1.

(a) Purchasing of groceries is one of the basic shopping requirements. Explain the online grocery shopping procedure with reference to any grocery e-store. Mention their advantages and limitations.

Ans: Online grocery shopping has become increasingly popular due to its convenience and efficiency.

Online grocery shopping procedure:

The typical online grocery shopping process for purchasing groceries from BigBasket is as follows:

1. Customer first makes list of required grocery items.

2.Log in: Open website of vendors and log in to the website. Customers must first sign up for an account on BigBasket website or app.

3. Browsing Product: Users can go through categories like fruits, veggies, diaries, and more, or they can search using search bar for specific items they need.

4. Add to cart: Customers can choose an item, check for deals, select the quantity they want, and then add it to their cart.

5. Checkout: After shopping, users proceed to checkout, where they confirm their delivery address and make payment using any of the payment options given.

6. After receiving the order, the server sends it to the closest retail location for fulfillment.

7. Order delivery: The retailer confirms the order's placement and delivery date. The retailer boxes and delivers groceries to the customer.

Advantages:

* It is a simple and comfortable way for customers to browse and shop for groceries.

* The consumer can find new items and have everything delivered straight to their door.

* The e-grocer promises the highest quality and prompt delivery.

* Online grocery stores offer a large selection of goods and a number of payment methods compared to local stores.

* The ease of purchasing whenever and wherever you want.

* The capacity to quickly identify deals and compare costs.

* Online grocery shopping cuts down on in-store time, particularly during peak hours.

Disadvantages:

- An online grocery store may serve a particular city or region only.
- Only Internet-savvy customers are served by online grocers.
- Managing perishable goods is really difficult.
- Delivery fees or minimum order limits can add extra costs.
- Potential for errors in order fulfillment, such as wrong or missing items.

(b) Define m-commerce. Explain its scope with four examples from various application areas.

Ans:

M-commerce:

M-commerce stands for Mobile Commerce. M-commerce is all about doing commerce transactions through mobile devices. Explosion and popularity of mobile devices provide huge opportunities for business enterprises and consumers to sell and purchase on-the-go using mobile devices such as PDA, smart phones and other hand-held devices. M-commerce is making the commerce anywhere anytime concept a reality using a host of technologies. M-commerce involves performing financial or commerce transactions over wireless and mobile devices which involve exchange of goods, services and information between end consumers and merchants.

M-commerce allows consumers to make purchases, conduct transactions and access services using mobile applications or websites optimized for mobile devices. This form of commerce leverages mobile technology to enhance the shopping experience.

Scope of m-commerce:

Mobile banking: This application makes it possible to perform bank related transactions such as accessing and managing bank accounts, paying bills, and transferring funds via mobile apps. For example, a user may utilize a peer-to-peer payment platform such as Venmo, PhonePe to send money to a friend or use their bank's mobile app to rapidly check their account balance while on the go.

Mobile shopping: This software combines services that enable transactions involving mobile device purchases of items. This is the most popular type of m-commerce, enabling customers to use specialized applications or mobile-friendly websites to browse and buy goods or services straight from their mobile devices. By selecting items from a catalogue that is available on a mobile device, the user can make a purchase. For example, a user

might browse through clothing options on an app like Amazon, finding an item of like, adding it to cart, and completing the purchase using your saved payment information.

Mobile Ticketing and Reservation: Mobile ticketing is appropriate for any service that requires payment before it can be used legally, such as public transportation, admission to a cultural event, or movie tickets. The traditional paper ticket can be replaced by this application, which guarantees that the user can purchase a right to utilization/ticket using a mobile device. The mobile device receives the ticket in digital format. For example, booking movie tickets through an app like BookMyShow and receiving them as digital tickets on your phone for convenient access at the cinema.

Mobile Information Services: This refers to the mobile services that offer informational content to their subscribers. Examples of such services are news updates of any nature (finance, politics, sport, etc.), travel information, access to search engines and Mobile Office (e-mails, appointments, etc.). For example, a user reading sports news articles on a mobile device.

