

## Chapter 01:

### What are the advantages and disadvantages of e-commerce?

Answer:

#### **Advantages are:**

- Ease of search
- Competition
- Saves time
- Customer tracking and Analytics
- Increased sales
- Scalable

#### **Disadvantages are:**

- No personal interaction
- Price and Product comparison
- Need for internet access
- Credit/Debit card fraud
- IT Security Issues
- All the eggs in one basket(website and downtime)

### Discuss the application of e-commerce in different sectors

Answer:

#### **1. Retail**

E-retailing, often known as online retailing, is the sale of products and services by businesses to customers via online stores. This is done through the use of tools such as virtual shopping carts and e-catalogs. There are several **e-commerce applications** in this industry.

#### **2. Accounting**

Finance and e-commerce are more intertwined than ever before. Banks and stock exchanges make extensive use of e-commerce in their operations. Balance checks, bill payments, money transfers, and more services are available through online banking. Online stock trading allows users to trade stocks online by providing information about equities such as performance reports, analysis, charts, and so on via websites.

### 3. Production

In the manufacturing industry, e-commerce serves as a platform for firms to conduct electronic transactions. Groups of firms can carry out their activities more smoothly by combining purchasing and selling, exchanging market conditions, inventory check information, etc.

### 4. Trade

Applying e-commerce to trade elevates it to a higher level, allowing individuals to participate without regard for geographical borders. This encourages more participation, more bargaining and contributes to the success of the trade.

### 5. Advertising

Development and commercialization strategies like pricing, product characterization, and customer relationship can be boosted by utilizing e-commerce. This will give consumers a more enriched and personalized purchasing experience. Digital marketing tactics have grown in importance as a means of promoting enterprises.

### 6. Digital Shopping

People's buying habits have shifted dramatically in the previous several years. "Go online" has become a success mantra for all enterprises. Online shopping is easy, pleasant, and, in most cases, inexpensive. The success of online shopping applications like **Flipkart and Amazon** demonstrates this.

### 7. Web and mobile applications

Mobile commerce or **m-commerce application** is a subset of retail e-commerce. **Mobile or web application development** has become a must-have for companies looking to showcase their skills. Purchases are made by the consumer using mobile or web applications that are optimized for the merchant. These programs also provide payment security by utilizing secure e-payment mechanisms.

### 8. Digital Reservations

Travel and tourism is a flourishing sector today, and online booking is a [developing e-commerce application](#). Online booking allows customers to buy travel necessities such as train/flight tickets, book hotel rooms, get tourism packages, transportation services, and so on. It makes people's trips comfortable and easy because everything can be set at the tip of their fingertips.

## 9. Digital Media

E-books and digital periodicals are gradually displacing traditional printed publications. It has numerous advantages, including portability, lightweight, accessibility from anywhere, and so on. They are also environmentally friendly because they assist in reducing paper use and saving forests. Because of these factors, internet publication, often known as e-publishing, has grown in popularity.

## 10. Internet Banking

E-Banking, often known as online banking, is an **e-commerce program** that has streamlined people's time-consuming and complex banking operations. It allows bank customers to do transactions online without having to wait in lengthy lines at banks. To provide virtual banking services to their consumers, most of the banks now have their web applications.

### Compare between traditional and electronic commerce

Answer:

1. E-Commerce is completely an in digital and online mode where the communication is through electronic form completely whereas Traditional Commerce is completely offline and through in person or face to face.
2. E-Commerce is reachable worldwide and has more connectivity whereas Traditional Commerce is limited to a particular geographical area especially smaller.
3. E-Commerce information of exchange takes place in different forms either through digital ads or emails etc. whereas the information of exchange in Traditional Commerce happens in the form of hoardings or pamphlets distribution or through any physical mode of exchange.
4. E-Commerce can have one to one marketing whereas Traditional Commerce can have only one-way marketing.

5. E-Commerce can have several payment modes such as online transactions or digital wallets or cash on delivery whereas Traditional Commerce can have only cash payment in person.
6. The delivery of goods in E-commerce is either the on the same day or any other day depending on the availability of logistics and several other restrictions depending on the location of the customers whereas in traditional commerce the delivery of goods is instant.
7. E-commerce provides a lot of discounts and at lower rates whereas in Traditional commerce there will be no or fewer discounts and no other options except to approach different seller which takes time.
8. E-Commerce provides good customer services in different forms such as chat option or direct call with customer care executive whereas Traditional commerce does not provide any such customer support.
9. E-Commerce accepts the return of the products if not interested or not liked by the customer within 7 – 15 days depending on the seller whereas Traditional commerce does not provide such return policy until there is damage in the product.
10. E-Commerce provides a lot of products in scope and a wide variety of products irrespective of brands and types of products whereas Traditional commerce has limited number of products with a particular seller as space is limited.

How the features like ubiquity, information density and richness make e-commerce better than traditional commerce. Justify with examples.

Answer:

In conventional commerce, the global market is a physical place where all the users visit to transact. For instance, radio and television are normally directed to motivate the consumers to visit the places to purchase the products. E-commerce is ubiquitous since it is present everywhere during all the times. E-commerce releases the marketplace from being constrained to a physical space and allows shopping the users from their desktop or laptops. Hence, the outcome is specified as market space. From the consumer point of view, ubiquity reduces the transactional costs. In order to perform, one does not require spending their money and time travelling to their nearer markets. More clearly, the ubiquity of e-commerce lessens the cognitive energy which is needed to complete a mission

Internet immensely increases the data density. Quality and total amount of data is available to the market participants, merchants and consumers. The technologies of e-commerce lessens the data collection, communication, storage and the handling costs. Simultaneously, these technologies enhance the timeliness and accuracy of data, enabling data more important and useful than ever before. Hence the data becomes cheaper, with higher quality and available in plenty. Richness of data refers to the content and complexity of a message.

[What is e-commerce? How it differs from e-business?](#)

Answer:

E-Commerce:

- Electronic commerce or **e-commerce** (sometimes written as **eCommerce**) is a business model that lets firms and individuals buy and sell things over the internet.
- It refers to transactions conducted via the internet.
- The term ecommerce also encompasses other activities including online auctions, internet banking, payment gateways, and online ticketing.

