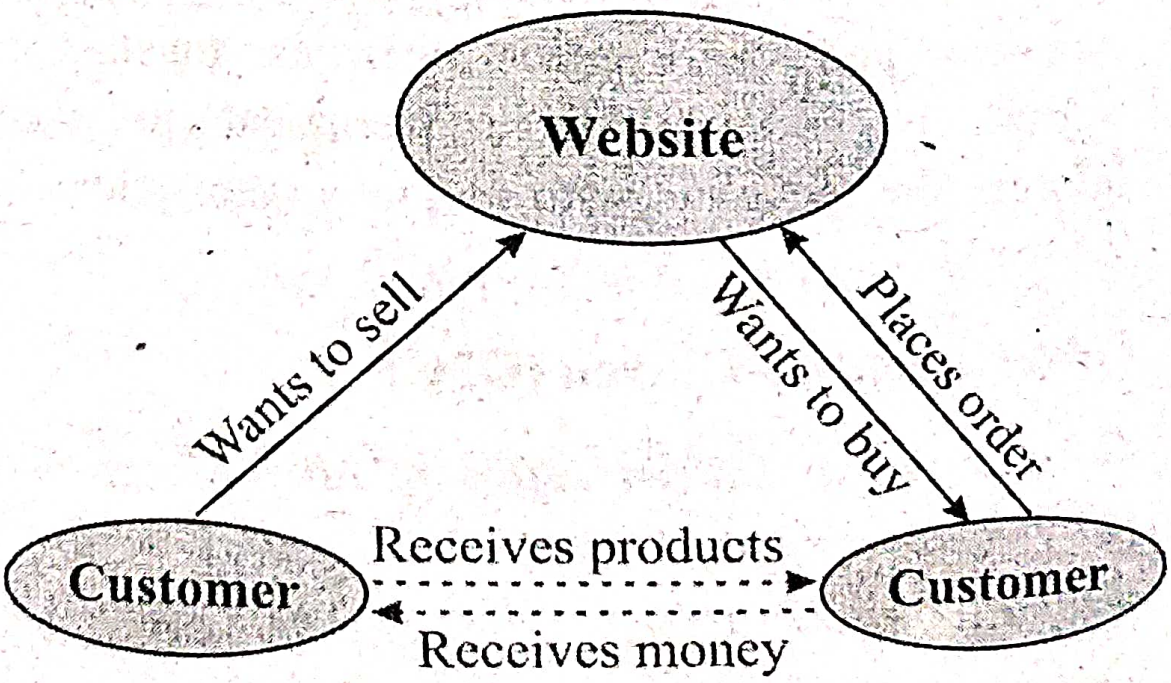
This type of e-commerce is used by the government departments to directly reach to the public by setting up

the websites. These websites have government policies, rules and regulations related to the respective departments. Any citizen may interact with these websites to know the details. This helps the people to know the facts without going to the respective departments.

G2C includes information about basic citizen services such as license renewals, ordering of birth/death/marriage certificates and filing of income taxes. It also includes information regarding citizen assistance for services like education, health care etc.

6. Consumer-to-Consumer (C2C)

Consumer-to-consumer e-commerce or C2C is simply commerce between private individuals or consumers. Example: Me selling a car to my neighbour.



Q3.(c) Explain the various issues in developing e-commerce applications.

Ans. Following are the issues in developing e-commerce applications:

1. Security issues
2. Flexibility issues
3. Scalability
4. Fault tolerance
5. User interfaces
6. Multi-channel interfaces

1. Security Issues

Security is a crucial feature as most of the transactions take place in a fully automated way. Restricted data are transmitted through a public network. Users must be sure that their money is safe and will not be lost or stolen.

2. Flexibility Issues

E-commerce systems are subject to frequent structural changes because of mutations of products and services provided by the firm or commercial partnerships.

3. Scalability

Scalability refers to the capability to support a certain number of users (thousands, even millions) without compromising with performance. It is important because a slow application often means to lose customers (especially in B2C) since they have very small patience.

4. Fault tolerance

A less fault-tolerant application will be less available to the user. Unavailability of the site may incur losses for the company as it may lose its customers forever. Thus it is necessary that the e-commerce application is fault tolerant.

5. User Interfaces

An e-commerce application must be intuitive, easily accessible and simple to operate. In the case of B2C, it must support profiling in order to anticipate the customer requests. Also they need to be customizable.

6. Multi-channel interfaces

E-commerce application interfaces must support several kinds of connections:

- *Web browsers*
- *Web TV*
- *Cellular phones (via WAP)*

3.(d) Differentiate between Traditional Commerce and E-Commerce. MDU BCA RE 2016, 2016

ns. Following are the differences between Traditional Commerce and E-Commerce:

Traditional Commerce	E-Commerce
1. Traditional commerce involves a great number of processes in addition to buying and selling transaction such as information exchange, identification of items or services, buying, payment, delivery, customer support, marketing feedback, manufacturing of new products and their distribution.	1. E-commerce is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the Internet. It is a system that combines the resources of information system with the network connectivity to directly link the key business constituents- customers and businesses.
2. Traditional commerce is based around face-to-face interaction. The customer has a chance to ask questions and the sales staff can work with them to ensure a satisfactory transaction.	2. E-commerce doesn't offer the benefit of face-to-face interaction unless live chats are implemented. Thus, the interaction between the business and the consumer is usually screen-to-face.
3. In traditional commerce, cost has to be incurred for the role of middlemen to sell the products.	3. E-commerce is very cost effective. The total cost required to run an e-business is comparatively less.
4. It is not easy to expand business, since business organization will have to incur a lot of expenses to expand the business.	4. In e-commerce, it is easy to expand the size of market from regional to international.
5. It takes a lot of time to complete a transaction in the traditional commerce.	5. It saves a lot of time for both the consumers and the business firm.
6. In traditional commerce, it is possible to physically inspect the goods before purchase.	6. In e-commerce, physical inspection of goods before purchase is not possible.
7. Traditional business is open only for a limited time. Thus, it has time limitations.	7. E-business is possible round the clock i.e. 24 × 7 service is possible. Thus, it has no time limitations.
8. It takes a lot of time and money to introduce a new product and analyze the response of the customers.	8. It is easy to introduce a product on the website and get the immediate feedback from the customers.

Traditional Commerce	E-Commerce
9. It takes a lot of time to complete a transaction in traditional commerce.	9. It saves a lot of valuable time for both the consumers and the business firm.
10. Communication or transactions are done in synchronous way. Manual intervention is required for each communication or transaction.	10. Communication or transaction can be done in asynchronous way. Electronics system automatically handles when to pass communication to required person or do the transactions.
11. It is difficult to establish & maintain standard practices in traditional commerce.	11. A uniform strategy can be easily established and maintained in e-commerce.
12. Communications of business depends upon individual skills.	12. In E-commerce or Electronic Market, there is no human intervention.
13. There is manual processing of business transactions in traditional commerce. Thus, clerical errors may occur.	13. There is an automated processing of business transactions in e-commerce. Clerical errors are minimized.
14. Unavailability of a uniform platform as traditional commerce depends heavily on personal communication.	14. E-Commerce website provides user a platform where all information is available at one place.

Traditional Commerce	E-Commerce
15. No uniform platform for information sharing as it depends heavily on personal communication.	15. E-Commerce provides a universal platform to support commercial / business activities across the globe.
16. This can prove invaluable for small business owners who don't have the startup capital to rent prime retail space and staff it to be able to sell their goods.	16. E-commerce is usually much cheaper than maintaining a physical store in an equally popular location. Opening an online store is much easier.
17. In traditional commerce, you are restricted to people who actually come to your shop.	17. With e-commerce, you can do business with anybody living on a country you are able and willing to send mail to.
18. A traditional commerce store has capability limits. Stocks are also limited.	18. An online store has no capability limits, and you can have as many clients as your stock can serve.
19. In a traditional store, the customer will be able to touch and check the items, to make sure they are suitable, and even try them on, which reduces the number of returned items or complaints.	19. In an e-commerce store, significantly higher rate of returns are expected, as many will just order and try the items at home, and won't hesitate to return them if they don't find the items suitable.

Q4.(a) What do you mean by Electronic Markets? Explain. **MDU BCA RE 2015**

OR

What do you mean by Electronic Markets? What are the various functions performed by the Electronic Markets? Explain.

Ans. Basically, an electronic market is a website where many companies can buy from and sell to each other using a common technology platform. They are the commerce sites on the internet that allow a large number of buyers and suppliers to meet and trade with each other. They are also known as electronic market places, online markets, e-hubs, or business-to-business markets.

An electronic market is an 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.

Electronic markets are the foundation of electronic commerce. They potentially integrate advertising, product ordering, delivery of products, and payment systems. Many electronic markets also offer additional services, such as payment or logistics services that help members complete a transaction. They may also support community activities like distributing industry news, sponsoring online discussions, and providing research on customer demand or industry forecasts for components and raw materials.

Functions of E-Markets

E-markets serve three particular functions:

1. ***They act as an exchange for business transactions- not only purchasing but also for checking prices and stock availability, invoicing and order chasing.***
2. ***They manage catalog content, converting product information into a common format understood by all parties.***
3. ***They provide additional services to support the trading process such as shipping, payment, tendering and determining a company's financial status.***

Other functions performed by the e-markets

- E-markets provide an electronic or online method to facilitate transactions between buyers and sellers. They present ideal structures for commercial exchange, because of the market efficiency attained by tightening and automating the relations between sellers and buyers of products and services.
- Electronic markets bring together their member companies into trading communities united by common business interests, thus improving speed and efficiency. They offer both buyers and sellers forums to reduce transaction costs, to enhance sales, to streamline distribution processes, to deliver and consume value-added services, and to streamline customer management.

Q4.(b) Write about the characteristics of Electronic Markets. What are the various barriers to the success of electronic markets? What are the various contributors in the success of electronic markets? Explain.

Ans. Following are the characteristics of electronic markets:

1. Cost reduction
2. Switching costs
3. Network externalities
4. Economies of scale and scope
5. Technological uncertainty

1. Cost reduction

Electronic markets reduce the costs of advertising price and product information to additional customers. They also reduce the cost of obtaining information on the prices and products of alternative suppliers.

2. Switching costs

Electronic markets may require sizeable investments from their participants, for hardware, software, employee training and organizational transformations.

