1. **a. Define ERP. Explain benefits of ERP. (4M)**

    An ERP System automates and integrates core business processes such as taking customer orders, scheduling operations, and keeping inventory records and financial data. ERP systems can drive huge improvements in the effectiveness of any organization by:

   - assisting you in defining your business processes and ensuring they are complied with throughout the supply chain;
   - protecting your critical business data through well-defined roles and security access
   - enabling you to plan your work load based on existing orders and forecasts
   - providing you with the tools to give a high level of service to your customers
   - translating your data into decision making information

   Four Tangible Benefits:
   1. Improves the productivity of process and personnel
   2. Lowering the cost of products and services purchased
   3. Inventory reduction
   4. Lead time reduction

1b. Explain ERP and Related technology with an example.(6M)

BUSINESS PROCESS REENGINEERING (BPR)

BPR has been around for quite some time and a lot has been written about it in both the practitioner trade magazines and the academic research journals. However, the controversy still remains if there is any accurate description of BPR, or if BPR is just a fad-an appealing label to tag on to whatever your company is doing to suggest that your latest and greatest work is 'in vogue.' But if reengineering is to continue in the long run, then it must do more than advertise its considerable successes to date. It must become more proactive and inclusive with regard to human, organizational, and motivational change issues.

Dr. Michael Hammer defines BPR as U ••• the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed." One of the main tools for making this change is information technology (IT). Any BPR effort that fails to understand the importance of IT and does the pre-BPR analysis and planning phases without considering the various IT options available and the effect of the proposed IT solutions on the employees and the organization is bound to crash before takeoff.

We have discussed how ERP systems help in integrating the various business processes of the organization with the help of the latest developments in IT. With a good ERP package, the organization will have the capability of achieving dramatic improvements in critical areas such as cost, quality, speed, and so on. Thus, many BPR initiatives end up in the ERP implementation.

BUSINESS INTELLIGENCE (BI)

Business intelligence (BI) represents the tools and systems that playa key role in the strategic planning process of the corporation. These systems allow a company to gather, store, access, and analyze corporate data to aid in decision-making. Generally, these systems will display business intelligence in the areas of customer profiling, customer support, market research, market segmentation, product profitability, statistical analysis, and inventory and distribution analysis, to name a few.

Most companies collect large amount of data from their business operations. To keep track of that information, a business would need to use a wide range of software programs such as spreadsheets, databases, and different database applications for various departments throughout their organization. Using multiple software programs makes it difficult to retrieve information in a timely manner and to perform analysis of the data.

BUSINESS ANALYTICS (BA)

Business analytics (BA) is the practice of iterative, methodical exploration of an organization's data with emphasis on statistical analysis. Business analytics is used by companies committed to data-driven decision-making. BA is used to gain insights that inform business decisions and can be used to automate and optimize business processes. Data-driven companies treat their data as a corporate asset and leverage it for competitive advantage. Successful business analytics depends on data quality, skilled analysts who understand the technologies, and the business and an organizational commitment to data-driven decision-making. Examples of BA uses include:

- Exploring data to find new patterns and relationships
- Explaining why a certain result occurred
- Experimenting on previous decisions
- Forecasting future results

Once the business goal of the analysis is determined, an analysis methodology is selected and data is acquired to support the analysis. Data acquisition often involves extraction from one or mere business systems, cleansing, and integration into a single repository such as a data warehouse or data mart. The analysis is typically performed against a smaller sample set of data. Analytic tools range from spread-sheets with statistical functions to complex data mining and predictive modeling applications, As patterns and relationships in the data are uncovered, new questions are asked and the analytic process iterates until the business goal is met. Deployment of predictive models involves scoring data records (typically in a database) and using the scores to optimize real- time decisions within applications and business processes. BA also supports tactical decision-making in response to unforeseen events; and in many cases the decision-making is automated to support real-time responses.

DATA WAREHOUSING

If operational data is kept in the databases of the ERP system, it can create a lot of problems. As time passes, the amount of data will increase and this will affect the performance of the ERP system. Thus, it is better to archive the operational data once its use is over. The phrase 'the use is over', does not mean that the archived data is useless. It is one of the most valuable resources of the organization. However, once the operational use of the data is over it should be removed from the operational databases. For example, once the financial year is over, the daily transactional data can

be archived. Figure 8.2 shows what happens if the data is not archived.

It is evident from Fig. 8.2 that even though the operational data volume is nearly the same each year, if the data is not archived the total amount of data that is stored in the operational data base will keep piling up. The-graph in Fig.8.3 shows the effect of keeping this huge amount of data in the operational database. As the volume of the data in the database increases, the performance of the database and the related applications degrades. From the above discussions, it is evident that we should separate the operational data from the non-operational data. The term archive data is consciously avoided, because if the non-operational data is archived, there is little or no use for it. But this data is a very valuable resource and is too precious to be kept in some tape archive. It is in this situation that a data warehouse comes in handy.

The primary concept of data warehousing is that the data stored for business analysis can most effectively be accessed, by separating it from the data in the operational systems. The most important reason for separating data for business analysis from the operational data has always been the potential performance degradation on the operational system that can result from the analysis processes. High performance and quick response time is almost universally critical for operational systems.