Two types of E-commerce are:

- Partial e-commerce

It is when a company will sell a good through the internet but the fulfillment of the good will need to take place in the "real" world. E.g., buying a product from Daraz, they will have to send it to us physically.

- Pure e-commerce:

It is when everything happens on the internet. E.g., buying Netflix and Online Gaming Subscription online.

- In these case the product and services are digital

## E-Business

- Shortly known as e-business, is the online presence of business.
- It can also be defined as the business which is done with the help of internet or electronic data interchange i.e. is known as E-business.
- E-commerce is one of the important components of e-business, but it is not an essential part
- E-business is not confined to buying and selling of goods only, but it includes other activities that also form part of business like providing services to the customers, communicating with employees, client or business partners can contact the company in case if they want to have a word with the company, or they have any issue regarding the services

Two types of E-business are:

- **Pure-Play:** The business which is having an electronic existence only. **Example:** oyo
- **Brick and Click:** The business model, in which the business exists both in online i.e. electronic and offline i.e. physical mode.

## Describe the factors that make U-Commerce different from M-Commerce?

Answer:

U-commerce:

- U-Commerce stands for Ubiquitous Commerce
- The ultimate form of e-commerce and m-commerce in an 'anytime, anywhere' fashion.
- It involves the use of **ubiquitous** networks to support personalized and uninterrupted communications and transactions at a level of value that far exceeds traditional **commerce**.
- The origin and development of Ubiquitous Commerce is based on various information and communication technologies.
- These technologies were driving forces for the evolution to business transactions at any time and in any place and so they will be in the future.

M-Commerce:

- M-commerce stands for Mobile commerce. Buying and selling of goods and services through wireless handheld devices

Compare and contrast pure vs. Partial e-commerce. Support your answer with proper examples

Answer:

- Partial e-commerce

It is when a company will sell a good through the internet but the fulfillment of the good will need to take place in the "real" world. E.g., buying a product from Daraz, they will have to send it to us physically.

- Pure e-commerce:

It is when everything happens on the internet. E.g., buying Netflix and Online Gaming Subscription online.

- In these case the product and services are digital

Explain different types of e-commerce.

Answer:

B2C (Business-to-Consumer),

B2B (Business-to-Business)

C2B (Consumer-to-Business)

C2C (Consumer-to-Consumer)

Explain the e-commerce framework.

Answer:

- People
- Public Policy
- Marketing and Advertisement
- Support Services
- Business Partnerships

What could be the challenges in e-commerce particularly in our country?

Answer:

1. Traditional Shopping Habit
2. Lack of trust
3. Lack of investment
4. Lack of effective payment gateway
5. Lack of e-commerce friendly rules

## Chapter 02:

Describe the possible types of revenues modes that can be adapted in e-commerce system

Answer:

- Advertising Revenue Model
- Subscription Revenue Model
- Transaction Fee Revenue Model
- Sales Revenue Model
- Affiliate Revenue Model

What is electronic data interchange? Explain the building blocks of an EDI system.

Answer:

- Electronic Data Interchange (EDI) is the computer-to-computer exchange of business documents in a standard electronic format between business partners.
- EDI is the inter-organizational exchange of business documentation in structured, machine processable form.
- EDI provides communication between trading partners that agree to exchange EDI transactions.
- EDI eliminates the paper documents associated with common business transactions.
- EDI message can be immediately processed by receiving computer without any human intervention or interpretation or re-keying



- One other advantage of EDI is that it generates the functional acknowledgment whenever an EDI message is received and is electronically transmitted to the sender.

Following are the building blocks of EDI system:

- Semantic (application layer) or Conversion layer
- Standard transaction layer
- Packing (transport) layer
- Physical n/w infrastructure layer.

### What are the advantages and disadvantages of EDI?

Answer:

Advantage:

- **Cost effective:** cutting paper waste and all paper processing quickly reduces paper costs
- **Efficiency:** cloud-computing and machine learning eliminates computational repetition, redundancies, and errors that would be more common among humans
- **Speed:** the electronic transfer of data ensures more consistency and accuracy without sacrificing pace
- **Accuracy:** by using cloud computing technology, we can transfer documents faster than would have otherwise been possible
- **Service:** faster processing means better customer service, over all; in turn, helping us to expand your customer base

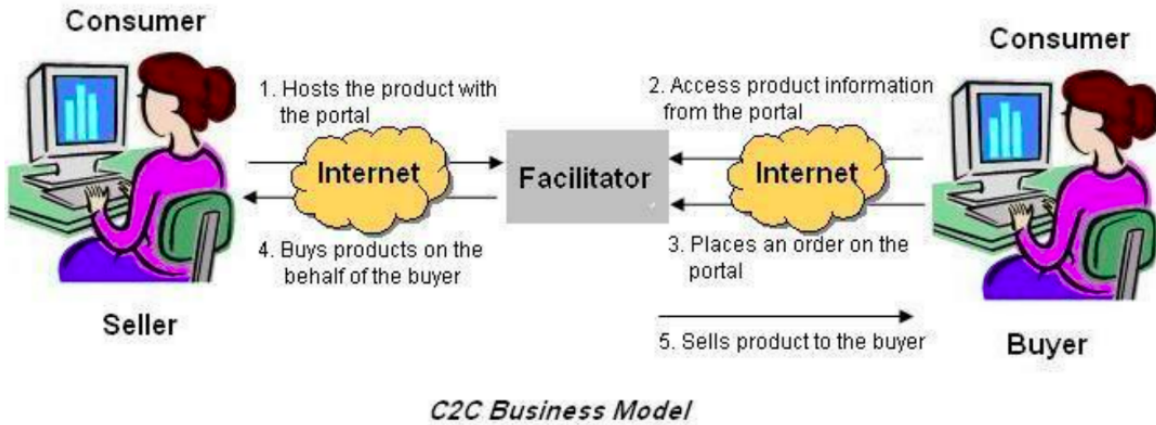
Disadvantage:

- EDI uses multiple standards which can often limit how many devices can be connected to the network.
- In addition to rigorous standards, EDI could also have too many rigorous standards bodies with too many document formats which can malfunction in the face of cross-compatibility issues, which you will encounter as you continue to apply more standards
- EDI has a higher price point, which can be a little pricey for new business owners
- Large companies might find that EDI can limit the types of partnerships one can develop with.