3. Network externalities

The benefits for individual participants in electronic markets increase as more businesses join their information systems. Electronic markets with large number of buyers and sellers create more value for their participants, who are provided with a wider selection of potential suppliers and customers. These network externalities may also generate an early mover advantage because early movers have more time to attract buyers and sellers.

4. Economies of scale and scope

Electronic markets typically require large capital investments and offer substantial economies of scale and scope. Initially large system development costs are incurred followed by the relatively small incremental costs for additional transactions until the capacity of system is approached, resulting in substantial economies of scale.

5. Technological uncertainty

Potential participants of electronic markets face substantial uncertainty regarding the actual benefits of joining such a system.

Barriers to Electronic Market Success

Following are the barriers to the success of e-markets:

1. Computer illiteracy
2. Insufficient security
3. Hierarchical transaction governance
4. Lack of IT infrastructure

1. Computer illiteracy

The level of computer illiteracy associated with the consumers that have access to IT infrastructure is a barrier to e-market success. Because of a lack of

education about computers, or a lack of willingness to accept new technology, a certain proportion of consumers are unable or unwilling to participate in electronic markets. As more and more children are introduced to computers in school, the proportion of consumers who potentially may participate in electronics will increase in the future.

2. Insufficient security

Insufficient data and message security inhibits some companies and consumers from participating in e-commerce. Confidence, reliability, and protection of information against security threats are the crucial prerequisites for the functioning of electronic commerce. Many initiatives are under way to improve security through improved data encryption and digital signatures. As the level of transaction security for e-commerce related information transfer improves, the expected level of e-market impact on industries, and the global economy will increase.

3. Hierarchical transaction governance

Another barrier to e-market success is the fact that a significant portion of all transactions are not market transactions, but are hierarchical transactions. Hierarchical transaction governance is often associated with transactions involving high asset specificity. Asset specificity is the difference between the value of an asset in its present use and its next best use. Transactions involving high asset specificity will continue to be governed by hierarchies because the firms involved generally need to maintain greater control over the transactions to minimize their overall risk.

4. Lack of IT infrastructure

The lack of IT infrastructure in India is a barrier to e-commerce participation by companies and consumers. In many areas, consumers do not have the same level of access to the Internet. This is a major barrier to electronic market diffusion because even if consumers wish to participate in e-markets, they are physically unable to. Even if access is available, an additional barrier may be poor physical telecommunications.

Contributors to Electronic Market Success

Following are the contributors to the success of electronic markets:

1. Product characteristics
2. Industry characteristics
3. Seller characteristics
4. Consumer characteristics

1. Product characteristics

First, the form of the product is important. Digitizable products are particularly suited for electronic markets because they not only take advantage of the digitization of the market mechanism, but also the distribution mechanism, resulting in very low transaction costs.

Second, the magnitude of the product price may be an important determinant. Higher the product price, greater is the level of risk involved in the market transaction

between buyers and sellers who are geographically separated and may have never dealt with each other before.

Some of the most common items currently sold through e-markets are low priced items such as CDs and books.

2. Industry characteristics

An industry factor that affects the impact of e-markets is the level of standards that exist in an industry for describing products. Availability of standards that both the buyer and seller recognize contributes to enhancing the sales electronically.

A second industry characteristic is the need for a transaction broker. Electronic markets are most useful when they are able to directly match buyers and sellers. Industries that require transaction brokers may be affected less by electronic markets than are industries where no brokers are required.

3. Seller characteristics

E-markets reduce the search costs and enable the consumers to find sellers offering lower prices. In the long run, this reduces profit margins for sellers that compete in e-markets. It may also increase the number of transactions that take place.

If sellers in an industry are unwilling to participate in this environment, then the impact of e-markets may be reduced. In highly competitive industries, with low barriers to entry, sellers may not have a choice. But, in oligopolistic situations, sellers may determine the success of e-markets in an industry if they want to maintain an environment of lower volume, higher profit margin transactions.

4. Consumer characteristics

Consumers can be classified as either impulse, patient or analytical. Impulse buyers purchase products quickly with little analysis, patient buyers purchase products after making some comparisons, and analytical buyers do substantial research before making the decision to purchase products or services.

Electronic markets may have little impact on industries where a sizable percentage of purchases are made by impulse buyers. For example: grocery store purchases. Because electronic markets require a certain degree of effort on the part of the consumer, these markets are more conducive to consumers who do some comparisons and analysis before buying (the patient or analytical buyers).

More the industry features associated with higher e-market impact, greater will be the expected impact of e-markets on that industry.

Q5.(a) Explain the obstacles in adopting E-Commerce in detail. MDU BCA 2018

OR

What are the obstacles in adopting e-commerce? Explain. MDU BCA RE 2017, 2017

OR

Describe the obstacles in adopting e-commerce application. MDU BCA RE 2016, 2015

Ans. Following are the obstacles in adopting e-commerce applications:

1. Lack of awareness
2. Trust and Confidence
3. Difficulty in reengineering business process
4. Huge investment required
5. Poor Customers, Suppliers, and Business Partners' Base
6. Lack of trust and confidence
7. Taxation
8. Lack of Legal and Regulatory Framework
9. Lack of Knowledge of E-Commerce
10. Weak payment and delivery systems

1. Lack of awareness

The primary obstacle to adoption of e-commerce is the lack of awareness of e-commerce, and the unavailability of access to telecom infrastructure at a reasonable cost. The organizations are unaware of the current developments or the role they could play in this new marketplace. The lack of awareness is closely related to the fact that the organizations in India are usually slower in adopting new technologies given the high investments necessary. Many of the business organizations are less risk taking and are not ready to experiment.

2. Trust and Confidence

Another main obstacle in the growth of e-commerce market is the lack of trust and confidence in various aspects of electronic marketplace. Organizations fear doing businesses with international marketplaces, due to cultural backgrounds and the fear of being deceived, due to lack of knowledge of new technologies.

3. Difficulty in reengineering business process

It takes much longer than expected to position an entire organization to benefit from e-commerce. Reengineering paper-driven processes and convincing people to use the new systems regularly are slowing the pace of implementation.

4. Huge investment required

The investment required for converting information into useful electronic format and to develop new methods to conduct paper-based processes electronically acts as a major barrier for small organizations. In addition to the cost concerns, organizations also face the resistance to change within their organizations and among the customers and suppliers.

5. Poor Customers, Suppliers, and Business Partners' Base

Another obstacle is the lack of a critical mass among customers, suppliers, and business partners. Until

sufficient numbers of their main local customers or suppliers participate in online commerce activities, there is little incentive for organizations to become engaged in e-commerce themselves.

6. Lack of trust and confidence

Lack of trust and confidence in various aspects of the electronic marketplace is another main obstacle to the e-commerce. Small organizations fear doing business with international marketplaces due to cultural backgrounds, fear of being deceived and due to lack of knowledge of new technologies.

7. Taxation

Business organizations are more concerned about taxation because many of them like to avoid taxes. Also, the taxation process is not transparent and often subjects to discretion of evaluators. Malpractice is common practice to avoid taxes. The application of existing taxation on commerce conducted over the internet requires that tax principles be consistent with the established principles of international taxation, neutral with respect to other forms of commerce.

8. Lack of Legal and Regulatory Framework

Conducting business through electronic networks raises numerous legal questions that include: the legal status and enforceability of electronic contracts; the legal jurisdiction of international e-commerce transactions; intellectual property rights and copyright protection for digital content; the privacy of personal data; and the validity of electronic evidence in legal disputes.

9. Lack of Knowledge of E-Commerce

E-commerce can demand fundamental shifts in business strategies, operations, and technologies. Due to a lack of knowledge of e-commerce technologies, there is an internal resistance to change, and skepticism of the benefits of e-commerce among the business organizations.

10. Weak payment and delivery systems

The majority of customers and suppliers do not use credit cards for their payments. E-commerce is associated with insufficient security safeguards and authentication processes. Customers are worried about giving their credit card details to vendors because of the security issues prevalent in the e-commerce.

Q7.(a) What do you mean by Value Chain in E-Commerce?

MDU BCA RE 2018, 2018, 2017, RE 2016, 2016, RE 2015

Ans. ***Value chain is a way of organizing the activities of a business so that each activity adds value or productivity to the total operation of the business.***

In 1985, Porter introduced the term value chain in his book. In this book, he introduced value chain as a strategic tool to identify how the critical components of business tie together to deliver value for the business across the value chain process.

In a business, the raw material is received as input and value is added to them through various processes. The finished product is sold as output to customers. This means that the organizations consist of a chain of value creating activities that assure competitive advantages as they deliver value to the customers.

The competitive advantage is achieved when an organization links the activities in its value chain at a cheaper cost and more effectively than its competitors. For example, the purchasing function helps the production activity to ensure the on-time availability of the raw material and the other supplies to meet the requirements for manufacturing. Further, the manufacturing function becomes responsible to produce quality products that the sales staff can depend on. The human resource function must hire or retain the right personnel to ensure continuity in manufacturing, sales and other areas of the business.

General components of value chain

Value chain divides activities into two components/types:

1. Primary activities
2. Support activities

1. Primary activities

Primary activities are associated with the mission of the firm. They are the processes that create products and services i.e. it is that aspect where operations and processes are involved to produce the kind of products or services the organization wants to sell or market. According to Porter, the primary activities of a business are:

- **Inbound logistics**

Inbound logistics refer to obtaining materials required for successful operations. It includes the activities like – vendor selection, comparative shopping, negotiating supply contracts and just-in-time arrival of goods.

- **Operations**

Operations involve manufacturing or creating a service. This is the actual conversion of raw materials received into finished products. It includes machining, packaging, assembly, equipment maintenance, testing and facility operations. This production activity provides added value for the marketing function.

- **Outbound logistics**

Outbound logistics deliver the product or service to customers. This activity represents the actual storing, distributing and shipping of the final product. It involves warehousing, materials handling, shipping and timely delivery to the ultimate retailer or customer. The output of this activity ties in directly with marketing and sales.

- **Marketing and sales**

Marketing and sales are included as primary activities because they are central to customer demand. It includes advertising, product promotion, sales management, identifying the product's customer base and distribution channels.

- **Service**

Service is responsible for after sales support of a product. It includes testing, maintenance, repairs, warranty work and replacement parts. The output of this activity means satisfied customers, improved image of the product and the business and potential for increased production, sales and so on.