These reasons to separate the operational data from analysis data have not significantly changed with the evolution of the data warehousing systems, except that now they are considered more formally during the data warehouse building process. Advances in technology and changes in the nature of business have made many of the business analysis processes much more complex and sophisticated. In addition to producing standard reports, today's data warehousing systems support very sophisticated on-line analysis including multi-dimensional analysis.
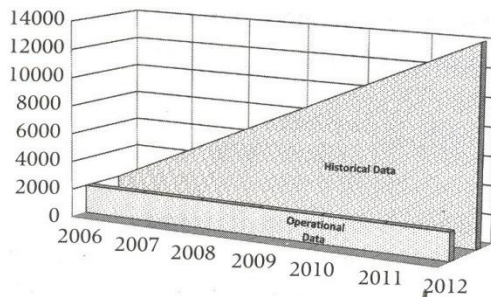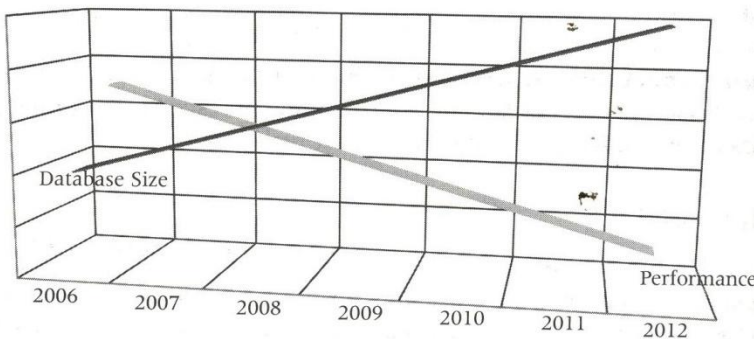

Figure 8.2 Operational data vs. archive data.

Figure 8.3 Data volume vs. performance.

E-Commerce and E-Business
On-line Analytical Processing(OLAP)
Supply Chain Management(SCM)

Customer Relationship Management(CRM)

2a. Define data in data warehouse. Explain the data ware housing architecture with a neat diagram.(10M)

Data Warehouse-Designed to support decision making. Its primary goal is to provide access to the data of organization.

The various components of data ware house architecture are:
1.Summarized data
2. Operational Systems of records
3. Integration/transformational programs
4.Current details
5.Data warehouse architecture/metadata
6.Archives

Figure 1-1 Architecture of a Data Warehouse
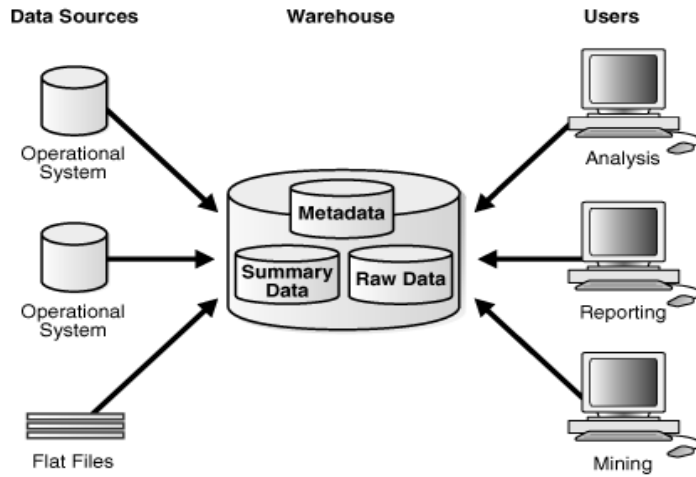
3a.Define Business Process Re-Engineering? Explain the different phases of BPR.(10M)

BPR is the fundamental rethinking and radical redesign of processes to achieve dramatic improvement, in critical, contemporary measures of performance such as cost, quality, service and speed,"

1. Begin Organizational change
2. Begin the reengineering organization
3. Identifying BPR opportunities
4. Understanding the existing process
5. Re-Engineering the process
6. Blue-print the new business system
7. Perform the transformation

4a. Explain the different components of sales and distribution process .(10M)

▪ Master Data Management

- Order Management
- Warehouse Management
- Shipping
- Billing
- Pricing
- Sales Support
- Transportation
- Foreign Trade

The functions of Warehouse management are:-

This module provides real time information about inventory levels across the enterprise and tools to manage the daily operational needs of single-site or multiple –site for warehouses.

The components of this module includes:-

➢ Inventory Planning:-

Comprises all planned inventory movements ,which enable the accurate forecasting of trends and the consequent adjustment of reordering points, safety stock, lead times for orders and service levels.

➢ Inventory Handling:-

It allows for monitoring of all warehouse oedre scanarios such as receipt, issue and transfer of inventory.

➢ Intelligent Location Assignment:-

Used to create intelligent storage put-away lists, which enable the storage of goods that are automatically inspected for quality and the detector of dedicated locations by criteria such as item, storage conditions, packaging definitions, size restrictions and location availability.