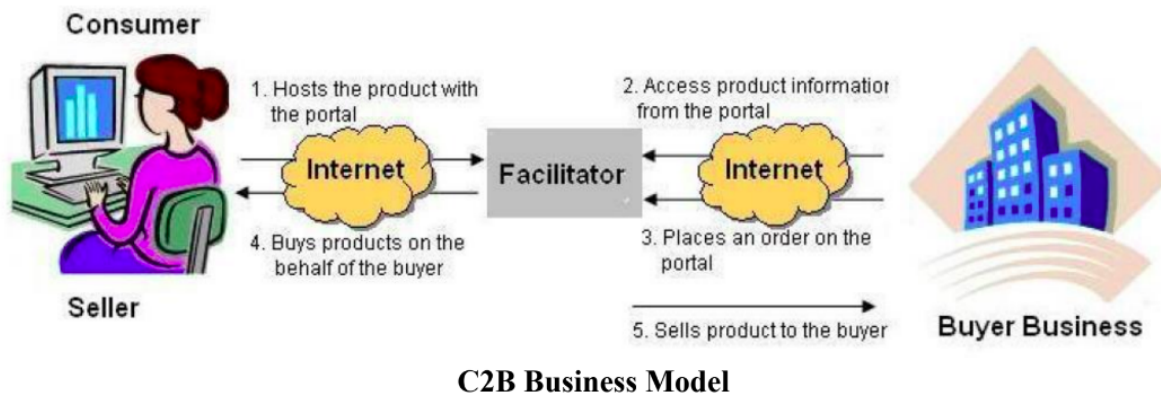
How EDI is used in e-commerce? Explain its components

Answer: Same answer as previous question

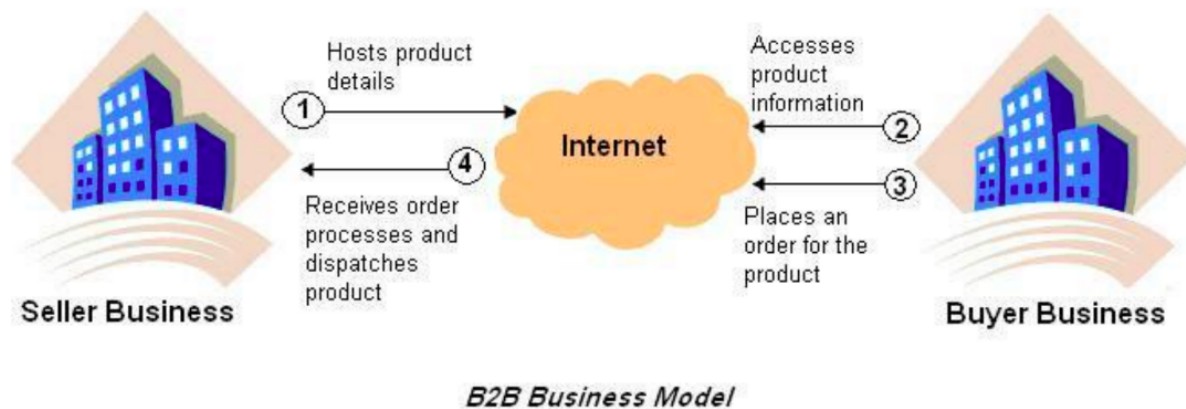
Explain C2C e-commerce and its benefits with example.



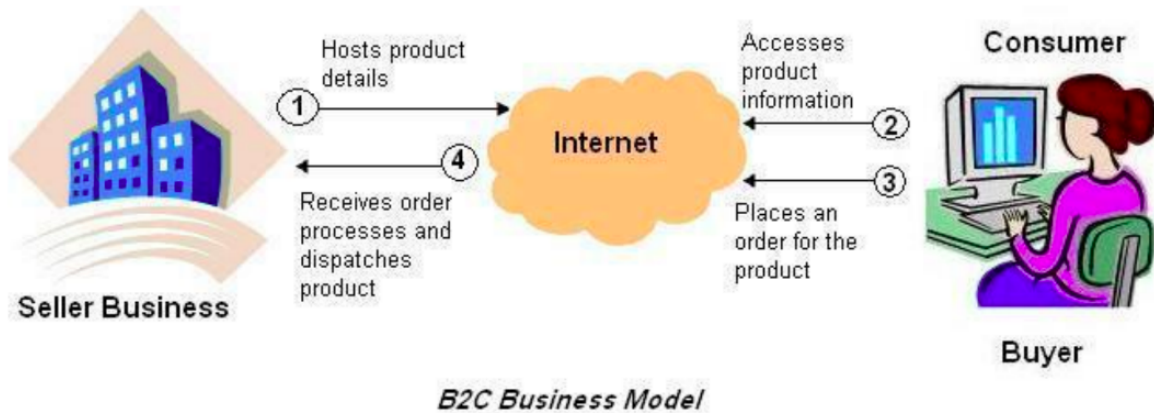
Explain C2B e-commerce and its benefits with example.



Explain B2B e-commerce and its benefits with example.



Explain B2C e-commerce and its benefits with example.



Consider a company is planning to establish a B2B e-commerce system in Nepal. Describe in detail about the possible types of B2B business models the company can adapt.