2. Support activities

Support activities are represented by the firm's infrastructure. These activities support primary activities and each other. These activities include tasks or activities indirectly associated with the actual production of goods and services without which, however, the primary activities will be hampered and value creation activities or creation of a product may not be realized. The key support activities in the value chain are:

- **Corporate infrastructure**

This activity is the backbone of the business unit. It includes general management, accounting, finance, planning, legal services and quality management.

- **Human resources**

Human resource management is concerned with recruiting, training and advancing the careers of people who work for the firm. The output of this activity affects virtually every other activity in the company.

- **Technology development**

Technology also applies to the support of the value chain through all of its steps. This activity adds value in the way it improves the product and the business processes in the primary activities.

- **Procurement**

Procurement deals with obtaining the raw materials needed to produce a product or service. Thus this activity focuses on the purchasing function and how well it ensures the availability of quality raw material for production.

Q7.(b) What are the benefits of e-commerce in the value-chain process? Discuss.

Ans. Every business is part of a value chain, with suppliers on the buy side, and customers on the sell side. Cost-saving methods usually focus on the buy side of the value chain and on improving the productivity of systems and processes that interact with suppliers. Revenue-enhancing benefits usually focus on sell side of the value chain and on improving the productivity of systems and processes that interact with customers. The benefits of e-commerce for both the buy side and sell side include:

1. New customers
2. New sales channels
3. Improved productivity
4. Better data for more informed decisions
5. Improved policy compliance
6. New services
7. Higher customer satisfaction
8. New information products

1. New customers

Establishing a new channel may result in reaching customers that the company is not currently serving effectively.

2. New sales channels

Establishing new channels such as a trading exchange, a new distribution network, or direct selling can provide new revenue opportunities.

3. **Improved productivity**

This benefit is usually measured in terms of the cos savings that result by lowering the cost of transactions For example, a company can automate a paper-based manual process such as requisitioning by using a purchasing application on a computer.

4. **Better data for more informed decisions**

Better data results in useful information for predicting future business events, such as next month's orders. More accurate data means that the company can adjust inventory level accordingly. If the demand forecast is accurate, the company can move to a just-in-time inventory solution.

5. **Improved policy compliance**

Policy compliance measures improve the quality and efficiency of business operations. For example, a company can set rules on specific general ledger codes that eliminate manual corrections or restrict purchasing to a list of approved vendors.

6. **New services**

Extending a business process may facilitate providing value-added services, such as dispute resolution, financial settlement, logistics and authentication.

7. **Higher customer satisfaction**

By having a better and deeper relationship with customers, we can ensure happier and more loyal customers who spend more money and return more often.

Q7.(c) Explain supply chain in detail.

MDU BCA RE 2018, 2018

OR

What do you mean by Supply Chain? Explain in detail.

MDU BCA 2016

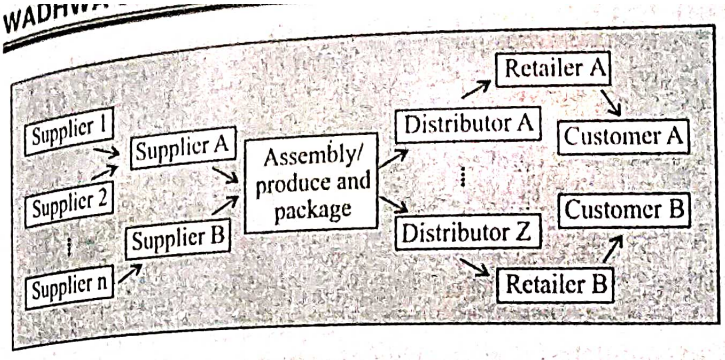
Ans. A supply chain is the system of organizations, people, activities, information and resources involved in moving a product or service from supplier to customer. Supply chain activities transform raw materials and components into a finished product that is delivered to the end customer.

A supply chain is a global network of organizations that cooperate to improve the flows of material and information between suppliers and customers at the lowest cost and the highest speed. The objective of a supply chain is customer satisfaction.

A supply chain can therefore be defined as a network "of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer".

Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements.

A model of a supply chain is shown below:



E-commerce can be used to link all the members in the supply chain for a seamless flow of goods, services and information about purchases, payments, delivery schedules and so on.

Supply Chain Goals

The main goals of supply chains are as follows:

- **Cost**

Providing products and services at a competitive price by utilizing efficient cost management strategies.

- **Time**

Making production, preparation and manufacturing possible within a short development cycle time.

- **Quality**

Enhancing first time right decision, quality of products and services with high information and value added contents.

- **Service level**

Achieving customer satisfaction, employee satisfaction and customer enrichment.

Q8.(a) Explain porter's value chain model in detail.
MDU BCA RE 2018, 2018

OR

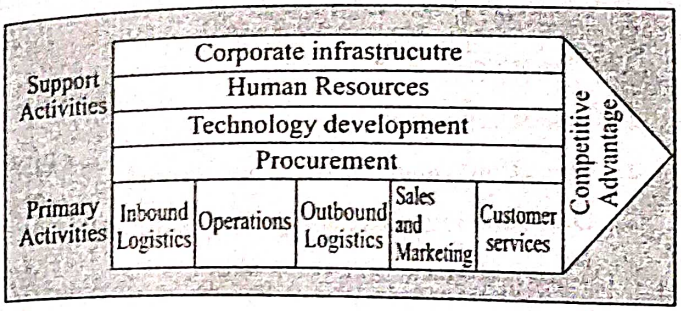
Discuss Porter's Value Chain Model.
MDU BCA RE 2017, 2017, RE 2016, 2016, RE 2015, 2015

Ans. The Porter's value chain model was developed by Michael Porter in 1985 to depict how customer value accumulates along a chain of activities that lead to an end product or service.

- ***The value chain model serves as a basic tool for diagnosing competitive advantage and finding ways to enhance It identifies technologically and economically distinct activities called value activities that an organization performs in the course of doing business.***
- ***The model is used to know, how optimally the organizational resources are used.***
- ***The model highlights specific activities in the business through which organizations can create value and get competitive advantage by applying competitive strategies.***
- ***The model helps to analyze where information systems are most likely to have a strategic impact.***
- ***The model views an organization as a chain or network of basic activities and each activity in the chain adds value to the final product/service.***

Through this model, the idea to consider the processes as complete entities and not as something that occurs within the respective departments of an organization was brought forward by Porter.

The model of value chain can be expressed as:



This model can be used to do company analysis in which, one can systematically evaluate a company's key processes and core competencies. In this analysis, one can first determine strengths and weaknesses of performing the activities and the value added by each activity. Some of the activities may add more value and might provide strategic advantage. This will help an organization to critically examine the value added activities at each stage and thus suggests whether to improve the business processes or drop the business processes.

According to Porter's value chain model, the activities conducted in any organization can be divided into two categories: primary activities and support activities. These value activities form a bridge between competitive strategy formulation and implementation.

Primary Activities

The primary activities are those business activities that relate to the production and distribution of the firm's products and services, thus creating value for which

customers are willing to pay. Primary activities involve purchasing materials, processing materials into products and delivering products to customers.

The five primary activities are:

1. Inbound logistics (inputs)
2. Operations (manufacturing and testing)
3. Outbound logistics (storage and distribution)
4. Sales and Marketing
5. Customer services (after-sales services)

The primary activities usually take place in a sequence from 1 to 5. As work progresses according to the sequence, value is added to the product or service in each activity. To be more specific, the incoming materials are processed (in receiving, storage etc.) and in this processing, value is added to them in activities called ***inbound logistics***. Next, the materials are used in ***operations***, where significant value is added by the process of turning raw materials into products. The products need to be prepared for delivery (packing, storing and shipping) in the ***outbound logistics*** activities and so more value is added in the activities. Then ***sales and marketing*** attempt to sell the products to customers, increasing product value by creating demand for the company's products. Finally, ***customer services,*** such as warranty service or upgrade notification, is performed for the customer, further adding value. All of these value adding, primary activities result in profit.

Support Activities

The primary activities are supported by support activities. Unlike primary activities, support activities do not add value directly to the firm's products or services. Rather, they contribute to the firm's competitive advantage by supporting the primary activities.

Support activities consist of:

1. Corporate infrastructure
2. Human resources
3. Technology development
4. Procurement

Each support activity can support any or all of the primary activities and the support activities may also support each other. These activities are described below:

1. Corporate infrastructure

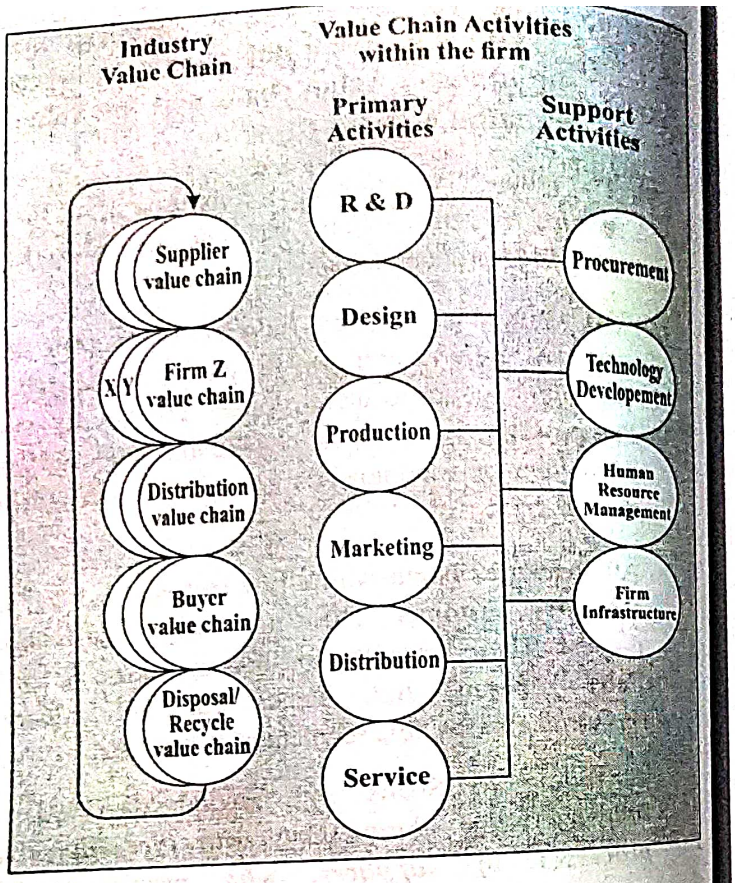
This activity is the backbone of the business unit. It includes general management, accounting, finance, planning, legal services and quality management.

