

# WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION

## SUBJECT: COMPUTER SCIENCE (COMS)

**CLASS – XII**

**SEMESTER – IV**

**FULL MARKS: 35**

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|--------|---|----------|--------|
| Unit 1 | Database Management System  | 20 Marks | 50 Hrs |
|        | <ul style="list-style-type: none"> <li>Introduction</li> <li>Drawbacks of Legacy System, Advantages of DBMS, Layered Architecture of Database, Data Independence, Data Models, Schemas and Instances, Database Languages, Database Users, DBA, Data Dictionary.</li> </ul>  |          | 3      |
|        | <ul style="list-style-type: none"> <li>Entity Relationship (ER) Modelling</li> <li>Entity, Attributes and Relationship, Structural Constraints, Keys (Super Key, Key, Candidate Key, Alternate Key, Primary Key), ER Diagram of Some Example Database, Weak and strong Entity Set, Specialization and Generalization, Constraints of Specialization and Generalization, Aggregation.</li> </ul>   |          | 10     |
|        | <ul style="list-style-type: none"> <li>Relational Model</li> <li>Basic Concepts of Relational Model, Relational Algebra.</li> </ul>   |          | 10     |
|        | Integrity Constraints : Domain Constraints, Referential Integrity, View.  |          | 2      |
|        | <ul style="list-style-type: none"> <li>SQL</li> <li>Introduction, Data Definition Language and Data Manipulation Language, Data type (char(n), varchar(n), int, float, date), constraints (not null, unique, primary key), create database, use database, show databases, drop database, show tables, create table, describe table, alter table (add and remove an attribute, add and remove primary key), drop table, insert, delete, select, operators (mathematical, relational and logical), aliasing, distinct clause, where clause, in, between, order by, meaning of null, is null, is not null, like, update command, delete command, aggregate functions (max, min, avg, sum, count), group by, having clause, joins: cartesian product on two tables, equi-join and natural join .</li> </ul> |          | 25     |
| Unit 2 | Foundation of Artificial Intelligence (AI)  | 15 Marks | 30 Hrs |
|        | <ul style="list-style-type: none"> <li>Introduction to Artificial Intelligence                             <ul style="list-style-type: none"> <li>Definition and scope of AI.                                     <ul style="list-style-type: none"> <li>Historical overview and key milestones.</li> <li>Differentiating AI from human intelligence.</li> </ul> </li> </ul> </li> </ul>  |          | 4      |
|        | <ul style="list-style-type: none"> <li>AI Subfields and Technologies                             <ul style="list-style-type: none"> <li>Machine learning: Supervised, unsupervised, and reinforcement learning.</li> <li>Deep learning and neural networks.</li> <li>Natural language processing (NLP) and computer vision.</li> </ul> </li> </ul>  |          | 10     |
|        | <ul style="list-style-type: none"> <li>Search as Optimization (only Basic Concepts)</li> <li>Strategies for State Space Search.                             <ul style="list-style-type: none"> <li>Data Driven and Gold Driven Search.</li> <li>Heuristic Search, Breadth First Search and Depth First Search.</li> <li>A* Search.</li> </ul> </li> </ul>   |          | 10     |

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| <p>🔗 Applications of AI</p> <ul style="list-style-type: none"><li>• AI in finance: Fraud detection, algorithmic trading, and risk assessment.</li><li>• AI in customer service and chatbots.</li><li>• AI in education: Personalized learning and intelligent tutoring systems.</li></ul> | 3 |
| <p>🔗 Ethical and Social Implications of AI</p> <ul style="list-style-type: none"><li>• Bias and fairness in AI systems.</li><li>• Impact of AI on employment and the workforce.</li><li>• AI and social inequality.</li></ul>   | 3 |

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