2.

(a) With the help of any online software store, explain the step-by-step procedure to purchase and download the requested software. Mention its advantages. 5

Ans:

Software purchases and downloads from online software stores is a simple and user-friendly procedure. There are many popular online software stores like Microsoft store, Apple store etc.. First step is to choose the store from which we are going to download. Let us take the example of downloading a software from Microsoft store.

The following is the shopping procedure normally followed to download a software from Microsoft store:

1. Customer logs on to the website: If you don’t already have an account, register by providing required information.
2. Search for the software: Use the store’s search bar to find the desired software.
3. Places an order through a secure order form : Once you find the software required, place an order through the provided secure order form.
4. Submits payment information : Enter your payment details like credit card or digital payment information.

5. Proceeds to download the purchased software: Once the payment is done, you get a link to download the software. Click the link to begin the download.

Advantages:

- It enables the seller to quickly, affordably, and effectively reach a sizable, computer-savvy worldwide market.
- Software vendors have an easy and affordable distribution channel when they sell online.
- Software can be purchased anywhere, at any time, and without having to go to a physical store.
- It removes the need for expensive courier and shipping fees as well as the necessity to produce and stock huge quantities of shrink-wrapped goods.
- Online retailers provide a greater selection of software selections than the physical retailers do.
- Software buyers get a quick and efficient way of getting software without waiting for shipping.
- Additionally, it removes the need to handle possible backorder circumstances.

(b) Describe the functionalities for the categories given below for an e-commerce website :

(i) User Experience

Ans: Functionalities of user experiences:

The ease and intuitiveness with which a client may navigate is referred to as the user experience. This includes responsive design, quick loading times and easy checkout processes. The e-commerce application should be visually appealing, responsive and interactive. The web application should contain consistent hierarchy and layout structure. The web application should provide consistent branding and immersive visual elements. For example, using large, clear images and straight forward menus improves the user experience.

(ii) Search Feature

Ans: Users can locate products easily using a powerful search function. The application should allow the user to search for the product by its attributes such as name, and brand. Features like sorting and filtering options help narrow down choices, making the shopping experience more efficient. The search should be filtered based on price, brand, and product features.

(iii) Personalization

Ans: Personalization refers to tailoring the shopping experience to individual users. This can include showing recommendations based on past purchases or browsing history. The application should provide personalized recommendations based on recent purchase history and user profile attributes for registered users.

(iv) Security

Ans: Ensuring the protection of user data is very important. Application should support authentication and authorization. The application should include implementing secure payment gateways, SSL certificates and privacy policies.

(v) Social Media

Ans: E-Commerce application should support social features to promote and advertise the product(s). It allows users to share their purchases and experiences, enhancing engagement and driving traffic. For example, enabling users to share their shopping experiences or products reviews on social media like Facebook or Instagram can promote products to a wider audience.

3.

(a) List and explain any four cyber crimes classification and related penalties under IT Act, 2000. 5

Ans: Cyber crimes can be classified on the following basis:

- Against Person
- Against Property
- Against Government/Corporate Entities
- Against Society at Large

Against Person

• Harassment via e-mails: Repeatedly sending abusive messages via email.

• Cyber stalking: Use of Internet to stalk someone like online harassment and online abuse.

• Email spoofing: Emailing messages with a forged sender address.

• Publishing/transmitting of obscene material.

• Cyber defamation: causing injury to the reputation of a person with the help of Internet by floating/publicizing negative messages.

• Cheating and fraud: Any deliberate deception for unfair or unlawful gain online is fraud. Examples are no delivery of paid products purchased online, misrepresentation of a product advertised for sale, and fraudulent promises for investment in securities.

Against Property :

• Unauthorized control/access of Computer system.

• Intellectual property crimes: Patent violations, copyright infringement, trademark violations, etc.

• Transmitting virus.

Against Government/Corporate Entities

• Possession of information in an unauthorized manner.

• Cyber terrorism: Use of Internet for terror activities.

• Distribution of pirated software.

Against Society at Large:

• Pornography.

