Sample solution: FIT 2021 Fall

What role does information technology play in today's corporate environment? Justify your answer.

Information technology has become very important in the corporate environment. IT has helped the organization, manager, and workers in a more efficient management, to inquire about a particular problem, conceive its complexity, and generate new products and services; thereby, improving their productivity and output.
Some of the key areas where IT can enhance corporate productivity are :

- Communication
- Inventory management
- Management Information Systems
- Customer Relationship Management

Communication:
An important use of technology in business is for communication through platforms such as conferencing software, email, video chat, company intranets and the internet in general. IT allows businesses to easily hold virtual meetings with staff and clients around the world without having to spend time and money on travel. At the same time, employees can access and share information and collaborate on their work regardless of location; employees can even work remotely so that the company can save on costs. Companies can also use platforms such as social media to address customer concerns more efficiently.

Inventory Management
Organizations need to maintain enough stock to meet demand without investing in more than they require. Inventory management systems identify the quantity of each item a company maintains, an order of additional stock by using a way of inventory management. By using IT in inventory management, it also will help in tracking the quantity of each item a company maintains, triggering when it comes to managing inventory.

Management Information System(MIS)
Information data is very important for an organization and a valuable resource requirement for safe and effective care. Data used is as part of a strategic plan for achieving the purpose and mission. Then, the company should use the management information system (MIS) to enable the company to track sales data, expenditure and productivity as well as information to track profits from time to time, maximizing return on investment and recognizing areas of improvement.

Customer Relationship Management
Companies are using IT to improve the way of design and manage customer relationships. Customer Relationship Management (CRM) systems capture every

relationship a company has with a customer, so that a more experience gain is possible. If a customer makes a call to the center and reports an issue, the customer relation officer will be able to see what the customer has purchased, view shipping information, call up the training manual for that item and effectively respond to the issue.

*** The above answer is enough for 8 marks.*
*** It is not necessary to write exact same points*
*** Instead of above given points you can write other points such as*

- Storing and Protecting Information
- Telecommuting
- Automated Processes
- Communication

Explain why and how companies are looking for innovative ways to use information systems for competitive advantage

*** The answer to this question is business pressure and responses***

What are the capabilities of an information system? Explain briefly

The capabilities of IT are as follows:
Provide fast and accurate transaction
Using CBIS such as TPS enables us to process customer transactions quickly and accurately. A reliable TPS can also help an organization save money on potential troubleshooting or coding costs for malfunctioning systems. Information systems can potentially conduct and organize thousands of transactions throughout the day.With a CBIS in place, businesses can effectively increase the speed of each transaction to minimize wait times for customers.

Provide large capacity, fast access storage
CBIS allows us to store large amounts of data. Data stored in digital format can be easily accessed and maintained. Further, digital data can be encrypted to provide extra security and also can be easily replicated and transferred.

Provide Fast Communications
One key feature of CBIS is its capability to provide faster communications—among employees, with business partners, and with customers. Instant messaging, email, video conferencing has transformed the way in which information flows. CBIS allows us to transmit and receive data in various forms with elevated security at a speed that is unmatched by any other modes of communication.

Span Boundaries
Using IT we can incorporate systems through which an organization receives intelligence about its environment and provides computerized information for its customers, suppliers, and the public at large. IT allows us to transcend geographical boundaries.

Support for decision making
With large data in our disposal we can make more informed decisions. Data warehouse and data mart that stores historical data allows us to lean onto past records and make logical future predictions. Expert system enables us to get access to domain specific expert knowledge.

Reduce Information Overload
IT enables us to filter the information so that we can focus on the information that is relevant to us. All databases come with powerful query features that can easily fetch the desired information based on our query parameters. IT prevents us from being overwhelmed by the volume of information and also helps us to discard unrelated or unnecessary information.

Provide a Competitive Weapon
In a modern business environment, IT provides us with new features that will help us to get an edge over other business competitors. With the help of IT we can provide instant service and response to our customers. Customer feedback and complaints can be easily, effectively and quickly addressed.