Answer:

B2B business model can be described as following

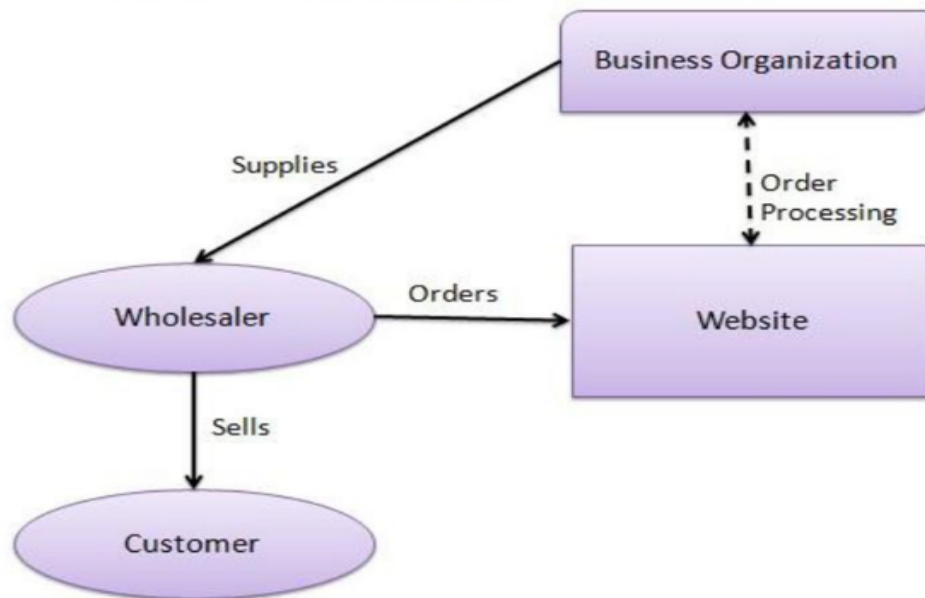
### Net Marketplaces

1. E-distributor
2. E- procurement systems
3. Digital Exchanges
4. Industry consortium

		What Businesses Buy	
		Indirect Inputs	Direct Inputs
How Businesses Buy	Spot purchasing	E-Distributor	Independent Exchanges
	Long-term sourcing	E-Procurement	Industry Consortia

Horizontal Markets ↔ Vertical Markets

## B2B Business Models



Following are the architectural models in B2B e-commerce –

- **Supplier Oriented marketplace** – In this type of model, a common marketplace provided by supplier is used by both individual customers as well as business users. A supplier offers an e-stores for sales promotion.
- **Buyer Oriented marketplace** – In this type of model, buyer has his/her own market place or e-market. He/She invites suppliers to bid on product's catalog. A Buyer company opens a bidding site.
- **Intermediary Oriented marketplace** – In this type of model, an intermediary company runs a market place where business buyers and sellers can transact with each other.

### Chapter 03:

1. What is an e-payment system? Why is orientation and standardization required for e-payment business systems?

Answer:

An e-payment or Electronic Payment system allows customers to pay for the services via electronic methods. They are also known as online payment systems. Normally e-payment is done via debit, credit cards, direct bank deposits, and e-checks, other alternative e-payment methods like e-wallets, bitcoin, bank transfers are also gaining popularity.

## Types of e-payment system

E-payments can be done in the following ways:

**Internet banking** – In this case, the payment is done by digitally transferring the funds over the internet from one bank account to another. Some popular modes of net banking are, NEFT, RTGS, IMPS.

**Card payments** – Card payments are done via cards e.g. credit cards, debit cards, smart cards, stored valued cards, etc. In this mode, an electronic payment accepting device initiates the online payment transfer via card

**Credit/ Debit card** – An e payment method where the card is required for making payments through an electronic device.

**Smart card** – Also known as a chip card, a smart card, a card with a microprocessor chip is needed to transfer payments.

**Stored value card** – These types of cards have some amount of money stored beforehand and are needed to make funds transfer. These are prepaid cards like gift cards, etc.

**Direct debit** – Direct debit transfers funds from a customer's account with the help of a third party

**E-cash** – It is a form where the money is stored in the customer's device which is used for making transfers.

**E-check** – This is a digital version of a paper check used to transfer funds within accounts.

**Alternate payment methods** – As technology is evolving, e-payment methods kept evolving with it (are still evolving..) These innovative alternate e-payment methods became widely popular very quickly thanks to their convenience.

**E-wallet** – Very popular among customers, an E-wallet is a form of prepaid account, where customer's account information like credit/ debit card information is stored allowing quick, seamless, and smooth flow of the transaction.

**Mobile wallet** – An evolved form of e-wallet, mobile wallet is extensively used by lots of customers. It is a virtual wallet, in the form of an app that sits on a mobile device. Mobile wallet stores card information on a mobile device. The user-friendly nature of mobile wallets makes them easier to use. It offers a seamless payment experience making customers less dependent on cash.

**QR payments** – QR code-enabled payments have become immensely popular. QR code stands for 'Quick Response' code, a code that contains a pixel pattern of barcodes or squares arranged in a square grid. Each part of the code contains information. This information can be merchant's

details, transaction details, etc. To make payments, one has to scan the QR code with a mobile device.

**Contactless payments** – Contactless payments are becoming popular for quite some time. These payments are done using RFID and NFC technology. The customer needs to tap or hover the payment device or a card near the payment terminal, earning it a name, 'tap and go'.

### **How e-payment system works?**

Entities involved in an online payment system

The merchant

The customer / the cardholder

The issuing bank

The acquirer

Payment Processor

Payment Gateway

Working of e-payments can be explained in the following three steps:

**Payment initiation** – Customer finalizes the product/service and chooses the payment method to initiate the transaction.

Depending on the payment method, the customer enters the required information like card number, CVV, personal details, expiration date, PIN, etc. The chosen payment method either redirects the customer to an external payment page or a bank's payment page to continue the payment process.

**Payment authentication** – The information submitted by the customer along with other details like payment information, customer's account information is authenticated by the operator.

The operator can be a payment gateway or any other solution involved. If everything gets authenticated positively, the operator reports a successful transaction. On the contrary, if there is any problem with any of the authentication checks, the transaction fails.

After the successful transaction, the customer gets a payment confirmation.

**Payment settlement** – After the successful authentication process, payment from the customer's bank gets transferred into the merchant's account by the online payment service provider.

## Benefits of e-payment systems

E-payments are making shopping and banking more convenient. They are helping customers to reach more clients locally and globally.

E-payments are faster making the transactions efficient.

With e-payments, customers can pay online at any time from anywhere, making them easily accessible and convenient for customers.

It's easy to integrate online payment system with businesses as many payment processing solution providers offering different types of solutions.

Online payment solutions come with security and risk and anti-fraud tools making them reliable and secure not only for customers but also for merchants.

E-payments are proved to be highly effective for international transactions, as they are cheaper, easier, faster, and generally are real-time.