• Polluting the youth through indecent exposure

• Financial crimes.

• Forgery- Manipulations in mark sheets, currency notes etc with the use of information technology.

• Sale of illegal articles like narcotics, weapons, etc.

• Online gambling

Cyber crime and related penalities:

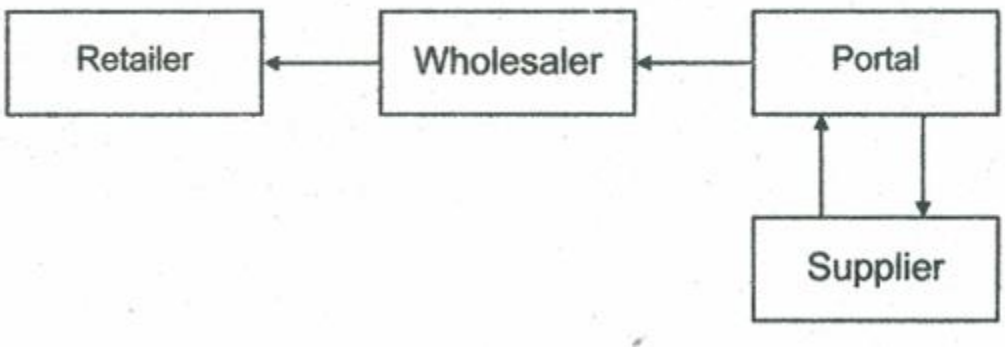
Cyber crime	Penalties
Sending offensive or false messages through communication service, etc. lt is also known as cyber stalking.	Imprisonment up to three years and with fine.
Cyber terrorism: Whoever uses cyber space with intent to threaten the unity, integrity, security or sovereignty of India or to strike terror in the society or any section of the people.	Imprisonment which may extend to life imprisonment.

Violation of privacy: Intentionally or knowingly captures, publishes or transmits the image of any person without his or her consent, under circumstances of violating the privacy of that person.	Imprisonment up to three years or fine up to two lakh rupees or both.
Breach of confidentiality and privacy: Securing access to any Computer, system or network.	Imprisonment up to two years or fine up to one lakh rupees or both.
Identity theft: Fraudulently or dishonestly make use of the .electronic signature, password or any other unique identification feature of any other person.	Imprisonment up to three years or fine up to rupees one lakh.
Hacking the Computer system	Imprisonment up to three years or with fine which may extend up to 5 lakh rupees or both.
Publishing or transmitting obscene material in electronic form.	First conviction: Imprisonment up to three years and with fine up to five lakh rupees. Subsequent conviction: Imprisonment up to five years and with fine up to ten lakh rupees .

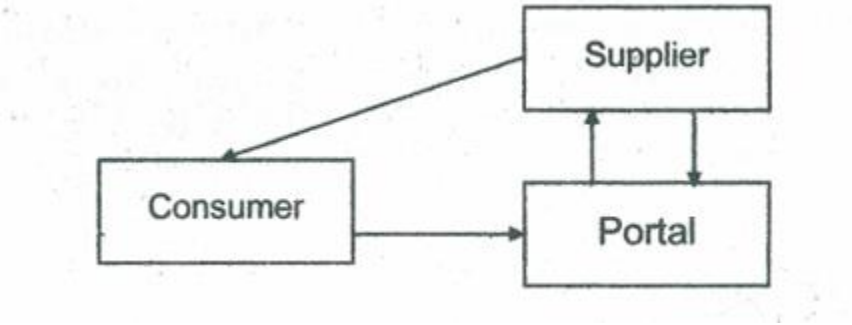
(b) Describe the characteristics of B2B, B2C, C2B and C2C models of e-commerce. Mention an example for each. 5

Ans:

B2B: B2B refers to Business to Business. In B2B e-commerce model, the transactions are between businesses. Here the companies are doing business with each other. The final costumer is not involved. An example of such transaction is between wholesaler and retailer. Examples of B2B portals include http://www.infobanc.com, http://www.ask4plastic.coin, http://www .matexnet.com, http://www.pcbindia.com.