Make a note of the CPU's working mechanism/instruction cycle. How do you evaluate a computer's performance ?
** Draw the block diagram of CPU **
The inputs are data and brief instructions about what to do with the data. These instructions come from software in other parts of the computer. The inputs are stored in registers until they are sent to the next step in the processing.
• Data and instruction travel in chips via electrical pathways called buses. The size of the bus determines how much information can flow at any time.
• The control unit directs the flow of data and instructions within the chip.
• The **arithmetic-logic unit (ALU**) receives data and instructions from the registers and makes the desired computation. These data and instructions have been translated into binary form. The CPU can process only binary data.
• The data in their original form and the instructions are sent to storage registers and then are sent back to a storage place outside the chip, such as a computer's hard drive. Meanwhile, the transformed data goes to another register and then on to other parts of the computer.
The cycle of processing, known as machine instruction cycle, occurs millions of times per second or more. It is faster or slower, depending on the following factors:
• **Machine instruction cycle:**

The cycle of computer processing, whose speed is measured in terms of the number of instructions a chip processes per second.

• **Clock speed:**

The preset speed of the computer clock that times all chip activities, measured in megahertz and gigahertz.

• **Word length:**

The number of bits (0s and 1s) that can be processed by the CPU at any one time.

• **Bus width:**

The size of the physical paths down which the data and instructions travel as electrical impulses on a computer chip.

• **Line width**:

The distance between transistors; the smaller the line width, the faster the chip.

Differentiate between microprocessor and microcontroller

Microprocessor	**Microcontroller**
It is only a processor, so memory and I/O components need to be connected externally	Micro Controller has a processor along with internal memory and I/O components.
Memory and I/O has to be connected externally, so the circuit becomes large.	Memory and I/O are already present, and the internal circuit is small.
It can't be used in compact systems	It can be used in compact systems
Due to external components, the total power consumption is high. Therefore, it is not ideal for devices running on stored power like batteries.	As external components are low, total power consumption is less. So it can be used with devices running on stored power like batteries.
Microprocessors are based on Von Neumann model	Micro controllers are based on Harvard architecture
It has no RAM, ROM, Input-Output units, timers, and other peripherals on the chip.	It has a CPU along with RAM, ROM, and other peripherals embedded on a single chip.
It uses an external bus to interface to RAM, ROM, and other peripherals.	It uses an internal controlling bus
It's used for general purpose applications that allow you to handle loads of data.	It's used for application-specific systems.
Example: intel 386	Example: Intel 8031/8051

What is an operating system ? With an example, describe the differences between system software, application software and enterprise software.

An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.
Some popular Operating Systems include Linux Operating System, Windows Operating System, VMS, OS/400, AIX, z/OS, etc.

System Software	**Application Software**	**Enterprise Software**
They are designed to manage the resources of the system, like memory and process management, security, etc.	They are designed to fulfill the requirements of the user for performing specific tasks.	They are designed to help corporations solve wide scale problems and are typically large platforms, too complex for individual or small business use.
It is written in a low-level language like a machine or assembly language.	A high-level language is used to write Application Software.	A high-level language is used to write Enterprise Software.
The System Software is a general-purpose software	Application Software is specific purpose software.	Enterprise Software is usually specific purpose software.
Capable of running independently.	Can’t run independently.	Can’t run independently.
System software are independent of the application software	Application software needs system software to run.	Enterprise software needs system software to run.
Example: Linux, Windows	Example: Spreadsheet software, word processing software	Example: ERP software, MIS, TCP

Define telecommunication system. What are the major components of the telecommunication system?
Telecommunications systems include wired and wireless local and wide area networks and hardware and software providing the capabilities for systems to communicate with each other or with users.It is a collection of nodes and links to enable telecommunication. Telecommunication is communication at a distance using electrical signals or electromagnetic waves.

Examples of telecommunications systems are the telephone network, the radio broadcasting system, computer networks and the Internet. The nodes in the system are the devices we use to communicate with, such as a telephone or a computer.