2. Human resources

Human resource management is concerned with recruiting, training and advancing the careers of people who work for the firm. The output of this activity affects virtually every other activity in the company.

3. Technology development

Technology also applies to the support of the value chain through all of its steps. This activity adds value in the



Q9.(a) What do you mean by Computer Security? Also explain Computer Security Classification.

MDU BCA RE 2015

Ans. ***Computer security is the protection of assets from unauthorized access, use, alteration, or destruction.***

Computer security is generally classified into three categories:

1. Secrecy/confidentiality
2. Integrity
3. Necessity

1. Secrecy/ confidentiality

Secrecy refers to protecting against unauthorized data disclosure and ensuring the authenticity of the data's source.

The main objective of computer security is to stop unauthorized users reading sensitive data. More generally, unauthorized user should not learn sensitive information. Confidentiality captures this aspect of computer security.

Thus, a secure computer system must not allow information to be disclosed to anyone who is not authorized to access it. Secrecy is of paramount importance in protecting national defense information and highly proprietary business information.

2. Integrity

Integrity refers to preventing unauthorized data modification.

A secure computer system must maintain the continuing integrity of the information stored in it. Integrity or accuracy means that the system must not corrupt the information or allow any unauthorized malicious or accidental changes to it.

3. Necessity

Necessity refers to preventing data delays or denials.

The information that is being stored or transmitted across communication networks should be available whenever required and to whatever extent as desired within pre-established time constraints.

Q9.(b) Define e-commerce security and its important aspects.

Ans. E-commerce security is an important managerial and technical issue. E-commerce security is concerned with unauthorized access to important data resources. Some e-commerce threats are controllable, some are partially controllable and some are completely uncontrollable. Some are intentional, while others are made unintentionally.

A comprehensive e-commerce security system protects hardware, software, procedures, customers, personnel and e-commerce resources to keep intruders and hackers at bay.

Moreover, an e-commerce security plan protects data resources, the second most important resource in an organization. The data resources can be an e-mail message, an invoice transferred using electronic data interchange (EDI), the blueprint for a new product design, the outline of a new advertising strategy, or financial statements.

Thus, e-commerce security is the protection of e-commerce assets from unauthorized access, use, alteration, or destruction.

Aspects of e-commerce security

E-commerce security is broken into three important aspects. These are:

1. Secrecy

2. Accuracy

3. Availability

1. Secrecy

A secret system must not allow information to be disclosed to anyone who is not authorized to access it. In highly secure government agencies (the Department of Defense, Central Intelligence Agency etc.), security ensures that only authorized users are granted access. In business organizations, confidentiality ensures the protection of private information (payroll, personnel and corporate data). In the e-commerce world, confidentiality ensures that customers' data are protected and will be used only for the intended purpose.

2. Accuracy

Accuracy ensures the integrity of data resources within the organization. This means the security system must not allow the data to be corrupted or allow any unauthorized changes to the corporate database. Database administrators and web masters must establish comprehensive security systems for corporate databases. Authorized users must be identified and they must be given proper access privileges. In e-commerce transactions, accuracy is probably the most important aspect of a security system.

3. Availability

Availability ensures the efficient and effective operation of an e-commerce site and a computer system. In the e-commerce environment, availability ensures that the

Q9.(c) What do you mean by copyright? What are the copyright issues related to e-commerce? Explain.

Ans. ***Copyright is a group of property rights granted to the creators of literary, artistic, musical, dramatic and audiovisual works.***

Copyright gives the creators of these works the exclusive right to reproduce and distribute copies of their works, to create derivative works, and to perform and display the works publicly. Copyright also gives creators and authors the right to determine whether their work will be used as part of another work, including films, video programs and other audiovisual productions.

Copyright prohibits copying someone else's work without his permission. It has the power over the right to copy the work even up to 70 years after the author's death. This period can differ depending on the kind of property being protected (books, musical compositions, photographs, films, maps, advertisements, web page paintings, computer programs, databases).

Normal practice is to copyright work with the copyright symbol ©, followed by name and date, to warn others against copying it. Works are protected by copyright, regardless of the medium in which they exist. Copyright does not protect ideas but protects the way the idea is expressed in a piece of work.

Copyright issues in e-commerce

Owing to the rise of the Internet, the concept and practice of copyright has become a dramatically heightened source of interest and concern. Even since the birth of the first copyright law in the world – the Statute of Anne in Britain – in 1710, the copyright protection has evolved from the protection of publishers to the protection of the author, distributor and users, as printing, electronic and digital technologies are developing rapidly. Following are the copyright issues in e-commerce:

1. Conflicts between services in e-commerce and traditional copyright

Internet has made vast information available to us. While enjoying the information service, conflicts between information service and traditional copyright may arise.

- Conflict between online entertainment and copyright: Plenty of thoughts have been invoked due to the conflict between an American online entertainment company MP3.com and other traditional entertainment companies. The thoughts concerning online entertainment have even referred to the International Trade and Law.
- Online movies and copyright: As the technologies advanced, a new technology named MP4 became popular. It adopts a compressive technology just like its counterpart MP3 with an additional feature of compressing images and thus facilitates the propagation of images online. When traditional copyright comes to the era of network, there should be some integration. The realization and protection of the benefits of movie producers/film-stars and the definition of the transmitters' legal status are the key problems that need to be addressed.

2. Online bookstores and copyright

The online publishing mode enables the readers to get a new book in the online book store in a very short period. It also costs almost the same as the published copy. The mode of electronic publishing has become a fashion but there has been no solutions to the concerning copyright issues.

3. Copyright protection of database

Database is an important foundation of e-commerce. It is the databases that store all procedures in e-commerce, including query and purchase of raw material, the exhibition, order, storage and transportation of products. The database copyright protection has to protect it either as a traditional copyright or as a new and independent legislative object. Some suggest that the database be protected as a compilation.

4. Current status of database protection

With the development of Internet and e-commerce, there are more and more appeals for the legislation of database protection. However, a single country or only a few countries provide legal protection to the database with the fast-growing Internet in the information era; it needs global cooperation and unanimous acknowledgement of the principle of database protection. Otherwise, any legislation in a certain region or a country concerning the Internet database piracy will be inadequate and useless.

Q9. (d) What do you mean by intellectual property? What are the intellectual property issues related to e-commerce? Explain

Ans. Intellectual property encompasses all the tangible and intangible products of the human mind. As a general rule, the creator of intellectual property owns it. For example, if you personally create an e-commerce site, it belongs entirely to you and you have exclusive rights to use this property in any lawful way you see fit. But the Internet potentially changes things. Once intellectual works become digital, it becomes difficult to control access, use, distribution and copying. These are precisely the areas that intellectual property seeks to control.

According to Intellectual Property Right (IPR) creative work is a kind of property. The owner can use, rent and sell his rights over the property. He is also given an exclusive right over the use of his work in a certain period of time.

Issues of intellectual property are becoming more significant in the economies of the countries in Central Asia. Since intellectual property is used in many sectors of the economy, priority has been given to the need to change legal and regulatory approaches. All of the countries have adopted and validated laws that guarantee provision of copyright and related rights.

The recognition and protection of intellectual property rights is an international concern. The World Intellectual Property Organization (WIPO), with 179 members, enforces and protects intellectual property around the

world. Several WIPO treaties, along with other international treaties and conventions, set up a framework invoking copyrights, neighboring rights and exceptions. In the U.S., the Digital Millennium Copyright Act (DCMA) was enacted in 1998 as an amendment to the Copyright Act. DCMA was started as a global effort by the World Intellectual Organization to prevent copyrighted music and video from copyright infringement through the use of emerging technologies.

Intellectual Property issues in e-commerce

The issue of intellectual property rights is at the forefront of controversies surrounding e-commerce. The international character of e-commerce raises questions for the nature of intellectual property law. The digital economy has the impact on the intellectual property system, namely, copyright and related rights, patents and trademarks, which are confronted with new issues created by e-commerce. The evaluation of e-commerce and its relationship with intellectual property is therefore likely to be an intensive and ongoing process, which will require vigilant monitoring of developments.

New issues have emerged with the rapid growth of e-commerce in the international marketplace. Digital copyright issues remain at the forefront in controlling piracy-enabling technologies. Trademark issues involve ownership of marks such that they can not be used as part of the registration of domain names. These illustrate the complexities of maintaining intellectual property rights in the digital era.

Q10.(a) Explain the security policy in detail.

MDU BCA RE 2018, 2018, 2017, RE 2016

OR

What is Security policy? What are the elements of security policy? Explain.

Ans. ***A security policy is a written statement describing:***

- ***Which assets to protect and why they are being protected?***
- ***Who is responsible for that protection?***
- ***Which behaviors are acceptable and which are not?***

The security policy primarily addresses physical security, network security, access authorizations, virus protection and disaster recovery. The security policy is a living written document which is reviewed and updated at regular intervals.

Security policy also emphasizes the importance of e-commerce security and sets out or references the specific policies, principles, standards and compliance requirements for achieving this. Security policy comprehensively describes the practices followed by a company with respect to maintenance of security of the information resources of the e-commerce infrastructure. Such a policy should provide the specific parameters on which the level of security shall be measured and the acceptable range of the values of such parameters. Through the security policy, the management of the company expresses its expectation with regard to the levels of information security to be maintained. It also conveys a commitment of the company towards ensuring

information security. For example, a company that stores its customers' credit card numbers might decide that those numbers are an asset that must be protected from unauthorized access. Then, the organization must determine the level of access to the system for various people in the organization. Next, the organization determines what resources are available to protect the assets identified. Using all this information, the organization develops a written security policy and commits resources required to implement the security policy. Absolute security is difficult to achieve but deployment of a comprehensive security policy can help avoid most intentional breaches and reduce their impact.

In order to ensure the minimum level of acceptable security for most e-commerce operations, a comprehensive security policy should fulfill some basic requirements. Following are these requirements:-

- **Secrecy:** It refers to preventing unauthorized persons from reading messages and business plans, obtaining credit card numbers or deriving other confidential information.
- **Integrity:** It refers to ensuring that a communication received has not been altered or tampered with. For this, enclose information in a digital envelope so that the computer can automatically detect messages that have been altered in transit.
- **Availability:** It refers to ensuing access to a resource. It provides delivery assurance for each message segment so that messages or message segment cannot be lost undetectably.
- **Key management:** It provides secure distribution and management of keys needed to provide secure communications.
- **Non-repudiation:** It refers to ensuring that none of the parties involved can deny an operation at a later date. It provides end to end proof of each message's origin and recipient.
- **Authentication:** It securely identifies clients and servers with digital signatures and certificates.