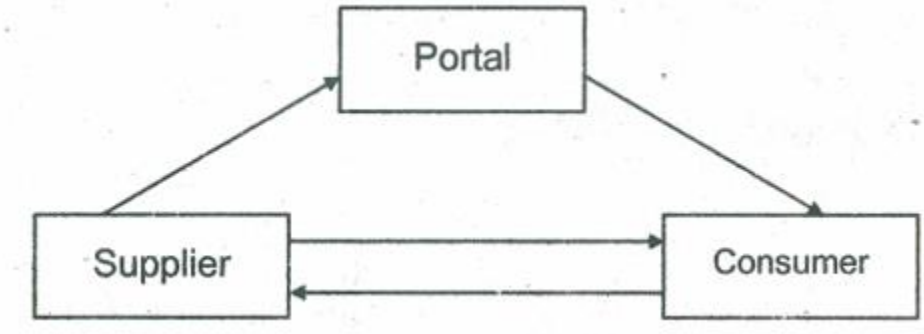
B2C: It refers to Business to consumers. In B2C e-commerce model , the transactions are between businesses and consumers. The company will sell their goods and/or services directly to the consumer. An example of such transaction is between Indian Railways and Passenger. Examples of B2C portals include http://www.irctc.co.in, http://www.amazon.com,and http://www.tatasky.com.



C2B:

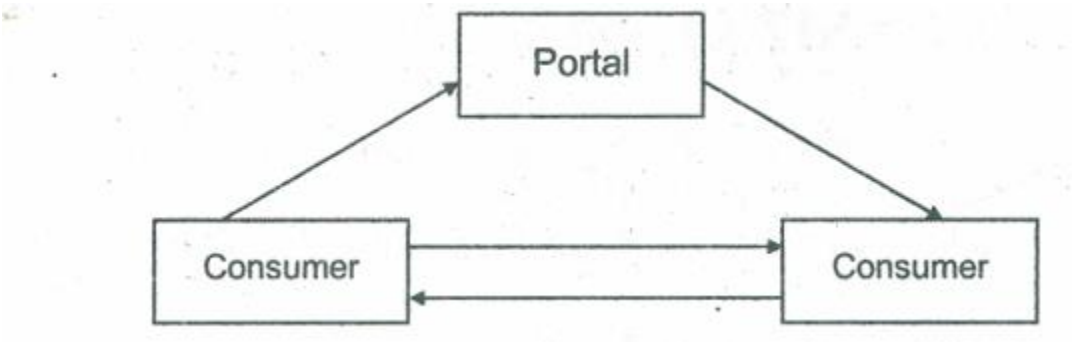
It refers to Consumer to Business. In C2B e-commerce model a consumer approaches website showing multiple business organizations for a particular service. So, the consumer provides a good or some service to the company. Consumer may place an estimate of amount s/he wants to spend for a particular service. Interest rates of personal loan ·car loan provided.by various banks via website is an example. Business organization which fulfills the consumer's requirement within specified budget approaches the customer and provides its services.

Examples of C2B portals include http://www.razerfinish.com, http://www.reverseauction.com and http://www.priceline.com.



C2C: It refers to consumer to consumer. In C2C e-commerce model , the transactions are between consumers and consumers. No company is involved. It helps people sell their personal goods and assets directly to an interested party. An example of such transaction

is between sellers and buyers of shares. In C2C model, organizations may be present as intermediaries. Examples of C2C portals include http://www.olx.in, and http://www.quickr.com.



4.