Components of Telecommunication system:

- Input and output devices, also referred to as '**terminals**'
  These provide the starting and stopping points of all communication. A telephone is an example of a terminal. In computer networks, these devices are commonly referred to as 'nodes' and consist of computer and peripheral devices.
- Telecommunication **channels**, which transmit and receive data
  This includes various types of cables and wireless radio frequencies.
- Telecommunication **processors**, which provide a number of control and support functions
  For example, in many systems, data needs to be converted from analog to digital and back.
- **Control software**, which is responsible for controlling the functionality and activities of the network
- **Messages** represent the actual data that is being transmitted
  In the case of a telephone network, the messages would consist of audio as well as data.
- **Protocols** specify how each type of telecommunication systems handle the messages

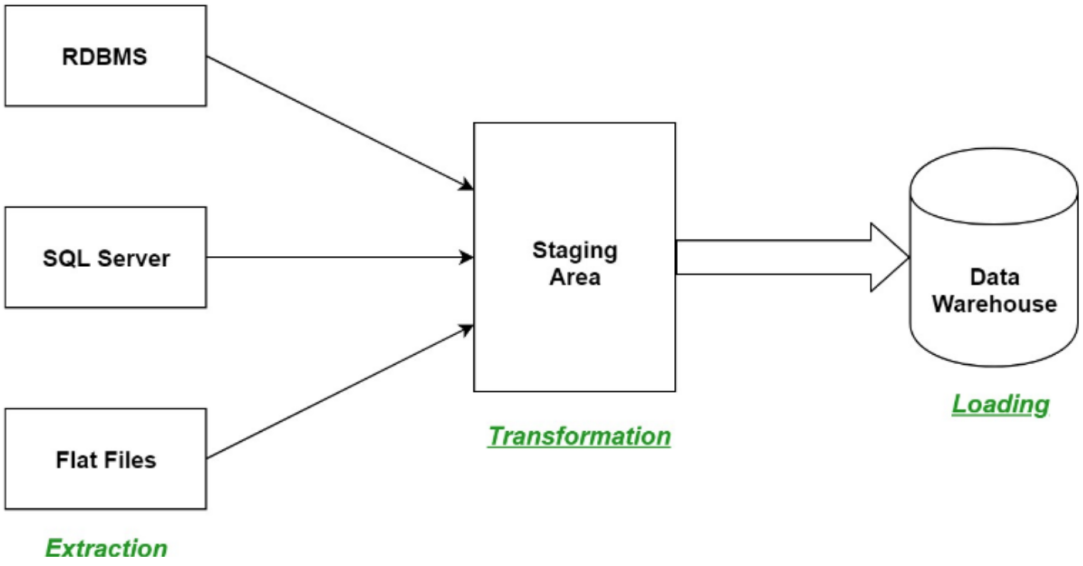
Differentiate between guided and unguided transmission media.

Guided Transmission Medium	**Unguided Transmission Medium**
The guided media is also called wired communication or bounded transmission media.	The unguided media is also called wireless communication or unbounded transmission media.
The signal energy propagates through wires in guided media.	The signal energy propagates through the air in unguided media.
Guided media is used for point-to-point communication.	Unguided media is generally suited for radio broadcasting in all directions.
It is cost-effective.	It is expensive
Discrete network topologies are formed by the guided media.	Continuous network topologies are formed by the unguided media.
Signals are in the form of voltage, current, or photons in the guided media.	Signals are in the form of electromagnetic waves in unguided media.
By adding more wires, the transmission capacity can be increased in guided media.	It is not possible to obtain additional capacity in unguided media.

It sends out a signal that indicates which way to go.	It does not indicate which way to travel.
It is suitable for communication over a shorter distance	It is best suited for communication over a longer distance
Examples of guided media are twisted pair wires, coaxial cables, and optical fiber cables.	Examples of unguided media are microwave or radio links and infrared light.

What is data warehousing ? Why is a data warehouse important for data mining ?