➢ Inventory Reporting:-

This function permits full visibility of inventory at single or multiple
Or multiple sites and provides a company with the tools to give customers accurate delivery dates.

➢ Inventory Analysis:-

This module enables the analysis of information that result from warehousing activities and use of feed back in process optimization.

➢ Lot Control:-

This facility offers lot tracking, so that a company can trace all the raw materials and finished gods that its products require.

➢ Distribution Data Collection:-

This is an essential element in paperless warehousing that provides the communication link between storage and shipping systems and warehousing equipment like bar-coding statements.

The Functions of shipping module:-

- Monitors dates of orders due for delivery.
- Creating and processing deliveries.
- Planning and monitoring work lists for shipping activities.
- Monitoring material availability and processing outstanding orders.
- Picking
- Packing Deliveries.
- Information support for transportation planning.
- Support for foreign trade requirements.
- Printing and sending shipping output.
- Data update in goods issue.

5 a. Relate the subsystem of finance module of an ERP system. Explain the function of each of these sub system in detail.(10M)

The finance modules of most ERP systems will have the following subsystems:

1. Financial Accounting:
a. General Ledger
b. Accounts Receivable/payable
c. Special Ledgers,
d. Fixed Asset Accounting.
e. Legal Consolidation.

2. Investment Management:
a. Investment Planning
b. Budgeting
c. Controlling
d. Depreciation Forecast
e. Simulation of Calculation.

3. Controlling:
a) Overhead Cost Controlling.
 b) Activity- Based Costing
c) Product Cost Accounting
d)Profitability Analysis.

4.Treasury Module

Financial Accounting:

The objective of a good financial accounting system is to provide companywide control and integration of financial information that is essential to strategic decision –making. The financial accounting module of an ERP system, gives you the ability to centrally track financial accounting data within an international frame work of multiple companies, languages, currencies and charts of accounts.

General ledger

The General ledger (GL) is essential both to the financial accounting system and to strategic decision-making. Through active integration with business processes in logistics and in the accounting sub-ledgers, the GL serves as a central pool of financial data for financial reporting as well as for other accounting areas. The general ledger supports all the function needed in a financial accounting system.

Investment Management

Investment Management provides extensive support for investment processes right from planning through settlement. Investment management facilitates investment planning and budgeting at a level higher than that needed for specific orders or projects. You can define an investment program hierarchy using any criteria-for example, department-wise. Investment program allows you to distribute budgets, which are used during the capital spending process. The system helps you monitor, and thereby avoid, budget overruns. Investment Management provides tools, enabling you to plan and manage your capital spending projects right from the earliest stage Investment Management module recognizes the importance of the asset accounting aspects of investment measures. The system automatically separates costs requiring capitalization from costs that are not capitalized, debiting the correct costs to the asset under construction. Asset accounting provides precise proof of origin for all transactions affecting acquisition and production costs.

6a. List the various subsystem of Human Resource module? Explain each subsystem in detail.(10M)

The different ERP system offers many subsystems under the HR umbrella.

The various subsystems under the HR module are:
1. Personnel Management:
(HR master data, Personnel administration, Information systems, Recruitment, Travel management, Benefits administration, Salary administration)
2. Organizational Management:
(Organizational structure, Staffing schedules, Jobdescriptions, Planning Scenarios, and Personnel cost planning)
3. Payroll Accounting:
(Gross / net accounting, History function, dialog capability,multi-currency capability, international solution)
4. Time Management:
(Shift planning, Work schedules, Time recording, Absence determination)
5. Personnel Development:
(Career and succession planning, Profile comparisons, Qualifications assessments, Additional training determination, Training and event management.

7 a. List and explain the subsystem of a plant maintenance module.(05M)

The major sub-system of plant maintenance module in e-resource ERP comprises of:

1. Preventive Maintenance Control
2. Equipment Tracking
3. Component Tracking
4. Repair and spare parts maintenance warranty claim tracking.

The plant maintenance module in e-resource ERP provides an integrated business reports. This reports help you to reduce the duration and cost of downtime. All maintenance tasks such as inspection, servicing and repair activities are saved in a historical database.

7 b. Summarize the main objectives of the material management module.(05M)
1. Pre-purchasing activity
2. Purchasing
3. Vendor evaluation
4. Inventory management
5. Invoice verification & material inspection

8a. Explain the following functions in Quality Management System(10M)

1. **Computer Integrated Quality Management (CIQ):**
The integration of Quality Management in ERP systems considerable advantages because only an integrated system can support all the elements of a quality management system. The Quality Management module is integrated with the master data and processes of the following applications:
- Material Management – (purchasing, inventory management, warehouse management, material requirements planning).
- Production-(work scheduling, shop floor control).
- Sales and distribution-(delivery, creation of quality certificates).

2. **Computer Aided Quality Management(CAQ):**
The requirements for quality management system changed as a result of the quality standards like ISO 9000 standards, and the term Computer Aided Quality Management must also re-defined. CIQ is more appropriate term in comparison to CAQ, because an isolated CAQ system cannot carry out the complete tasks of a quality management.

Quality Management Module Functions-
1. Quality planning.
2. Quality Inspection
3. Quality Control.