Elements of Security Policy

A security policy of a company not only should be well documented but also be comprehensive. A comprehensive security policy besides covering the data security also takes care of various issues pertaining to authorization, authentication and non-repudiation. In order to enhance levels of trust among the users, a security policy needs to have statements relating to large number of elements. Typical elements of a security policy include the following:

1. Security definition

A security policy includes a well-defined security vision for the organization. The security vision should convey to the readers the intent of the policy in ensuring the confidentiality, integrity and availability of data and resources through the use of effective and established security processes and procedures. The security policy is implemented and what it entails in terms of the mission and the business goals of the organization.

Q11.(a) What do you mean by Security Threats in E-Commerce? **MDU BCA RE 2018, 2018**

OR

Discuss various security threats to E-commerce. **MDU BCA RE 2017, 2016**

OR

Discuss/explain electronic commerce threats. **MDU BCA 2017, RE 2016**

OR

Give a complete description about the security threats to E-commerce. **MDU BCA 2015**

Ans. E-commerce involves transactions of any kind of business done over an electronic system. This kind of business involves transactions that take place over internet. E-commerce utilizes internal networks that interface with the World Wide Web. The nature of this kind of business, introduces internal and external risks to both the website and the business systems to which it is connected to. An e-commerce website can face some security threats that have to be addressed, to avoid any losses. These are:

1. Client Threats
2. Communication Channel Threats
3. Server Threats

1. Client Threats

Client threats refer to the threats that a client/user is exposed to when it comes in contact with any activity given the nature of the Web.

Client programs interpret data that are downloaded from arbitrary servers on the Internet, if there are no checks on the contents of these imported data, there exists the potential for these data to subvert programs running on the client system. Most client threats come from Active content, which are programs that are embedded transparently in Web pages and that cause actions to occur.

The best known active contents forms are Java applets, Active X controls, JavaScript and VBScript. These are the programs that interpret or execute instructions embedded in downloaded objects. Malicious active content can be embedded into seemingly innocuous Web pages. This delivery technique called Trojan Horse, immediately begins executing and taking actions that cause harm. A Trojan Horse is a program hidden inside another program or Web page that masks its true purpose. Adding Active content to Web pages involved in e-commerce introduces several security risks. Malicious programs delivered quietly via Web pages could reveal credit card numbers, usernames and passwords that are frequently stored in special files called cookies.

2. Communication Channel Threats

The Internet serves as the electronic chain linking a consumer to an electronic commerce resource. The Internet is not at all secure. Messages travel in any number of different paths from the source node to the destination node. The messages then passed through any number of intermediate computers and the path can vary each time a message is sent. It is impossible to guarantee that every computer on the Internet through which messages pass is safe, secure and non-hostile. It is very likely that some person can reach the message, alter the contents or completely eliminate it from the network.

3. Server Threats

The server is highly vulnerable and forms the threat link in the Client-Internet-Server Group serving the electronic commerce path between the commerce server and a user. Servers can be exploited by anyone determined to cause destruction or to acquire information illegally. Most entry points include the web server and its software, databases and CGI programs residing on the server.

Q13.(a) Explain electronic cash in detail.
MDU BCA 2018, RE 2016, 2016

OR

What do you mean by electronic cash? Explain the process of creating electronic cash.

Ans. ***Electronic cash is a general term that describes any value storage and exchange system created by a private (non-governmental) entity that does not use paper documents or coins and that can serve as a substitute for government-issued physical currency.***

Because electronic cash is issued by private entities, there is a need for common standards among all e-cash issuers so that one issuer's e-cash can be accepted by another issuer. This need has not been met yet. Each issuer has its own standards and electronic cash is not universally accepted, as is government-issued physical currency.

Electronic cash transactions are more efficient and therefore less costly than other methods thereby meaning lower prices for consumers. Transferring electronic cash on the internet costs less than processing credit card transactions.

Electronic cash transfers occur on the internet, which is an existing infrastructure and uses existing computers. Thus additional costs that users of e-cash must incur are nearly zero. Electronic cash does not require a party to obtain an authorization, as is required with credit card transactions.

Electronic cash is a secure and convenient alternative to bills and coins. This payment system complements credit, debit, and charge cards and adds conventional convenience and control to everyday customer cash transactions. E-cash usually operates on a smart card and has an embedded microprocessor chip. The microprocessor chip stores cash value and the security features that make electronic transactions secure.

Electronic cash transactions usually require no remote authorization or personal identification number (PIN) codes at the point of sale. This is because e-cash is transferred directly from the customer's desktop to the merchant's site. E-cash can be reloaded onto card's microprocessor chip as frequently as needed. Using e-cash, the customer has two options: a stand-alone card containing e-cash, or a combination card that incorporates both e-cash and debit. E-cash can be transferred over a telephone line or over the web. The microprocessor chip embedded onto the card keeps track of the e-cash transactions.

Process of creating electronic cash

Creating truly anonymous electronic cash requires a bank to issue electronic cash with embedded serial numbers such that the bank can digitally sign the electronic cash while removing any association of the cash with a particular customer.

The process begins when a consumer creates a random serial number that he sends to the bank issuing the electronic cash. The bank uses the consumer's random serial number along with the bank's digital signature and

sends the random number, electronic cash and digital signature as one package to the user. The consumer can now spend the electronic cash, which is digitally signed by the bank. When the consumer spends the electronic cash and the merchant passes it along to the issuing bank, the bank validates the electronic cash because it contains the bank's digital signature. However, the bank cannot determine the identity of the spender. It only knows that the electronic cash is genuine.

Q13.(b) What are the properties of an electronic cash system? Explain the working of an electronic cash system. What are the essential characteristics of an ideal electronic cash system?

Ans. Electronic cash (e-cash) systems differ in implementation but every electronic cash system must have the following properties:

- **Monetary value**

  Monetary value is present if the electronic cash is backed by hard currency, a bank-certified cashier's check, or bank-authorized credit. When e-cash created by one bank is accepted by the others, reconciliation must occur without any problems.

- **Interoperability**

  Electronic cash must be interoperable. To be interoperable, electronic cash must be exchangeable for goods, services, paper cash, other electronic cash, lines of credit, or any purpose for which money is used. Interoperability depends on acceptance of electronic cash by an international clearing house because parties to most transactions will not be using the same bank.

- **Storable and Retrievable**

  Electronic cash must be storable and retrievable. Remote storage and retrieval will allow users to exchange e-cash from office, home or while traveling.

The cash could be stored on a remote computer's memory, e.g. smart cards, electronic wallets.

- **Security**

  Electronic cash should not be easy to alter or copy while being stored or exchanged. Procedures must be in place to verify that the electronic cash is spent only once i.e. double spending issue should be taken care of.

When used, e-cash is transferred directly and immediately to the participating merchants and vending machine. Similar to regular cash, e-cash enables transactions between customers without the need for banks or other third parties.

Working of an electronic cash system

Step 1: A customer or merchant signs up with one of the participating banks or financial institutions.

Step 2: The customer receives specific software to install on his or her computer. The software allows the customer to download "electronic coins" to his or her desktop. The software manages the electronic coins. The initial purchase of coins is charged against the customer's bank account or against a credit card.

Step 3: When buying the services from a website that accepts e-cash, the customer simply clicks the "Pay with e-cash" button. The merchant's software generates a payment request, describing the items purchased, price, time and date.

Step 4: The customer can then accept or reject this request. When the customer accepts the payment request, the software residing on the customer's desktop subtracts the payment amount from the balance and creates a payment that is sent to the bank or financial institution of the merchant, and then is deposited to the merchant's account.

The entire process takes a few seconds. The merchant is notified and in turn ships the goods.

Before purchases can be made, both the merchant and the customer need to establish banking arrangements and internet links with the bank that is issuing the e-cash. The customer first requests a transfer of funds from his bank account into the e-cash system. The e-cash system then generates and validates e-cash coins which the customer is able to use on the internet. The coins are data streams digitally signed by the issuing bank using its private key. The customer is then able to send e-cash to any merchant who will accept this form of payment using the software provided by the e-cash service provider. The customer encrypts the message and endorses the coins using the merchant's public key. The merchant then decrypts the message with its private key and verifies the validity of the coin using issuing bank's public key. The merchant is then able to turn e-cash into real funds to be credited to the merchant's bank account.

Electronic cash is a form of payment that is exchanged electronically. Customers withdraw electronic coins from a bank and pay merchants with them. The merchants then

Q14.(a) What do you mean by Electronic Payment System? Explain its characteristics. Also compare it with Traditional Payment.

MDU BCA 2015

Ans. Electronic Payment System

In an e-commerce environment, payments take the form of money exchange in an electronic form and are therefore called electronic payments. Electronic payments (e-payments) are an integral part of e-commerce and are one of its most crucial aspects.

Electronic payment is a form of a financial exchange that takes place between the buyer and the seller facilitated by means of electronic communications. Electronic payment is a financial exchange that takes place in an online environment.

An electronic payment system is a system of financial exchange between buyers and sellers in the online environment that is facilitated by a digital financial instrument such as encrypted credit card numbers, electronic cheques backed by a bank.

To a consumer, an electronic payment system is a convenient way of making a purchase or paying for a service without holding cash or having to go through the process of completing a cheque and producing some form of acceptable identification.

To a supplier of goods or services, an electronic payment is the receipt or outward movement of funds, linked into an inventory management, ordering or

accounting system, eliminating the need of large cash holdings, time consuming clerical activities and offering easier management of cash flows.

To an account/payment manager or bank, an electronic payment is a series of processes by which value exchange is captured, verified and accepted; a series of checks, balances to ensure integrity.

E-payment is based on electronic financial network, and uses various apparatus and cards as media, computer and communication technologies as means to realize circulation and payment by making use of binary data stored in the bank computer systems. Thus an e-payment has the following features:

- ***It is supported by computer technologies. It realizes storage, payment and circulation.***
- ***Multiple functions are integrated together, including deposit, loan and non-cash settlement.***
- ***It is widely applied to areas such as production, exchange, distribution and consumption.***
- ***It is simple, secure, fast and reliable.***
- ***It is usually accomplished through exclusive network for banks.***

Electronic payment systems facilitate the most important action after the customer's decision to pay for a product or service; which is- the delivery of payments from customers to vendors in a most effective, efficient and problem-free way.