A data warehouse is a relational or multidimensional database management system designed to support management decision making. A data warehouse is a collection of computer-based information that is critical to successful execution of enterprise initiatives. It provides a tool to satisfy the information needs of the employee's at all organizational levels-not just for complex data queries but as a general facility for getting quick, accurate and often insightful information. It is designed so that its users can recognize the information they want and access that information using simple tools. The data in the "warehouse" are stored in a single, agreed upon format even when underlying operational applications store the data differently.



Data mining is a process in which data is extracted and analyzed to fetch useful information. In data mining hidden patterns are researched from the dataset to predict future behavior. Data mining is used to indicate and discover relationships through the data.
Data mining uses statistics, artificial intelligence, machine learning systems, and some databases to find hidden patterns in the data. It supports business-related queries that are time-consuming to resolve.

Data warehouse is important for data mining because

- Data warehouse ensures consistency. Data warehouses are programmed to apply a uniform format to all collected data, which makes it easier for corporate decision-makers to analyze and share data insights with their colleagues around the globe. Standardizing data from different sources also reduces the risk of error in interpretation and improves overall accuracy.
- Data warehousing improves the speed and efficiency of accessing different data sets and makes it easier for corporate decision-makers to derive insights that will guide the business and marketing strategies that set them apart from their competitors.
- Data warehouses store historical data in a standard format which makes it easier to extract information and analyze them.

Discuss the strategic importance of the Inter-organizational System and the Global Information System.

An interorganizational system(IOS) refers to the way partnered businesses manage their relationships between one another and their clients or customers. Businesses that sell similar items or services, or require the help of other businesses to complete the sale of a product are undeniably linked in the market. An IOS system ensures that communication between these businesses is efficient, creates healthy competition and improves the services delivered to clients and customers.

IOS provides following strategic importance

- **Efficient Supply Chain Management** : An interorganizational system creates automated communication between interconnected businesses, or information that is programmed to update itself, with minimal manual operation from a worker.
- **Technology Exchange**: When one company implements and uses a new technology in an IOS system, partnering companies automatically benefit from this discovery. Technology is exchanged easily and encourages creators to develop new products and programs.

- **Global Communication:** IOS makes communication available at a global level. The wider the network of communication, the more businesses have a chance to learn new tactics from one another and increase productivity.
- **Reduce Business Risks:** An effective ISO system reduces business risks by making sure that each aspect of the business is being watched. The system provides checks and balances that hold each aspect of the company accountable to one another and partnering companies.

Global Information System:
It is an information system that works across national borders. It facilitates communication between headquarters and subsidiaries in other countries. GIS incorporates all the technologies and applications found in a typical information system and stores, manipulates, and transmits data across cultural and geographic boundaries.

Advantages of Global Information System are

- **Make Better Business Decisions**: By mixing regional and location-related information with other company information companies can gain critical ideas that help their businesses succeed. With spatial issues companies can select trading places, assistance areas and clients of interest, and existing the details in thematic maps and reviews to accomplish faster and better company choices.
- **Improve Functional Performance & Reduce Cost**: The details provided by GIS are used to greatly improve operational preparation and control, and to re-engineer and improve company procedures. It gives you solutions for redirecting optimization, and servicing, preparing and confirming.
- **Enhance Customer Service and Increase Sales**: Understanding your clients, providing them with the best possible assistance and finding more people like them is central to increasing revenue. GIS helps organizations to recognize their best clients and use spatial issues to determine regional areas where similar census apply in order to focus on industry development.
- **Better & More Cost-effective Plan Citizens**: Government companies, especially municipalities, face remarkable difficulties in the economy. They have to face providing increasing communities, with higher objectives of assistance, while dealing with reducing sources. GIS provides an efficient remedy to improving key resident services such as permit/licensing, preparing, servicing, features control and trains and buses.

How can information technology be used for data interchange and fund transfer ? How can people benefit from it?

Since the advent of IT, EFT(Electronic Fund Transfer) and EDI(Electronic Data Interchange) have gathered popularity and are used extensively for data interchange and fund transfer respectively.