### 2. What type of electronic payment system is required in e-commerce? Explain.

*Read from notes. Explain atleast 5 types of payment system from long questions*

### 3. Explain the threats on the electronic payment system.

### 4. Explain the electronic payments system and its type? Also, explain the advantages and features of electronic payment system.

### 5. What is digital wallet, e-cash, e-checks, Digital/Electronic wallet? Explain.

Answer:

**Digital Wallet:** Digital wallet are technologies that electronically stores credit card numbers, debit card numbers, loyalty card numbers, etc. on the cloud. Your money still stays in your bank or credit card account. Digital wallet basically keeps your details to make transactions easier. Examples of digital wallet are Google Pay, Apple pay & Visa Checkout. With digital wallets, we can not only go cashless, we can also go cardless.

**E-cash:** e-cash aims to mimic the functionality of paper cash, by providing such properties of anonymity and transferability of payment. e-cash is intended to be implemented data which can be copied, stored, or given as payment (for example, attached to an email message, or via a USB stick, bluetooth, etc). Just like paper currency and coins, e-cash is intended to represent value because it is backed by a trusted third party (namely, the government and the banking industry).

**E-checks:** An e-check is an electronic version of a paper check that provides different payment processing times and less waste. With an e-Check, money is electronically transferred from the payers' checking account and directly deposited to the sellers account, after passing through the ACH(Automated Clearing House) network. It also means that you can convert a paper check received from a customer into an electronic transfer. Electronic checks combine the security, speed, and processing efficiency of all electronic transactions with the infrastructure and processes associated with paper checks.

**Digital/Electronic wallet:** Digital wallet are technologies that electronically stores credit card numbers, debit card numbers, loyalty card numbers, etc. on the cloud. Your money still stays in your bank or credit card account. Digital wallet basically keeps your details to make transactions easier. Examples of digital wallet are Google Pay, Apple pay & Visa Checkout. With digital wallets, we can not only go cashless, we can also go cardless.

## 6. What are the advantages and disadvantages of smart-card?

Following are the advantages of a smart card:-

### **More secure:-**

Smart cards offer more security and confidentiality than any other financial or transaction card on the market. They use encryption and authentication technology which is more secure than previous methods associated with payment cards.

### **Safe to transport:-**

Another advantage to having a smart card is their use the banking industry. These cards give the holder the freedom to carry large sums of money stolen. They are also safe because the cards can be easily replaced, and the person would have to know the pin number to access its store value.

### **Offer a variety of benefits:-**

Smart cards Offer a variety of benefits to merchants, financial institutions, and other card issuers such as faster transaction, increased sales, reduced costs, easier book-keeping, and fewer losses.

### **Time-saving:-**

Making a payment with a smart card saves a lot of time because its chip contains details about the owner in a non-encrypted form and the user doesn't have to explicitly provide details for verification.

### **Double as an ID card:-**

They can provide complete identification in certain industries. There are numerous benefits of using smart cards for identification. For example, a driver's license that has been created using



smart card technology can give the police the ability to quickly identify someone who's been stopped for speeding or reckless driving.

#### **The safe place to store sensitive information:-**

Smart cards are a safe place to store sensitive information such as keys, passwords or personal information.

#### **Less expensive:-**

As compared to debit and credit cards, smart cards are less expensive and provide faster transaction processing.

#### **Prevents fraud:-**

Other benefits of using smart cards for identification can be used by governments to prevent benefits and social welfare fraud to ensure the right person is receiving the welfare benefit.

Following are the disadvantages of a smart card:-

#### **Easily Lost:-**

Smart cards are small, lightweight and can be easily lost if the person is irresponsible. Since smart cards have multiple uses, the loss may be much more inconvenient. If you lose a card that doubles as a debit card, bus pass and key to the office, you would be severely inconvenienced for a number of days.

#### **Security:-**

Another drawback of using smart cards is their level of security. They are more secure than swipe cards. However, they are not as secure as some in the general public would believe. This creates a false sense of security and someone might not be as diligent as protecting their card and the details it holds.

#### **Slow Adoption:-**

If used as a payment card, not every store or restaurant will have the hardware necessary to use these cards. One of the reasons for this is since technology is more secure, it is also more expensive to produce and use. Therefore, some stores may charge a basic minimum fee for using smart cards for payment, rather than cash.

#### **Possible Risk of Identify Theft:-**

Smart cards are vulnerable to hardware hacking, which means that data stored in the card can be altered or corrupted. For criminals seeking a new identity, they are like gold, based on the amount of information it can contain on an individual.

**7. Explain the digital token based electronic payment system.**

Answer:

The digital token based payment system is a new form of electronic payment system which is based on electronic tokens rather than e-cheque or e-cash. The electronic tokens are generated by the bank or some financial institutions.

Electronic tokens are three types:

- Cash or Real-time. • Transactions are settled with exchange of electronic currency.
- Debit or Prepaid. • Users pay in advance for the privilege of getting information.
- Credit or Postpaid. •