Various modes of electronic payment are:

- *Electronic cash*
- *Electronic wallets*
- *Smart cards*
- *Credit cards*
- *Debit cards*
- *Charge cards*

Characteristics of an electronic payment system

Following are the essential characteristics of an electronic payment system:

1. Acceptability

The payment infrastructure should not only be robust, but also available and accessible to a wide range of consumers and sellers of goods and services. The value stored in the electronic cash should be honoured and accepted by other banks and financial institutions for reconciliation.

2. Reliability

Users and businesses want a payment system that is reliable, because the availability of services and smooth running of an enterprise will depend on the availability and successful operation of the payment infrastructure. The users should be completely shielded from system or single point failure.

3. Security

Digital currency should be stored in a form that is resistant to replication, double-spending and tampering. At the same time, it should offer protection from the intruders trying to tap it and put it to unauthorized use, when transmitted over the internet.

4. Usability

The user of the payment mechanism should be able to use it as easily as real currency. This requires that the payment system should be well integrated with the existing applications and processes that acquire the role of transacting parties in e-commerce.

5. Scalability

The payment system infrastructure should be scalable, to be able to handle the addition of new users and merchants, so that systems will perform normally without performance degradation and maintain the quality of service. It should be able to offer the same performance and cost per transaction overheads with a growing number of customers and transactions.

6. Anonymity, privacy

This characteristic refers the desire of users to protect their privacy, identity and personal information. In some transactions, the identities of the parties could be protected by anonymity. Anonymity means that it is not possible to discover someone's identity or to monitor an individual's spending patterns.

7. Applicability

Applicability of a payment system is defined as the extent to which it is accepted for payments at points of sale, or at online e-commerce sites. Debit cards and credit cards have high applicability, as one can pay with them in a variety of places. The applicability of a payment system may vary from country to country.

8. Authorization type

Authorization type is defined as the form of a control over the validity of transactions. The authorization type can be offline or online. Offline authorization means that users of the system can exchange money while not connected to a network, without a third party mediating the transaction. Paper cheques are the example of offline authorization.

9. Convertibility

Funds represented by one payment system should be easily convertible into funds represented by other payment systems. Users should be able to transfer money from electronic payment systems to another accepted money form i.e. receive it in cash, or transfer to a bank account. The electronic currency should be interoperable and exchangeable with other forms of electronic cash, paper currencies, and deposits in bank accounts, bank notes or any other financial instrument.

10. Interoperability

A payment system is interoperable if it is not dependent on one company, but it is open and allows other

interested parties to join. This can be achieved by means of open standards for data transmission protocols and infrastructure. An interoperable system can faster gain the necessary customer base for future development and will have a higher level of applicability.

11. Multi-currency

Effective and efficient payment systems between countries are possible when a system allows processing multiple currencies, as it is currently done with credit cards. This feature is not implemented in payment systems of many countries, binding them to a particular region. Multi-currency payments are required for payments in cross-border e-commerce.

12. Traceability

Traceability indicates how easy it is to trace money flows and sources of funds that are going through a payment system and used for purchases. In electronic payment systems, money can be traced by records that are kept of a payment activity.

13. Linkability

Linkability of an electronic payment system implies that payments can be associated with a particular user, or that it is possible to recognize several payments originating from the same user. Users can be linked to their spending even if the system they use is anonymous. A relation between the user and his payments can be established.

14. Trust

Trust refers to the degree of customers' confidence that their money and personal information will be safe, and that all parties involved will not act against users' interests. Users need to trust that payments will be conducted in a proper way, and that their money will not be stolen or misused.

15. Flexibility

Payment systems should be in a position to accept several forms of payment rather than limiting the users to a single form of currency.

16. Efficiency

Efficiency here refers mainly to the cost overheads involved in the operation of digital payments. The cost of payment per transaction should be negligible.

Comparison of Electronic Payment System with Traditional Payment System

Compared with tradition payment systems, e-payment has the following features:

1. ***E-payment introduces digital circulation to realize information transmission, so all means of e-payment are digitalized. But, traditional payment is realized through physical circulation such as cash circulation, bill transfer and bank exchange.***
2. ***The working environment of e-payment is based on an open system platform i.e. internet, while***

Q16.(a) Explain Smart Card in detail.

MDU BCA RE 2018, 2018

OR

What are Smart Cards? Also explain the various components of a smart card chip.

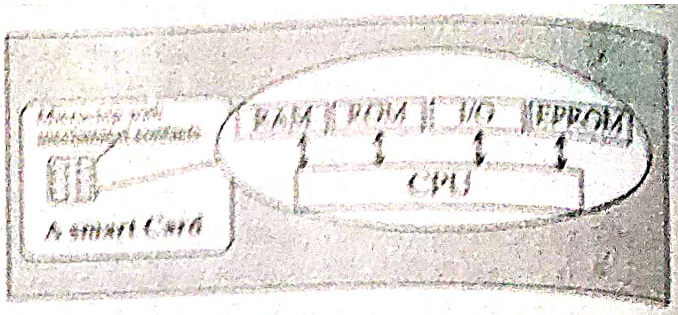
Ans. ***Smart card is a thin, credit card-sized piece of plastic that contains a half-inch-square area that serves as the card's input/output system. This is its interface with the outside world, and handles a variety of applications.***

A smart card contains a programmable chip, a combination of RAM and ROM storage, and an operating system of sorts, all embedded in plastic. It encrypts digital cash on a chip and can be refilled by connecting to a bank.

A smart card carries more information than can be accommodated on a card with a magnetic stripe. The chip's ability to store information in its memory makes the card smart. It can make a decision, because it has relatively powerful processing capabilities.

By carrying smart cards, people can conduct different types of electronic transactions anywhere in a secure and efficient manner over the internet.

Smart cards are embedded with a microprocessor chip. They are intelligent because the data on a smart card can be manipulated through programs or commands. Also, the data is better protected by means of cryptographic techniques. The chip also provides mechanical contacts to connect to external devices, for providing power supply, supporting data transfer, etc. The chip of a smart card contains the following components:



1. **Central processing unit (CPU)**

   It controls the operation of the smart card. Usually, an 8-bit microprocessor is used. In some smart cards, an additional cryptographic processor may be incorporated to perform cryptographic functions.

2. **Random-access memory (RAM)**

   It is used for storing temporary data i.e. the data stored in RAM is retained only when the power is on.

3. **Erasable programmable ROM (EPROM)**

   It is for storing long term data such as cryptographic keys and software applications. Data is maintained irrespective of the power status but it can be erased by electronic means.

4. **Read only memory (ROM)**

   It stores permanent data such as the operating system. Data is loaded into the card at the production stage and it can only be read.

5. **Input/output interface**

   It provides data input/output functions.

A smart card is manufactured by going through the following steps:

Step 1: The chip is fabricated.

Step 2: A module is produced by using the fabricated chip from step 1.

Step 3: The plastic card is manufactured.

Step 4: The module from step 2 is added to plastic card.

Step 5: Data and programs are loaded into the chip.

Step 6: Personalized data is loaded into the chip.

Microprocessors on smart cards can also authenticate the validity of transactions. When a cardholder initiates a transaction with a retailer, the chip in the retailer's electronic cash register confirms the authenticity of the smart card by examining a unique digital signature stored on the smart card's chip. It guarantees the authenticity of the digital cash held on a smart card.

Widespread adoption of smart cards would pave the way for an open smart-card system for payment transfers. In such a system, there would be numerous smart card issuers, holders and participating retailers. A cardholder will not have to provide a personal identification number. Just as with the physical cash, the user of the smart cash can remain anonymous.

Each time a cardholder uses a smart card, the amount of purchase is deducted automatically and credited to a retailer. The retailer can transfer accumulated balances to its bank at the end of the day by means of telephone links. This permits payments to be completed within just a few seconds.

Q16.(c) Write detail note on Credit Card System.

MDU BCA RE 2018, 2018

OR

Explain Credit Cards.

MDU BCA RE 2016, 2016

OR

What do you mean by Credit Cards? Also explain the characteristics of Credit Cards.

Ans. Credit cards are another popular form of payment systems. They allow consumers to extend their purchasing power. As a result, these cards are often used for large purchases, when the customer might not have enough cash on hand to complete the transaction.

A credit card is a payment card issued to users as a system of payment. It allows the cardholder to pay for goods and services based on the holder's promise to pay for them. 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.

A credit card is a small plastic card that has a magnetic strip on the exterior. The magnetic strip carries some form of encoded information about the card number and the card holder. The data that is encoded onto the card may be encrypted making it difficult for potential thieves to decode or copy the information onto another card. A card reader is required to read as well as write the information to the magnetic strip.

Traditionally, the credit cards were used as off-line means of payment. But today, with the growth of internet users, they have been widely accepted as on-line payment mechanisms as well.

Today, credit cards are the dominant form of payment on the web. Their electronic nature allows consumers and e-commerce stores to pay and receive payment immediately. While cheques and money order payments might take days to complete, credit card payments take only seconds. As a result, credit cards account for the majority of online transactions.

To make a credit card transaction truly secure and non-refutable, the following sequence of steps must occur before actual goods, services or funds flow:

1. *A customer presents his or her credit card information (along with an authenticity signature) securely to the merchant.*
2. *The merchant validates the customer's identity as the owner of the card account.*
3. *The merchant relays the credit card charge information and signature to its bank or online credit card processors.*
4. *The bank or processing party relays the information to the customer's bank for authorization approval.*
5. *The customer's bank returns the credit card data, charge authentication and authorization to the merchant.*

Credit cards are the most convenient way to make online payments. They work around the globe, regardless of the location or the country of the issuing bank.

In the credit card payment system, there are four players: customer, vendor, issuer and acquirer.

The issuer issues the customer a credit card after verifying his credentials. The issuer may or may not charge a one time or recurring processing fee from the customer. The vendor has to apply to the acquirer for the permission to accept one or more card brands.

In off-line use of a credit card, the customer presents his credit card to the vendor in exchange of goods/services he wishes to purchase. The vendor verifies the validity of the credit card by sending the credit card information to the acquirer. The request is then passed over to the customer's issuer, which may be a bank or a financial institution. The issuer verifies the information and returns the authorization to the vendor through the acquirer. The vendor then accepts payment from the customer through his credit card. The payment is later redeemed to the vendor by the customer's issuer through the acquirer and the customer is debited for the amount which he has to pay.

