UNIT–1 : Business Intelligence – Introduction (PYQ Solution)

AKTU · Business Intelligence and Analytics (BCDS051) · Solutions by **Chirag Jain**, Ycotes

SECTION A Answers (≈70 Words Each)

Q1. What are the limitations of mathematical modeling? (Jan 2023)

A mathematical model simplifies reality, so it has limits. It depends on assumptions that may not hold, and needs accurate data, which is often missing. Complex human and social factors are hard to express in equations. Models can be costly and time consuming to build, may become outdated as conditions change, and give a false sense of precision. Results are only as good as the data and the formulation.

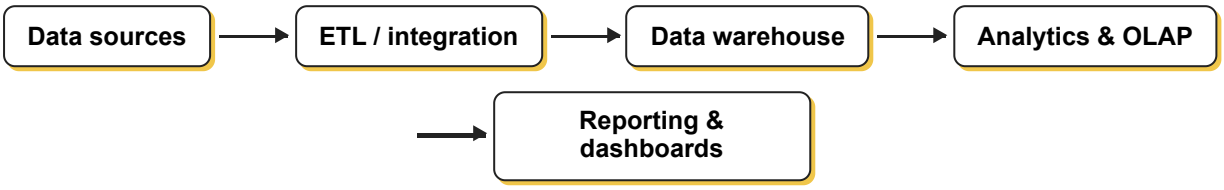
Q2. What factors influence a rational choice while making decisions in problem solving? (Jan 2023)

A rational choice depends on: clear objectives, the quality and availability of information, the set of alternatives and their consequences, risk and uncertainty, time and cost constraints, the decision maker's knowledge, experience and bias, and organisational policies and resources. Rational decisions evaluate alternatives against criteria and choose the best expected outcome.

SECTION B Answers (≈250 Words Each)

Q1. Draw and explain business intelligence architecture. (Jan 2023)

Business Intelligence (BI) architecture is the framework of technologies and processes that convert raw data into information for better decisions.



Business intelligence architecture

Layers:

- **Data sources:** operational databases (OLTP), ERP, CRM, spreadsheets, web and social data, external feeds.
- **Data integration (ETL):** extracts data, cleans and transforms it, and loads it into the store; staging area handles temporary data.
- **Data storage: data warehouse** and data marts, with metadata repository describing the data.
- **Analysis layer:** OLAP engines, data mining, statistical and predictive analytics.
- **Presentation layer:** reports, dashboards, scorecards, ad-hoc queries and alerts delivered to users.
- **Management and security:** metadata management, governance, access control and monitoring across all layers.

Working: data flows from sources through ETL into the warehouse; analysts query it with OLAP and mining tools; results are shown to managers through dashboards, supporting strategic, tactical and operational decisions.

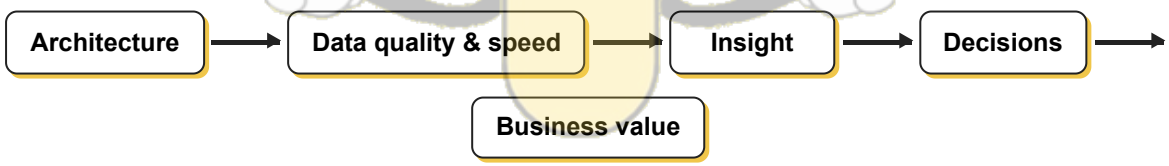
Benefits: a single version of truth, faster decisions, better forecasting and competitive advantage.

SECTION C Answers (≈500 Words Each)

Q1. How does the business intelligence architecture influence business intelligence purpose? (Jan 2023)

The **purpose of BI** is to provide timely, accurate information that supports better decisions. The architecture decides how well this purpose is met.

- **Data sources and integration:** a good ETL layer brings consistent, clean data from many systems, so reports are trustworthy (**single version of truth**).
- **Storage design:** a warehouse with star schema and data marts gives fast, historical, subject-oriented data for trend analysis; poor design makes queries slow and limits analysis.
- **Analytics layer:** OLAP and mining allow drill-down, forecasting and discovery, converting data into insight.
- **Presentation layer:** dashboards and self-service reports decide whether business users actually use the information.
- **Scalability and performance:** the architecture determines how much data and how many users can be supported.
- **Security and governance:** control access, data quality and compliance, which builds user confidence.
- **Flexibility:** a modular architecture adapts to new sources and requirements, keeping BI aligned with changing business goals.



How architecture drives BI purpose

Example: a retailer with real-time ETL and a well-modelled warehouse can see stock-outs the same day and reorder quickly; a batch-only, siloed system gives stale reports and misses sales.

Conclusion: BI purpose is achieved only when the architecture is integrated, scalable, secure and user-friendly.

Q2. What are the factors responsible for successful BI projects? (Jan

2023)

Key success factors:

1. **Clear business objectives** and alignment with strategy; start with business questions, not technology.
2. **Executive sponsorship** and management commitment.
3. **Data quality and governance:** accurate, consistent and well-documented data with metadata management.
4. **Right architecture and tools:** scalable, integrated, suitable for user skills.
5. **Skilled, cross-functional team:** business analysts, data engineers, IT and end users together.
6. **User involvement and adoption:** training, easy dashboards, self-service.
7. **Phased delivery:** start small with quick wins, then expand iteratively.
8. **Realistic budget, time and ROI measurement**, with defined KPIs.
9. **Change management:** handle resistance and build a data-driven culture.
10. **Security and compliance.**

Conclusion: successful BI projects balance people, process and technology, with business value as the goal.