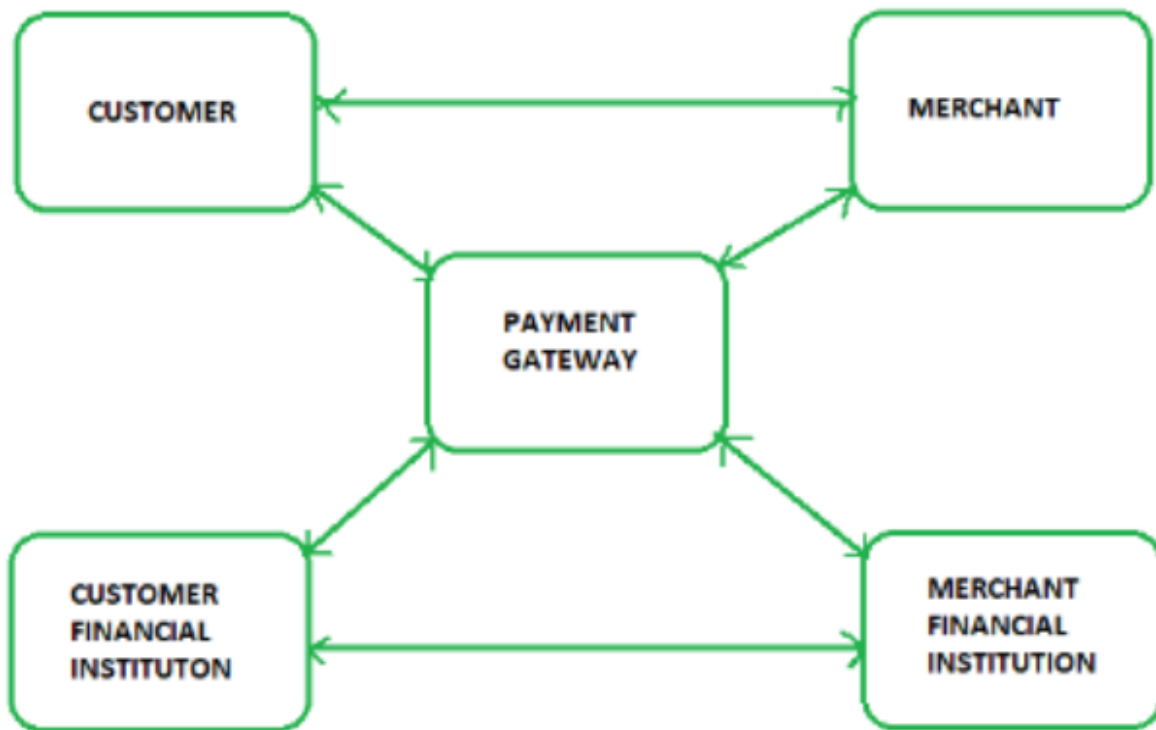
**8. What is Secured Electronic Transaction (SET) Protocol? Describe how purchase request, payment authorization and payment capture are done in SET?**

Answer:

Secure Electronic Transaction or SET is a system which ensures security and integrity of electronic transactions done using credit cards in a scenario. SET is not some system that enables payment but it is a security protocol applied on those payments. It uses different encryption and hashing techniques to secure payments over internet done through credit cards.

SET protocol was supported in development by major organizations like Visa, Mastercard, Microsoft which provided its Secure Transaction Technology (STT) and NetScape which provided technology of Secure Socket Layer (SSL).

SET protocol restricts revealing of credit card details to merchants thus keeping hackers and thieves at bay. SET protocol includes Certification Authorities for making use of standard Digital Certificates like X.509 Certificate.



Purchase Request:

The Merchant and Payment Gateway must agree on the Cardholder's purchase, although each of them gets only partial information: the Merchant does not know the card details, and the Payment Gateway does not know what is being bought. To meet this objective, SET uses a dual signature. The Cardholder signs the concatenation of the hashes of the Payment Instructions and the Order Information. He combines this with the card details, including the PAN and other secret numbers, CardSecret and PANSecret, which help to authenticate him.

**Payment authorization** as the name suggests is the authorization of payment information by merchant which ensures payment will be received by merchant.

**Payment capture** is the process by which merchant receives payment which includes again generating some request blocks to gateway and payment gateway in turn issues payment to merchant.

9. Discuss how credit card transactions, electronic checks and stored value payment system work. Mention their pros and cons.

10. What issues need to be considered while designing electronic payment system?

#### Chapter04:

1. What is a shopping cart in an e-commerce application? How can you build shopping carts?

2. What is a catalog in e-commerce application? How can you create catalogs?

3. Explain transactions in E-commerce with examples

## **Chapter05:**

1. What are the security threats in e-commerce? How client server and data transactions securities are maintained in e-commerce?

### **1. Financial frauds**

Besides stealing bank cards and account details, cybercriminals have got really creative. Ever since the first online businesses entered the world, villains now target apps and websites.

There are two common frauds that are used to target the e-commerce industry: credit card frauds and fake returns.

Credit card fraud happens when a criminal uses stolen credit card data to purchase goods or services on an e-commerce store. When payment authorization based solely on passwords and security questions does not verify a person's identification. If someone else obtains our credentials, this might result in a fraud prosecution. This allows the third party to effortlessly take money.

Fake returns are unauthorized transactions made to false requests for returns. Businesses reimburse unlawfully obtained merchandise or damaged goods in refund fraud, which is a typical financial scam.

### **2. Phishing**

Phishing is a cybercrime that aims at stealing user's confidential data — login and passwords. This is achieved via mass email campaigns run on behalf of popular brands, as well as personal messages inside of the various services like social networks.

Messages often contain a direct link on a fake website that looks exactly like the real one, or on a website that redirects the user somewhere else. When the user lands on a fake page, cybercriminals try to make the user enter his login and password that he uses to access a specific website, which allows villains to get access to bank accounts.

### **3. Spam**

Emails are recognized for being a powerful medium for increasing sales, but they are also one of the most often utilized channels for spamming. Nonetheless, leaving infected URLs in comments on your blog or contact forms is an open invitation for internet spammers to damage you. They frequently send them through your social media inbox and wait for you to click on them. Furthermore, spamming not only compromises the security of your website, but it also slows it down.

#### **4. Bots**

Bots are automated software applications programmed to perform specific tasks. Web crawlers, probably the most known type of bots, are those that define websites' rankings by systematically browsing all the exiting pages on the internet. However, there are bots specifically created to crawl websites for their pricing and inventory information.

Cybercriminals use this technique to change the pricing of your online store, or to garner the best-selling inventory in shopping carts, resulting in a decline in sales and revenue.

#### **5. DDoS Attacks**

DDoS (distributed denial of service) assaults have evolved from a small annoyance that may have caused modest harm to a huge security risk that is easily damaging and shutting down the business continuity of the world's largest and most powerful corporations.

A DDoS assault aims to prevent a company from operating until the attack is effectively prevented or the attacker ceases. This attacks can harm your website or app by generating a large number of requests which eventually can crash the whole system and make it unavailable for the end-user. This eventually disrupts your site and affects sales.

#### **6. Brute Force Attacks**

The brute force attack is one of the most common password-cracking techniques. This approach presupposes that a hacker tries to use as many character combinations as possible in order to figure out the correct password.

#### **7. SQL Injections**

SQL injection is a cyber-attack aimed to entry your website's database by targeting your query submission forms. Hackers inject malicious code into your database to read, delete, change, collect or add data.