(a) Compare and contrast the conventional processing of a purchase order with that of an Electronic Data Interchange (EDI). 5

Ans:

Conventional method	Electronic Data Interchange
Rely on paper-based or manual methods for exchanging purchase orders, invoices, and other documents.	Uses electronic communication for exchanging business documents between trading partners.
Can be slower and more prone to errors due to manual data entry and processing.	Offers faster and more efficient document exchange, reducing processing time and errors.
May require more resources for handling paperwork, data entry, and document storage.	Involves initial setup costs but can lead to long-term cost savings by reducing paper usage, manual labor, and errors.
Scaling operations with manual processes can be challenging as order volume increases.	EDI systems can easily handle increased transaction volumes and adapt to evolving business needs.
The need for human intervention and physical document handling makes the process inefficient and adds to administrative costs.	EDI cuts down on expenses related to paper, printing, mailing, and manual labor.
Tracking the status of orders and managing supplier relationships can be difficult without real-time data and integrated systems.	Real-time data exchange provides better visibility into the order fulfillment process and enables effective tracking.
The manual nature of conventional processing leads to longer processing times, with potential delays at each stage.	EDI drastically reduces processing time, enabling faster order fulfillment and quicker deliveries.

(b) Discuss the benefits and impediments of m-commerce.

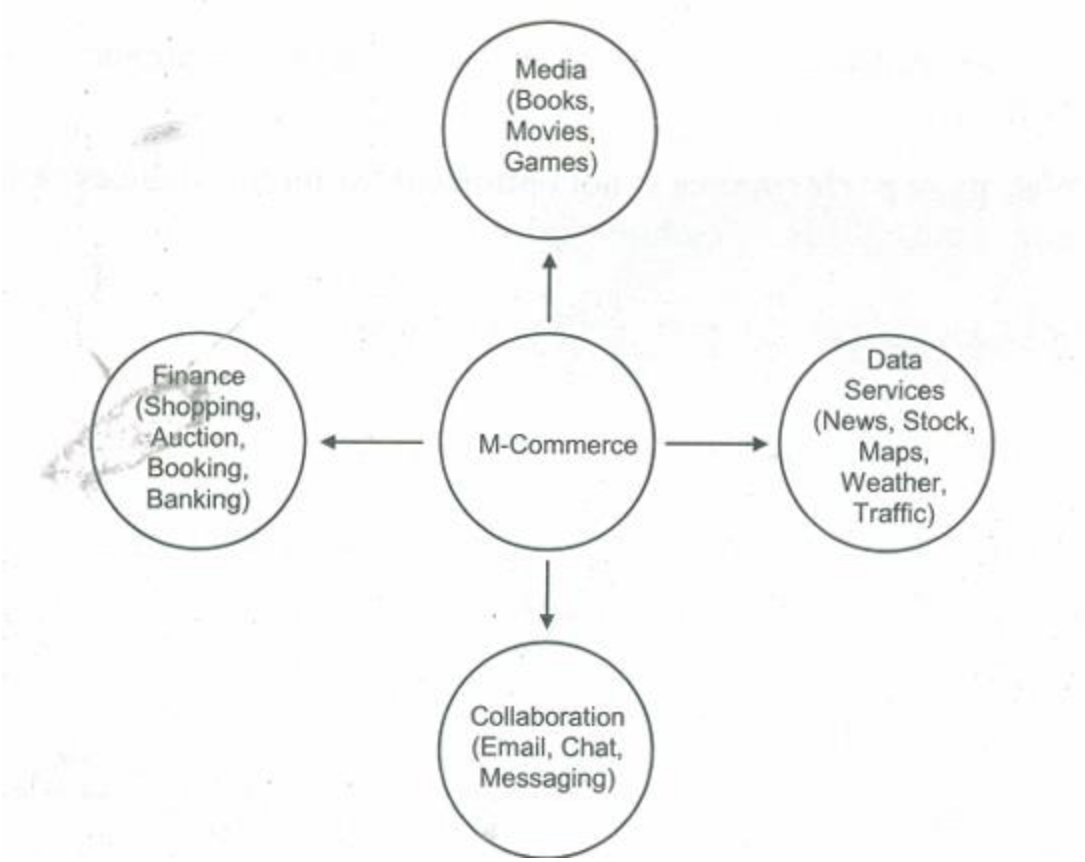
Ans:

Benefits of m-commerce :

- M-commerce allows consumers to shop anytime and anywhere using their mobile devices.
- It allows businesses to provide a real-time updates on sales, new product launches and inventory changes. It provides timely and on-the-go access to information such as stock quotes during travel.
- Businesses can reach a broader audience through m-commerce.
- It can be a more cost-effective way to reach customers compared to traditional advertising.
- Many vendors are pushing deals to encourage m-commerce which can be leveraged by customers.
- Opportunity to use mobile device for instant payments.
- Reduces overall transaction cost through streamlined business processes and offers competitive price to customers.
- Mobile technology covers wider distance and enhances the reach of potential customers.

