

### Areas of Competencies for National Skill Competency Test of IT Graduates

| Areas of Competencies                        | Weightage % | Topics   |
|--|-------------|--|
| <b>Computer Networks and Cloud Computing</b> | 10%         | 1 - Data Communication                           |
|  |             | 2 - Computer Networks                            |
|  |             | 3 - Data Link Layer                              |
|  |             | 4 - Network Layer                                |
|  |             | 5 - Transport Layer                              |
|  |             | 6 - Application Layer                            |
|  |             | 7 - Wireless Networks                            |
|  |             | 8 - Cloud Computing                              |
|  |             | 9 - Network Security (Networks Perspective)      |
|  |             | 10 - Next Generation Networks                    |
| <b>Programming (C++/Java/Python)</b>         | 10%         | 1. Programming Fundamentals                      |
|  |             | 2. Data Types & Variables                        |
|  |             | 3. Operators & Expressions                       |
|  |             | 4. Control Structures                            |
|  |             | 5. Functions / Methods,                          |
|  |             | 6. Input / Output Handling,                      |
|  |             | 7. Strings & Text Processing                     |
|  |             | 8. Arrays & Collections                          |
|  |             | 9. Object-Oriented Programming (OOP)             |
|  |             | 10. Memory Management Concepts                   |
|  |             | 11. Exception & Error Handling                   |
|  |             | 12. Modules, Packages & Libraries                |
|  |             | 13. Advanced Programming Concepts                |
|  |             | 14. Concurrency & Parallelism (Introductory)     |
|  |             | 15. Debugging, Testing & Optimization            |
|  |             | 16. Software Development Practices               |
| <b>Data Structures &amp; Algorithms</b>      | 10%         | 1 - Foundations of Data Structure and Algorithms |
|  |             | 2 - Linear Data Structures                       |
|  |             | 3 - Non-Linear Data Structures                   |
|  |             | 4 - Searching Algorithms                         |
|  |             | 5 - Sorting Algorithms                           |
|  |             | 6 - Hashing                                      |
|  |             | 7 - Tree Algorithms                              |
|  |             | 8 - Graph Algorithms                             |
|  |             | 9 - Algorithm Design Techniques                  |
|  |             | 10 - Advanced Data Structures                    |
|  |             | 11 - String Algorithms                           |
|  |             | 12 - Complexity & Optimization                   |
| <b>Operating Systems</b>                     | 5%          | 1. Introduction to Operating Systems             |
|  |             | 2. Operating System Structures                   |
|  |             | 3. Process Management                            |
|  |             | 4. CPU Scheduling                                |
|  |             | 5. Thread Management                             |

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|   |     | 6. Concurrency & Synchronization           |
|   |     | 7. Deadlocks                               |
|   |     | 8. Memory Management                       |
|   |     | 9. File System Management                  |
|   |     | 10. Secondary Storage Management           |
|   |     | 11. Input / Output Systems                 |
|   |     | 12. Protection & Security                  |
| <b>Software Engineering</b>                     | 10% | 1. Introduction to Software Engineering    |
|   |     | 2. Software Process Models                 |
|   |     | 3. Agile Software Development              |
|   |     | 4. Software Requirements Engineering       |
|   |     | 5. Software Project Management             |
|   |     | 6. Software Design                         |
|   |     | 7. Software Architecture                   |
|   |     | 8. User Interface Design                   |
|   |     | 9. Software Implementation & Coding        |
|   |     | 10. Software Testing                       |
|   |     | 11. Software Maintenance & Evolution       |
|   |     | 12. Software Quality Assurance             |
|   |     | 13. Software Metrics & Measurement         |
|   |     | 14. Software Configuration Management      |
|   |     | 15. Software Risk Management               |
|   |     | 16. Software Security Engineering          |
| <b>Web Development</b>                          | 10% | 1. Introduction to Web Development         |
|   |     | 2. Web Architecture & Protocols            |
|   |     | 3. HTML Fundamentals                       |
|   |     | 4. CSS Fundamentals                        |
|   |     | 5. Advanced CSS & Responsive Design        |
|   |     | 6. JavaScript Fundamentals                 |
|   |     | 7. Advanced JavaScript                     |
|   |     | 8. Frontend Frameworks & Libraries         |
|   |     | 9. Backend Development Fundamentals        |
|   |     | 10. Server-Side Programming                |
|   |     | 11. Databases for Web Applications         |
|   |     | 12. Web Security                           |
|   |     | 13. Web Performance & Optimization         |
|   |     | 14. Web Testing & Debugging                |
|   |     | 15. Deployment & Hosting                   |
|   |     | 16. Web APIs & Integration                 |
|   |     | 17. Modern Web Development Practices       |
| <b>AI / Machine Learning and Data Analytics</b> | 10% | 1. Introduction to AI, ML & Data Analytics |
|   |     | 2. Mathematical Foundations                |
|   |     | 3. Python for AI & Data Analytics          |
|   |     | 4. Data Collection & Pre-processing        |
|   |     | 5. Exploratory Data Analysis (EDA)         |
|   |     | 6. Supervised Learning                     |