Characteristics of Credit Cards

The main characteristics or features of credit card are listed as follows:

1. Alternative to cash

Credit card is a better alternative to cash. It removes the worry of carrying various currencies to pay at the different trade counters. It is easy and fast to use a credit card rather than waiting for completion of cash transactions. Credit card helps a cardholder to travel anywhere in the world without a need to carry a large amount of cash. The risk of money theft is also reduced.

2. Credit limit

The credit cardholder enjoys the facility of a credit limit set on his card. This limit of credit is determined by the credit card issuing entity (bank or NBFC) only after analyzing the credit worthiness of the cardholder. The credit limit is of two types: normal credit limit and revolving credit limit. Normal credit limit is the usual credit given by the bank or NBFC at the time of issuing a credit card. Revolving credit limit varies with the financial exposure of the credit cardholder.

3. Facilitates payment in domestic and foreign currency

Credit card gives its holder a unique facility to make payments either in domestic (native) currency or if necessary, also in foreign (non-native) currency as per requirement. Credit card reduces the cumbersome process of currency conversion i.e. it removes the financial complexities often encountered in converting a domestic currency into a foreign currency. Using this feature, a credit cardholder can easily make payments to merchants present in any corner of the world.

4. Record keeping of all transactions

Credit card issuing entities like banks or NBFCs keep a complete record of all transactions made by their credit cardholders. Such a record helps these entities to raise appropriate billing amounts payable by their cardholders, either on a monthly or some periodic basis.

5. Regular charges

Regular charges are basic routine charges charged by the credit card issuing entity on the usage of credit card by its cardholder. The regular charges are primarily classified into two types- annual charges and additional charges. Annual charges are collected on per annum or yearly basis. Additional charges are collected for other supplementary services provided by the credit card issuing entity such as add-on-card, issue of a new credit card, etc.

6. Grace period

The grace period is referred to those minimum numbers of additional days within which a credit cardholder has to pay his credit card bill without any incurring interest or financial charges.

7. Higher fees on cash withdrawals

Credit card issuer makes charges on cash withdrawals made through credit card at the ATM outlets and other desks. Generally, cash withdrawal fees are quite higher than fees charged by the bank or NBFC for the other regular credit transactions. On cash withdrawn done through a credit card, interest is charged from the same day i.e. interest is charged since the day on which cash is withdrawn.

8. Additional charges for delay in payment

The credit card payment is supposed to be made within a due date as mentioned on the bill of a credit card. If payment is not done on time, then a credit-card issuer

Q18.(a) What do you understand by EDI? What are the benefit of EDI over traditional methods of data and document exchange?

MDU BCA RE 2017

Ans. EDI

The Electronic Data Interchange (EDI) is defined as the computer-to-computer exchange of business documents in a structured, pre-defined standard format.

The main purpose of the EDI is to avoid and prevent additional human intervention of reading and processing information between trading partners by establishing a standard data transmission protocol.

EDI can be used to electronically transmit documents such as purchase orders, invoices, shipping bills, receiving advices and other standard business correspondence between trading partners.

EDI can also be used to transmit financial information and payments in electronic form. Payments carried out over EDI are usually referred to as Electronic Funds Transfer (EFT).

The electronic data interchange process is the computer-to-computer exchange of business documents between companies. EDI replaces the faxing and mailing of paper documents.

EDI documents use specific computer record formats that are based on widely accepted standards. However, each company will use the flexibility allowed by the standards in a unique way that fits their business needs.

Benefit of EDI over traditional methods of data and document exchange

The use of EDI helps to eliminate or significantly reduce the problems found in the traditional information interchange system. With the implementation of EDI, the merchants can review their material requirements and create purchase order. However, instead of printing a hardcopy of the order and mailing it, the purchase order will be transmitted directly to the supplier over an electronic network.

On the supplier's end, the transaction will be received and posted automatically. If there is an available stock, the supplier can even deliver the items on the same date they received the order. Further more, the supplier now can be able to send its shipping document and notification electronically to the merchant, providing the client with accurate receiving documents prior to the actual arrival of the items. In addition, since the invoice can be sent directly to the merchant's accounts payable system through the EDI implementation, the supplier can receive its payment sooner than before. Thus, with the help of EDI the problems associated with the traditional data and document exchange are solved as follows:

- ***EDI saves a company money and time by providing an alternative to, or replacing information flow that require a great deal of human interaction and materials such as paper documents etc.***
- ***The delays associated with the physical transmission of documents, and the time required for human to***

read and re-enter data are eliminated and automated by electronic data transfer.

- *EDI minimize the time companies spend to identify and resolve interbusiness problems. Many problems come from data-entry errors which could be eliminated by EDI.*
- *EDI reduces invoice queries which can be particularly significant in reducing delays in payment.*
- *Labour costs can be reduced, as data are not required to re-enter frequently and manually at each stage of the processing cycle.*
- *EDI improves customer services by enabling the quick transfer of documents and a marked decrease in errors.*

In short, with the implementation of EDI, the productivity, efficiency and accuracy between business and trading partners can be greatly improved.

Q19.(a) What are the major components of an EDI system? Explain. MDU BCA RE 2017

Ans. The major components of the EDI system are:

1. Standard Document Format

The standard agreed upon format for the document to be electronically transmitted.

2. EDI Translation Management Software

Software used to convert the document your application's format into the agreed upon standard format. For optimum performance the translation software should be on the same platform as your business application.

3. Communications Software

A programming tool that enables you to write communications protocols, or a separate application. It can be a module to the translator or a separate software application.

4. Modem

A hardware device used to transmit electronic information between computer systems. The higher the baud rate, the faster the communications will be.

5. VAN

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.

6. Point-to-Point

A direct communication link from one computer to another. Some trading partners offer a direct connection to their EDI computer. Trading partners may opt for the method of communication instead of using a VAN.

7. Trade Agreement

A legally binding trade agreement between you and your trading partner.

19.(c) What are the benefits of EDI? Also explain the drawbacks or disadvantages of EDI.

Ans. Following are the benefits of EDI:

1. **Speed**

Information moving between computers moves more rapidly and with little or no human intervention. Sending an electronic message across the country takes minutes or less.

2. **Improved problem resolution**

EDI responds quickly to business enquiries and transfers of documents with an automatic audit to ensure accuracy and consistency. EDI can minimize the time companies spend to identify and resolve inter-business problems as most of such problems come from data-entry errors. Thus, EDI improves the relationships between the trading partners.

3. **Streamlines the information flow**

EDI helps in streamlining the flow of information. The order-processing, shipping of goods, invoice preparation and transmission can all be done within a few hours. This is a significant improvement over the non-EDI environment which takes days/weeks to do the same.

4. **Reduces redundancy**

Often, trading partners file the copies of same document at multiple places. The EDI environment eliminates the need for multiple copies and reduces redundancy without

compromising the accessibility and retrieval of old documents.

5. Reduces Lead Time

As the exchange of documents among trading partners happens electronically through interconnected computers, a lot of time is saved. The process of transferring the documents and information is instantaneous and offers weeks of time saving as compared to the traditional environment that uses postal/courier based exchange of printed documents.

6. Easy retrieval of older documents

As all the documents exchanged between trading partners are stored in an electronic mailbox, documents can be accessed, retrieved and examined at any point of time very easily. While, in case of a non-EDI system, it may take hours or even days to locate and retrieve a printed business document from the past.

7. Improvements in overall quality

EDI brings improvements in overall quality by providing better record keeping, fewer errors in data, reduction in processing time, less reliance on human interpretation of data, minimized unproductive time.

8. Reduces errors

The direct electronic transfer of documents between inter-organizational systems eliminates the chances of errors due to re-entry of data printed on paper from one system to another system.

9. Provides better information for management decision making

It provides accurate information and audit trails for transactions, enabling businesses to identify areas offering the greatest potential for efficiency improvement and cost reduction.

10. Expands the market reach

Most of the large manufacturers deal only with the EDI enabled suppliers. In order to streamline the purchase process, they often form a value-added network. By being a part of that network, many opportunities open up for supplying the material to other larger suppliers who are also a part of the network.

11. Increases revenue and sales

Many large organizations use EDI and trade with other EDI-enabled suppliers. The efficiency acquired by EDI reduces the total transaction cost by eliminating paperwork and related errors. It also helps in quicker settlement of accounts. The reduced transaction cost saves money and the supplier is in a better position to offer the items at cheaper costs, which leads to improved revenue and sales.

12. Cost reduction and time saving

By eliminating unnecessary paperwork, information flow becomes more efficient. For example: the seller's EDI computer sending electronic billing documents eliminates the paper invoices.

13. Improved customer service

EDI can improve customer service by enabling the quick transfer of business documents, reducing the errors and by providing an automatic audit trail.

14. Reduces turnaround time

Electronic trading documents can be delivered far more quickly than their paper counterparts, thus the turnaround time from order to delivery can be reduced.

15. Accuracy with integrity

Eliminating data entry means improved accuracy in the way data are processed. This contributes to the integrity and reliability of the business processes. The receipt of more accurate and complete business transactions through EDI improves information processing.

16. Planning and forecasting

By using EDI for forecasting and planning, companies are able to get forward warning of likely orders and thus it can plan the production and stock levels accordingly.

17. Accurate invoicing

Just like orders, invoices can also be sent electronically. The EDI invoices can be automatically matched against the original order and cleared for payment thereby avoiding all sort of queries that arise when paper invoices are matched to orders.

The benefits from EDI implementation can also be classified into direct benefits and long term strategic benefits.

Direct Benefits

- *Data is entered only at the source, thereby decreasing the errors.*
- *There is no need for rekeying the information as the transfer of information from computer to computer is automatic.*
- *Cost of processing EDI documents is much less than that of processing the paper documents.*
- *Customer service is improved. The quick transfer of business documents allows orders to be fulfilled faster.*
- *There is improved job satisfaction among data entry operators, clerks etc. as they are deployed in more creative activities.*
- *Information is managed more efficiently.*

Strategic Benefits

- *Customer and supplier relations are improved through more effective and faster communication and exchange of information.*
- *More accurate forecasting and business planning is achieved due to information availability at the right place and right time and with the help of data mining techniques.*
- *The competitive edge is maintained and enhanced.*

- *Business relations with trading partners are improved.*
- *Reduction of paper products is achieved.*

Drawbacks / disadvantages of EDI

Following are the disadvantages of EDI:

1. Too many standards

There are too many standard bodies developing standard documents formats for EDI. For example: one company may be following the X12 standard format, while its trading partner follows EDIFACT standard format.