Electronic Data Interchange is the computer to computer exchange of business documents or information in a standard format between businesses that can be read and understood by the computer system.
Electronic Funds Transfer (EFT), refers to transferring money electronically. It has made life easy and safe, it proves to be a cheaper as well as faster method of transferring funds/ money as compared to the exchange of physical money.

Benefits of EDI

- Improve business cycle speeds
- Reduce human error and improve record accuracy
- Increase business efficiency
- Paperless and environmentally friendly
- Enhance transaction security

Benefits of EFT

- It helps merchants to access funds faster
- Customers can set up automatic payments with EFTs
- Most EFT transactions don't require a hold on the funds
- It is safer to receive funds through the EFT process
- Transaction dispute through EFT payment can be easily investigated and resolved

What are the roles of IT to support business functions ?
*** For 5 marks the answer below is sufficient****
*** For more detail refer to page 244 of the text book*
The principal business functions in a business firm are:

1. Marketing and Sales
2. Production
3. Accounting and finances
4. Human resource

IT plays a vital role in smooth operation and continuous development of all the functional departments of business.
Roles of IT in Accounting and Finances

- Economic and Financial forecasting
- Budgeting
- Investment Management
- Financial control
- Auditing
- Profitability analysis and cost control

Roles of IT in Marketing and Sales

- Customer profiles and preference analysis
- Mass customization
- Targeted advertising on the web
- Customer inquiry system and automated help desk

- Telemarketing

  Roles of IT in Production
  - Logistic and material management
  - Inventory Management
  - Material requirement planning(MRP)
  - Manufacturing resource planning(MRP II)
  - Just-in-time (JIT)
  - Project Management

  Roles of IT in Human Resource
  - Recruitment
  - Position Inventory
  - Employee selection
  - Training and human resource development
  - Performance Evaluation

Describe how information technology aids human resource management and planning.

Managing human resources in large organizations requires extensive record-keeping as well as planning. IT can aid in both HR management and planning in following ways:

- **Personal files and skill inventory:**
  All information about an employee is contained in an HRM personnel file. The information includes his or her skills and experience, performance evaluations and compensation. When personnel files are computerized, it is easy to identify qualified employees within the company for open positions, promotion, transfer, special training programs and layoffs.
- **Benefit administration**
  Managing the benefits system can be a complex task, due to its many components such as health care plans, pensions etc. Using intelligent agents companies can assist the employees to choose and trade-off benefits and also monitor their actions.
- **Personnel Planning**
  Companies can develop qualitative and quantitative workforce planning models that assist the HR department to forecast requirements for both people and skills. IT can further enhance such a model as it helps in collecting, updating and processing the information.
- **Succession planning and implementation**
  Replacement of top managers can be a difficult, lengthy and expensive process. Expert systems and personnel databases can be used to successfully support succession planning.
- **Labor management negotiation**

IT based Decision Support System(DSS) enables companies to negotiate labor management as such a system can simulate financial and other impacts of fulfilling any demands made by employees and it can also provide answers to queries.

Describe the most difficulties that the Nepali E-commerce business organizations face in real practice.

E-commerce is the activity of electronically buying or selling of products on online services or over the Internet.
Some of the difficulties faced by Nepali E-commerce business organizations are :

- Insufficient telecommunications bandwidth
  Many rural and smaller towns in Nepal are still facing the issue of slow internet connection due to insufficient telecommunications bandwidth.
- Expensive Internet accessibility
  Internet and data rates are still expensive in Nepal as compared to neighboring countries, which can discourage customers from indulging in online buying activity.
- Insufficient critical masS of buyers
  High percentage of the population in Nepal are still not confident about online platforms. Customers in Nepal still resist changing from a real store to a virtual store.
- Taxes and other fees
  Legislative efforts to impose taxes on e-commerce have not been fully successful yet. State and local authorities in Nepal are still not clear about how to impose tax on electronically generated revenues.
- Copyright
  Copyright issues and protection of intellectual properties have not yet been fully imposed as a policy by the government.