  Some of the important m-commerce services are:
  - Mobile money transfer,
  - Mobile auctions
  - Mobile banking,
  - Mobile shopping

The four main categories of benefits of m-commerce are shown below:



Impediments of m-commerce:

Though m-commerce is a promising technology, there are few challenges which are preventing it from wider adoption. Some of the impediments of m-commerce are:

- Mobile security: This is one of the prime concerns which is further increased due to the transactions happening over wireless networks. Similarly, the security issues related to mobile payment systems is another limitation.
- Mobile network coverage and bandwidth: Wireless networks offering high bandwidths are not available in all areas posing challenges to commerce transactions. This limitation affects the ability to load apps or websites efficiently.
- Mobile experience: Due to the wide variety, of mobile devices, operating systems and device form factors, it requires a design that leads to robust user experience that caters to consumers of all these devices. Applications not conforming to standards pose challenges across various mobile platforms.

- Screen size is limiting user experience. Some mobile shopping apps and websites are not well-optimized for smaller screens.
- Interoperability across multiple networks, protocols and devices also pose challenges.
- Web page performance is not optimized for mobile devices resulting in slower page loads on mobile platforms.
- Many consumers worry about the safety of their personal and financial information when shopping via mobile devices. Data breaches and identity theft are significant concerns.

5. Write short notes on any two of the following : 2x5=10

(a) Secure Socket Layer

Ans: It is a web security protocol that is used to establish an encrypted link between a web server and a web browser. It was developed by Netscape. It operates between the application and transport layers. It is commonly used to manage the security of message transmission on the Internet. It secures the data during online transactions or when transmitting confidential information. It is a solution to authentication, privacy and integrity problems and avoids attacks. SSL authenticates servers and users. It establishes encrypted link to hide the data transmitted thus leading to data integrity.

Characteristics of SSL:

• It operates at TCP/IP transport layer,

• It uses a dedicated TCPIIP socket,

• It encrypts the communications between the server and client when connection is established, and

• It requires a server certificate.

Working of SSL:

The following are various steps of SSL handshake:

1. Establishing a connection:

Client hello: SSL client attempts to connect to a SSL server (website secured with SSL) by sending a client hello message.

Server hello: Web server responds with a server hello.

2. Client requests web server to prove its identity.

3. The server sends its SSL certificate to the client. The certificate contains the server's public key and is signed by a trusted Certificate Authority (CA).

4. The client verifies the server's certificate against its list of trusted CAs. Accordingly, it sends a message to the server. If the certificate is valid, the client trusts that it is communicating with the right server.

5. If the server requires client authentication, it asks for "client certificate request".

6. Then the client sends its certificate.

7. SSL server verifies the signature on the client certificate.

8. Client sends a digitally signed acknowledgement to start sharing.

9. Server sends a digitally signed acknowledgement to start sharing.

10. The data in encrypted form is shared between the server and browser and a secured session starts that protects message privacy, integrity and security. A secure session starts between server and client enabling data to be transmitted in encrypted form, thus ensuring privacy, integrity and security.

11. When the session ends, both parties can send a message to close the connection securely.

(b) Online Trading System

Ans: It is a platform that allows individuals and institutions to buy and sell financial securities, such as stocks, bonds, commodities and currencies, through the internet. The investor / trader gets updated information online. It leads to the decrease in the practice of an investor of looking at the share price in the morning newspaper. The transaction is dealt at a price at a moment checked in an online trading platform than issuing instructions for execution to brokers by phone or by person.