#### **8. Cross-Site Scripting (XSS)**

Cross-site scripting is an attack that comes in the form of a piece of browser code script (HTML). When the attacked user opens the browser and the website, the malicious script starts

running and receives access to the various types of user's sensitive data that must be protected.

#### **9. Trojan horses**

Malware, a program usually downloaded by customers as legitimate software, is called a trojan horse. To this category belong programs that can gather data about credit or debit cards, transfer this information to the hacker, as well as crash users' computers or use PC resources for hacker's goals without permission of the user. These programs get any sensitive data with ease and may also infect your website.

## **10. Man in the middle**

A cybercriminal may eavesdrop on the communication between a store consultant and a customer. If the client is connected to a vulnerable Wi-Fi or network, hackers can take advantage of that to steal sensitive data.

## **2. Describe the various security mechanisms used to secure ecommerce systems.**

Answer:

### **1. HTTPS and SSL certificates**

SSL certificate is one of the ways to protect user's personal data on the internet.

You may have seen that there are two types of browser addresses — HTTP and HTTPS. Both abbreviations stand for communication protocol. The protocol is a set of rules that defines data exchange between browser and server, what kind of information should exist there and what to do with that data.

HTTPS is a protected version of HTTP. It's an SSL protocol, that gets activated after SSL-certificate is set and encrypts personal data before the information is transferred to the e-commerce website or app owner.

This kind of protection is really useful when you have transactions to be done on your website. Whenever customers enter their credit card information it can be stolen by hackers and used by them later on. Thus, using an SSL certificate will make payments on your website secure and clients won't be afraid of scams.

### **2. Anti-malware**

Anti-malware is software that detects and deletes computer viruses, as well as other undesirable or harmful programs. Anti-malware also reestablishes files that have already been harmed by viruses and prevent further file or software modification that can be done by malicious code.

Anti-malware is used against worms, viruses, and Trojan horses.

### **3. Secure server and the admin panel**

Using passwords that contain different characters and are hard to guess is a key. You should also change them frequently. Another good practice is restricting user access and defining user roles. Let everyone perform only what they have to on the admin panel. Making the panel notify you if a foreign IP tries to access it is an extra step for your security.

#### **4. Secure payment gateway**

Don't store clients' credit card information on your database. Alternatively, use Stripe and PayPal as a third party to manage the payment transactions away from your website.

#### **5. Deploy firewall**

A firewall is a network security system that controls and filters network traffic (incoming and outgoing) according to defined rules and eliminates e-commerce security threats.

Efficient firewalls protect your website against XSS, SQL injection, and other cyber-attacks.

#### **6. Additional e-commerce security measures**

Tell your clients to use resources that are familiar to them, click on saved links, use the official internet banking app and check out where they get their messages from.

Make scanning your website from malware your constant routine.

Increase your data protection by using multi-layer security and backing up your data.

Use efficient plugins for e-commerce security and update your systems often.

**3. How preserving confidentiality and integrity ensures security in e-commerce? Discuss various mechanisms used to ensure data and message security in e-commerce systems.**

Answer:

**4. What is cryptography? How cryptography can be used to ensure data and message transaction security in ecommerce?**

Answer:

The origin of the word cryptology lies in ancient Greek. The word cryptology is made up of two components: "kryptos", which means hidden and "logos" which means word.

The main goals of modern cryptography can be seen as:

1. user authentication

2 data authentication (data integrity and data origin authentication)

### 3. non-repudiation of origin, and data confidentiality

In cryptography one often makes use of encryption.

With encryption we transform the clear-text (or plaintext) into cipher-text. To get back to the original text, we apply the inverse transformation, called decryption.

These transformations themselves are public: this makes it possible to analyze these algorithms and to develop efficient implementations.

However they use a secret parameter: the keys which are known only by the sender and/ or the receiver.

This key is the only thing one needs to know in order to encipher or decipher. Thus it is really important to manage one's keys and keep them secret where necessary.

There are two types of encryption primitives:

1. symmetric or conventional ciphers and
2. asymmetric or public-key ciphers

#### Symmetric Ciphers:

The oldest ones and most used until now are the symmetric ciphers. In these schemes, the key used to decipher the cipher-text is equal to the one used to encipher the plaintext.

The best known cipher in this category is the Data Encryption Standard (DES) that was adopted in 1977 by the American NBS (National Bureau of Standards) as FIPS 46.

#### Assymmetric Ciphers:

The asymmetric or public-key ciphers are the most recent cryptographic tools.

In contrary to the symmetric systems the key used to encipher and the one used to decipher are different.

Each partner thus has two keys. He/She keeps one key secret and makes the other one public.

If A wants to send a message to B, he/she just enciphers it with B's public key.

Since B is the only one who has access to the secret key, B is the only one who can decipher the message and read the contents.



The most popular public-key cipher is the RSA system

RSA stands for Rivest, Shamir and Adleman, the names of the three inventors).