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|                       |     | 7. Ensemble Learning                              |
|                       |     | 8. Unsupervised Learning                          |
|                       |     | 9. Model Evaluation & Validation                  |
|                       |     | 10. Feature Engineering & Selection               |
|                       |     | 11. Deep Learning Fundamentals                    |
|                       |     | 12. Advanced Deep Learning                        |
|                       |     | 13. Natural Language Processing (NLP)             |
|                       |     | 14. Computer Vision                               |
|                       |     | 15. Big Data Analytics (Introductory)             |
|                       |     | 16. Model Deployment & MLOps Basics               |
|                       |     | 17. AI Ethics, Security & Privacy                 |
| <b>Cyber Security</b> | 5%  | 1. Introduction to Cyber Security                 |
|                       |     | 2. Security Fundamentals & Principles             |
|                       |     | 3. Cryptography Basics                            |
|                       |     | 4. Network Security                               |
|                       |     | 5. Operating System Security                      |
|                       |     | 6. Web Application Security                       |
|                       |     | 7. Malware & Attack Techniques                    |
|                       |     | 8. Authentication & Access Control                |
|                       |     | 9. Secure Software Development                    |
|                       |     | 10. Wireless & Mobile Security                    |
|                       |     | 11. Cloud & Virtualization Security               |
|                       |     | 12. Digital Forensics                             |
|                       |     | 13. Incident Response & Management                |
|                       |     | 14. Security Monitoring & Auditing                |
|                       |     | 15. Cyber Laws & Ethics                           |
|                       |     | 16. Emerging Trends in Cyber Security             |
| <b>Databases</b>      | 10% | 1. Introduction to Database Systems               |
|                       |     | 2. Database System Architecture                   |
|                       |     | 3. Data Models                                    |
|                       |     | 4. Relational Database Concepts                   |
|                       |     | 5. Relational Algebra & Calculus                  |
|                       |     | 6. Structured Query Language (SQL)                |
|                       |     | 7. Advanced SQL                                   |
|                       |     | 8. Database Design & Normalization                |
|                       |     | 9. Transaction Management                         |
|                       |     | 10. Concurrency Control                           |
|                       |     | 11. Recovery Management                           |
|                       |     | 12. Indexing & File Organization                  |
|                       |     | 13. Query Processing & Optimization               |
|                       |     | 14. Database Security                             |
|                       |     | 15. Distributed Databases                         |
|                       |     | 16. NoSQL & Modern Databases                      |
|                       |     | 17. Data Warehousing & Data Mining (Introductory) |
|                       | 20% | 1. Introduction to Problem Solving                |
|                       |     | 2. Problem Understanding & Analysis               |

**Problem Solving And  
Analytical Skills**

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| 3. Logical Reasoning Fundamentals              |
| 4. Algorithms & Flow Control                   |
| 5. Data Representation & Abstraction           |
| 6. Pattern Recognition & Generalization        |
| 7. Mathematical & Quantitative Reasoning       |
| 8. Algorithmic Thinking                        |
| 9. Critical Thinking & Decision Making         |
| 10. Debugging & Error Analysis                 |
| 11. Complexity & Efficiency Awareness          |
| 12. Problem Solving Using Programming          |
| 13. Data-Driven Problem Solving                |
| 14. Creative & Innovative Thinking             |
| 15. Real-World Problem Solving                 |
| 16. Communication & Documentation of Solutions |