Advantages:

- It leads to paperless transactions. That is, shares are held in electronic form in the demat account.
- It helps in improving market transparency.
- Investors can trade from anywhere with an internet connection.
- Online trading system platforms are available 24/7, allowing traders to buy and sell securities at any time.

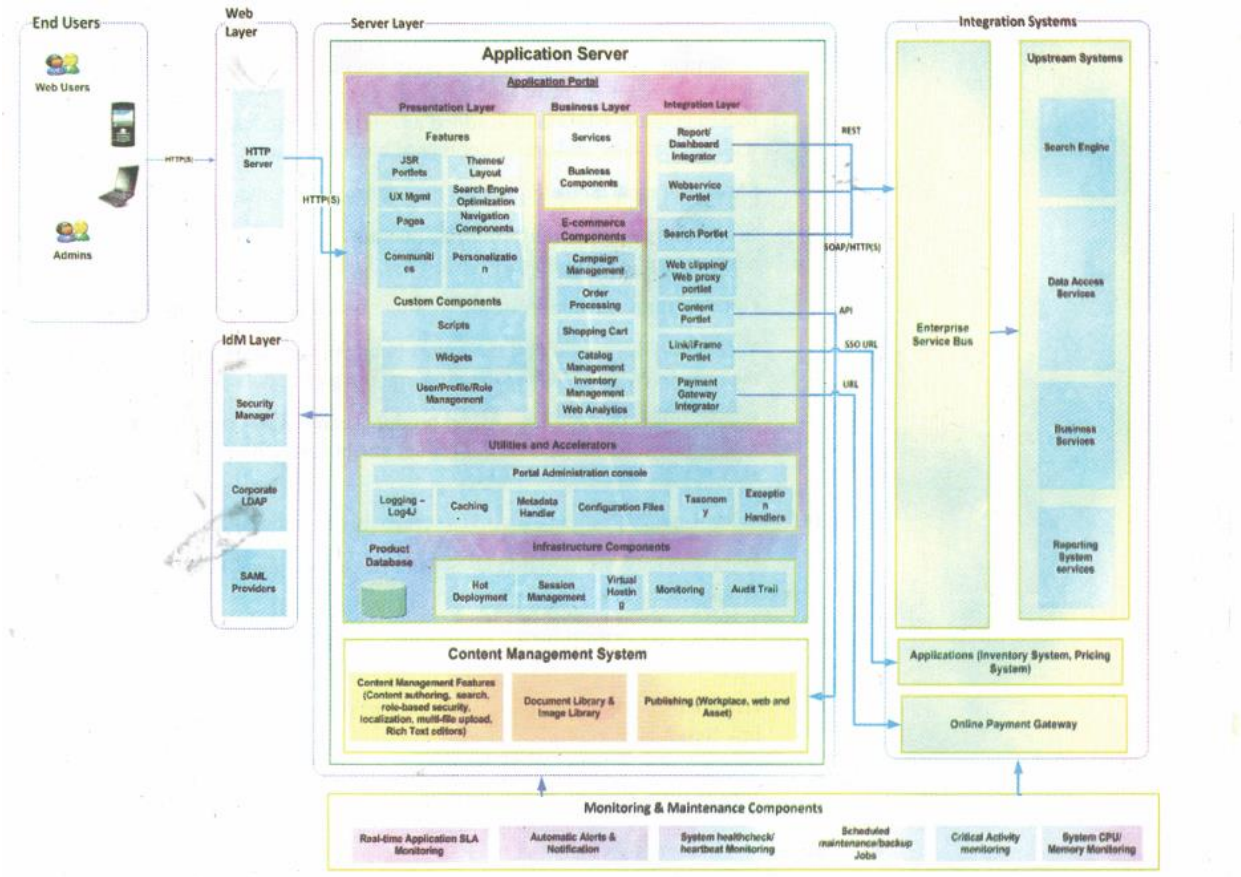
- Online trading system has lower commissions and fees compared to traditional brokerage services.
- It helps in smooth market operation while retaining the flexibility of conventional trading practices.
- Traders have access to real-time market data, enabling them to make quick decisions based on the latest information.
- There is free access to high quality research reports generated by financial players.
- All the records of transactions are available online.