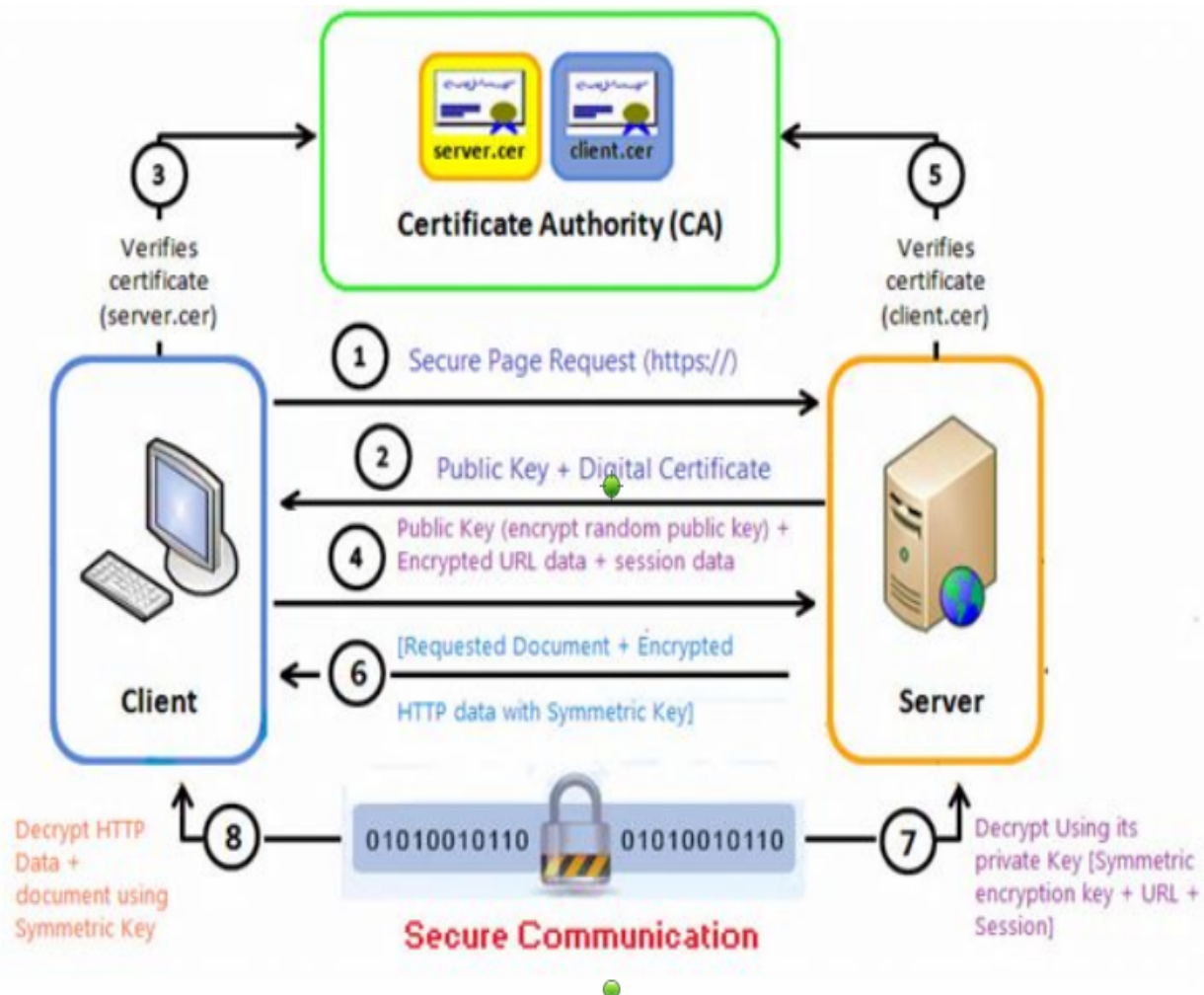
The security of this scheme is related to the mathematical problem of factorization: it is easy to generate two large primes and to multiply them but given a large number that is the product of two primes, it requires a huge amount of computation to find the two prime factors.

5. Define malicious code. How the potentially unwanted programs like adware and spyware works?

Answer:

6. Explain Secured Socket Layer.

Answer:

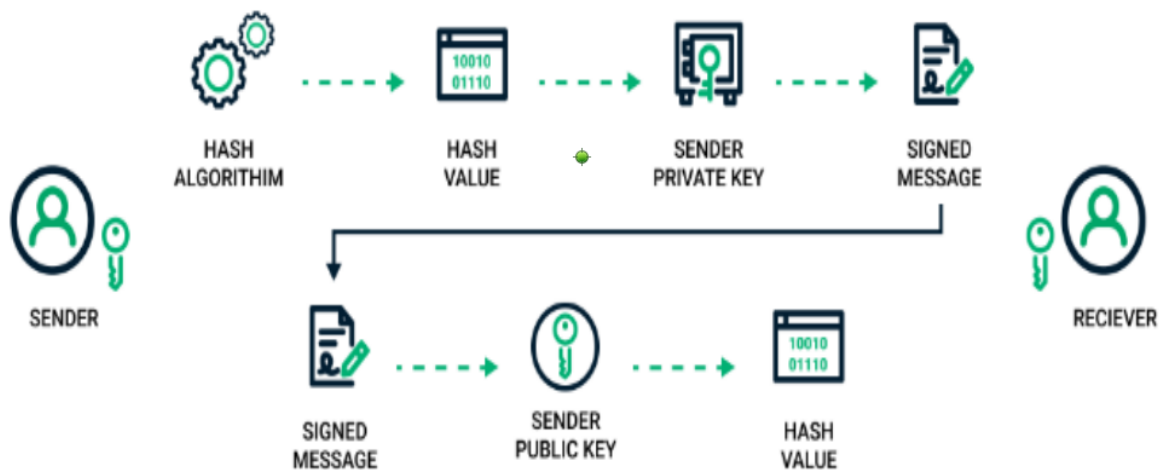


SSL is a non-proprietary protocol, developed by Netscape, used to secure communication on the Internet. SSL uses public-key technology and digital certificates to authenticate the server in a transaction and protects private information as it passes from one party to another. SSL transactions do not require client authentication

1. A browser sends a request to connect to the server and asks for a secure page (usually a document).
2. The web server sends its public key with its signing certificate back to the client.
3. The browser checks whether the certificate was issued by a CA it trusts. The client compares the information in the certificate with the information received from the website and verifies all the details. If so, the browser shows the purity of the server certificate by showing a green padlock and the client proceeds.
4. The browser generates a random symmetric encryption key and then encrypts it to the public key of the server. Finally it sends it to the server along with the encrypted URL and other encrypted HTTP data.

5. The web server decrypts the incoming packet using its private key and uses the symmetric key to decrypt the URL and HTTP data that was generated randomly at the client side.
6. Then the requested document from the client, along with other data encrypted with the symmetric key, is sent back to the browser.
7. Finally, the browser decrypts the packet using the symmetric key and secure handshaking is established.

### 7. Explain Digital Signature with its application.



Answer:

Here is how sending a digital signature works:

1. The sender selects the file to be digitally signed in the document platform or application.
2. The sender's computer calculates the unique hash value of the file content.
3. This hash value is encrypted with the sender's private key to create the digital signature.
4. The original file along with its digital signature is sent to the receiver.
5. The receiver uses the associated document application, which identifies that the file has been digitally signed.
6. The receiver's computer then decrypts the digital signature using the sender's public key.