2. Changing standards

Each year, most standards bodies publish revisions to the standards. This poses a problem to EDI users. One organization may be using one version of the standard while its trading partners might still be using older versions.

3. EDI is too expensive

EDI is expensive and requires a heavy investment to launch and maintain the technology. Small companies might find it difficult to invest on EDI because of the expenses to be incurred in implementing and maintaining it.

4. EDI limits your trading partners

Some large companies tend to stop doing business with companies who don't comply with EDI. For example: WalMart is doing business with only those companies that use EDI. The result of this is a limited group of people you can do business with.

5. Rigid requirements

EDI needs highly structured protocols, previously established arrangement, unique proprietary bilateral information exchanges.

6. Requires maintenance of links with other systems

Responsibilities may have to be changed during the introduction of EDI system. Unless this system and the links with the other systems are managed well, it is not possible for the data processing department to be involved in production and purchasing decisions.

7. Open to limited traders

EDI requires expensive VAN (Value Added Network) networking to operate at peak efficiency. Only high-volume, large trading partners can afford this investment.

8. Requires implementation of EDI program

Some companies are only doing business with others who use EDI. If a company wants to do business with these organizations, they have to implement an EDI program.

9. Requirement of special hardware and software

EDI is point to point. Every contact requires special hardware and software.

10. Usage not easy

As a system, EDI is not easy to learn, use and implement.

Q20.(a) What do you mean by EDI standards? Explain in detail. MDU BCA RE 2018, 2018

OR

What are standard of EDI? Explain. MDU BCA 2017

OR

Explain EDI Standards. MDU BCA RE 2015

Ans. When e-business started, the need for common standards was felt as there were many different types of computer systems and different ways of storing data. Since the sender and receiver in the EDI systems had to exchange business documents that could be interpreted by all parties, it became necessary to develop standards in EDI. Many independent or industry-specific standards were developed to address the requirements of each industry segment.

But, a large number of businesses operated across various industry segments. Thus, the cross-industry standards were required to provide smooth functioning of EDI systems. Over a period of time, two major EDI standards have evolved.

- The first one is X12 which was developed by the Accredited Standards X12 committee of the American National Standards Institute (ANSI).
- The second international standard was developed by the United Nations EDI for Administration, Commerce and Trade (EDIFACT).

EDI standards need these basic components

- A syntax for messages which specifies the structure and sequence of elements in the data. Just as syntax in a language defines where to place the subject, verb and object in a sentence, similarly EDI syntax defines where to put things like the sender's address, date and time, reference number and other such values.
- An encoding scheme to identify the character set being used.
- A data dictionary that defines the standard business data elements, such as sender, product code, address, currency, etc.
- Combinations of data elements to be used for standard messages.

ANSI X12

The Accredited Standards Committee (ASC) X12 was set up by the American National Standards Institute (ANSI) in 1979 to develop cross county standards for exchanging electronic documents for use by all businesses in the United States. The committee developed ANSI ASC X12, commonly referred to as the X12 standard. Today, EDI standards are firm but not static because the development of EDI is a continuing effort.

The X12 standard sets the framework and rules for electronic data interchange. It describes the format for structuring the data, the types of documents that should be transmitted electronically, and the content of each document. The identification numbers for various forms, codes for a variety of fields, and types of information are also defined in the standard. The standard also defines the sequence of the information flow.

The ANSI ASC EDI standard defines the data structure and content for business transactions transmitted between computer applications. The data is grouped to represent all the information required for a particular business function, such as a purchase order.

The X12 standard defines a set of documents referred to as transaction sets, for a wide range of business transaction forms. Each transaction is given a numeric code, and each transaction set is used for defining the transfer of a single document (purchase, order, manifest etc.) between the computers of two trading partners. The data embedded in a transaction set conveys the same information that is contained in the printed version of the document. Usually, it is a subset of the whole information on the printed version.

The X12 devised the standard to deal with transactions such as purchase order placement, order processing, shipping, invoicing, payments, and cash application processing for products and services. In the X12 standard, paper documents related to particular business activities are mapped into a transaction set. It assigns a numeric code to each of these transaction sets in a manner very similar to the numbering of business forms allowed at many organizations.

Examples of ANSI ASC X12 transactions include:

- Vendor Registration (form no. 838)
- Request for Quotation (form no. 840)
- Response to Request for Quotation (form no. 843)
- Purchase Order or Delivery Order (form no. 850)
- Purchase Order Acknowledgement (form no. 855)
- Functional Acknowledgement (form no. 997)

EDIFACT- An International Standard

In 1987, the United Nations announced an international standard called EDI for Administration, Commerce, and Transport (EDIFACT). The EDIFACT standard is promoted by the United Nations Economic Commission, which is responsible for the adoption and standardization of messages. The International Standards Organization (ISO) has been entrusted with the responsibility of developing the syntax and data dictionary for EDIFACT.

EDIFACT serves the purpose of trans-border standardization of EDI messages. EDIFACT combines the efforts of American Nation Standards Institute's ASC X12, Trade Data Interchange (TDI) standards developed and deployed by much of Europe and United Kingdom.

EDIFACT is a set of internationally agreed upon standards, directories and guidelines for the electronic interchange of structured data that relate, in particular, to trade in goods and services.

EDIFACT consists of data elements (a value), segments (a logical group of data elements), and messages (a collection of segments relating to a business function), and rules for combining them.

Each data element has attributes such as:

- Coded tag or identifier (code dictionary)

- Title
- Plain text description
- Format (length and datatype or class)
- Year of insertion in Directory, along with previous issue in parenthesis.

EDIFACT is becoming widely accepted as the foremost international EDI standard. Today, EDIFACT and ANSI are working towards compatibility.

Q20.(b) How are EDI standards implemented? Explain.

Ans. Before using EDI, the trading partners must set up a trade agreement which will define all the parameters of EDI.

- Each partner in an EDI trade agreement must independently determine a method to translate internal data to and from EDI formatted messages.
- Each partner must agree on the communications media and arrange the method for transmitting information. This may involve any of several methods such as a dedicated communications link, a VAN or the Internet.
- Each partner must provide for system recovery in case of failure or error, security and timely response.

The sender must convert data from an internal system to EDI formats for transmission. The receiver must be ready to receive transmissions in a timely fashion as agreed by trading partners. This could be instantaneous or at regular time intervals. Data could be transmitted to a VAN and stored for later retrieval by the receiver. The receiver converts the EDI transmission data to the internal system for processing.

Each transaction set represents a single business form. The header area contains the preliminary information such as business name, address, date, etc. Next is the actual transaction information, the item, description, quantity, etc. where each line corresponds to one segment

and each item in the segment is a data element. Last is the summary data which contains the control information.

Each data element is assigned a unique reference number in the EDI master data element list. The structure of each message is strictly defined while allowing for variable length data.

The transfer of information can be done by any electronic media from magnetic tape to telecommunication. EDI standards are designed to be independent of communications media. Before any transaction can occur the sender and receiver must ensure that a valid connection has been established. Methods of error checking and recovery must also be established to safeguard against lost of data.

Q21.(a) What do you mean by EDI security? Explain in detail. MDU BCA RE 2018, 2018, RE 2016

OR

Explain EDI Security. MDU BCA 2016

Ans. An important aspect of EDI is the security of messages during exchange. It should be ensured that the interchange of messages is reliable. Further aspects of security are:

- **Controls in the EDI standards**

EDI standards include controls designed to protect against errors in message and the corruption of message during the interchange.

- **Controls in the transmission protocol**

Transmission protocols include protection, such as longitudinal control totals in order to detect any corruption that occurs during transmission. When the corruption of message is detected, the network system starts a retransmission without the need for outside intervention.

- **Protection against tampering**

When there is a concern that the transmission might be intercepted and modified, it can be protected by a digital signature. The digital signature is designed to ensure that the message received is exactly the same as the message sent. It also ensures that the source of message is an authorized trading partner and the message was not altered during the transmission.

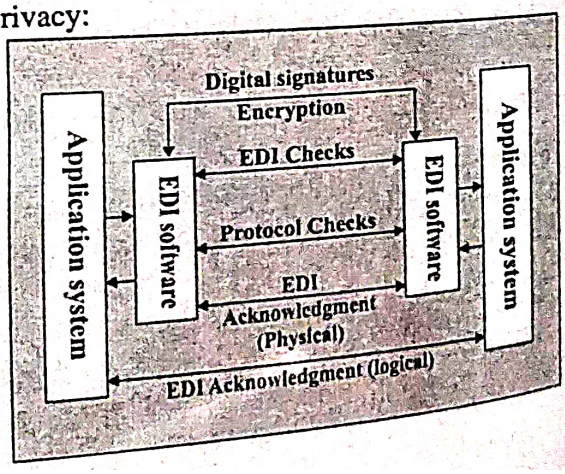
- **Privacy of message**

In case, when the contents of the message are considered sensitive, the privacy of the message can be protected during transmission by encrypting the data. Encryption is the process of encoding messages or information in such a way that only authorized party i.e. the trading partner can read it.

- **Non-repudiation**

One potential problem is that the recipient of the message might deny having received it. Non-repudiation means to ensure that a transferred message has been sent and received by the parties claiming to have sent and received the message. It is a way to guarantee that the sender of a message cannot later deny having sent the message and that the recipient cannot deny having received the message. Non-repudiation can be obtained through the use of digital signatures, confirmation services and timestamps.

The figure shows the overall facilities for EDI security and privacy:



Another aspect of security provided for by the EDI standard is the receipt of acknowledgement message. This is a transaction specific message sent out by the receiving system to acknowledge each message, order etc. Trading partners that use receipt acknowledgement message need to be clear about the level of security implied by the recipient of the acknowledgement. The EDI acknowledgement message can be:

- Automatically generated by the EDI Software (physical acknowledgement). It informs the sender that the message has arrived but there is no guarantee that it is passed to the application for processing or that it is a valid transaction within the application.
- Coded into the application to confirm that it is in the system for processing.
- Produced by the application once the message is processed to confirm that the message was valid and possibly to give additional information such as stock allocation and expected delivery date (logical acknowledgement).