Disadvantages:

- Due to the policy of online brokerage house, some stocks may not be, available for trading online for whom the customer needs to contact other brokerage houses.
- The scope of manipulation, speculation and malpractice is more due to the security issues associated with Internet.
- Technology dependency can result in disruptions like platform outages, slow execution speeds, or internet failures, which can negatively impact your online trading. There are chances of losing the trade if online trading system fails.
- Cyber threats such as hacking, phishing attacks, malware, and ransomware are a threat to online trading platforms. Personal and financial information can be compromised by these attacks, resulting in identity theft or financial losses.

(c) Architecture of e-commerce portal

Ans: The following is a sample logical architecture of the online shopping e-commerce portal:



Various components of e-commerce portal are explained below. The multi-layered architecture is mainly based on MVC architecture.

Presentation Layer: Includes presentation components like web pages and user experience components. The key components are explained below:

- Web pages: HTML compliant pages such as home page, search page, products page, shopping cart and check out page.
- Themes/Layout: Pages will be designed with consistent themes and layout.
- Navigation components: Include navigation left navigation component, etc.
- Personalization engine: The engine tracks the purchase history of user and uses the user profile attributes such as interests, location to provide personalized product recommendations. The engine also tracks customer's web behaviors, click path, downloads to fine tune the product recommendation.
- Search Engine Optimization (SEO): Makes the pages search engine friendly so that they get higher ranking in search engine results driving more traffic.

E-commerce Components: Include server side business components and services to satisfy the core e-commerce requirements.

* Campaign management module: Helps the business and marketing team to setup the sales and marketing campaigns, and seasonal offers and promotions. The content is mainly retrieved from content management systems (CMS) to perform dynamic delivery.

* Order processing module: Manages all parts of order flow such as order placement, order fulfilment, and order tracking. This is integrated with online payment gateways and supports varieties of payment modes. For Indian context, COD is also added as one of the modes of payment along with net banking and credit/debit card based payment.

* Shopping cart module: Allows the user to add to and update shopping cart.

* Inventory management module: Interacts with internal inventory management ERP (Enterprise Resource Planning) system.

* Catalog management module: Maintains and categorizes product catalog.

* Web analytics module: Tracks user behavior on the web pages to improve the effectiveness of personalization and recommendation.

* Search: Includes keyword based product search. User can filter the search results based on price, model, product attributes such as color, size, brand etc.

Integration Layer: Primarily involves service based integration components.

- Data services component: Uses Data Access Object (DAO) to access the product database.
- Web services component: Is built into the application using JAX-WS to support any future services based integration.
- Iframe/link based integration component is provided to support any future link based integration.
- Search engine component: Helps in indexing product details to provide query-based search results.

Identity Management (IDM) Layer: It includes security manager, LDAP and SAML providers.

- LDAP server acts as the user registry. It stores the user profile information.
- Online shopping applications provide security at coarse-grain level through authentication and at fine-grained level through authorization. Additional security measures include admin access to catalog management and personalized promotion management.

Monitoring and Maintenance Component: Includes real time application SLA monitoring, automatic alerts and notifications, system health check/ heart beat monitoring, scheduled

maintenance/backup jobs, critical activity monitoring and system CPU/ memory monitoring.

- Real-time application SLA monitoring components would check the live production of web pages.
- Automatic alerts and notification through email when the page/system performance falls below a pre-configured threshold value.
- System health-check/heartbeat monitoring to ping the availability of portal system and all interfacing systems to ensure that they are responding within expected response time. Automatic notification is trigged if any system is down.
- Scheduled maintenance and backup jobs to perform system clean-up and back up activities.
- Web analytics will be configured to monitor the business-critical process/activities in real-time. This could include activities such as page load time, search processing time etc. Additionally reports would be designed to display the monitoring data.
- System CPU /Memory monitoring is done.