F. WAIT LIST: Wait list will be maintained post-wise and category-wise for all posts. Candidates will be released from this waitlist against non-joining, resignation, or termination due to unsatisfactory performance/breach of conduct rules, subject to the candidates securing minimum qualifying marks as may be stipulated by the Bank for selection. This wait list will be valid for a period of one year from the date of declaration of final result or till the date of issuance of a fresh advertisement for the vacancy for the same post, whichever is earlier

Indicative Syllabus

(Syllabus mentioned below is only indicative and not exhaustive. Syllabus prescribed is for candidates' reference purpose only. Online Examination may contain questions beyond the purview of the syllabus as deemed fit)

(A) MANAGER (DATA SCIENTIST)

1. Programming, Data Structures & Machine Learning Fundamentals

– Programming and Data Structures:

- Python basics, Object Oriented Programming Concepts (Abstraction, Encapsulation, Inheritance, Polymorphism)
- Arrays, Linked List, Stacks, Queues, Trees, Heaps, Hashing and Recursion
- Searching and Sorting Algorithms along with their Space-Time Complexities

– Statistics and Machine Learning:

- Basic Probability and Statistics, Hypothesis Testing
- Supervised, Unsupervised and Reinforcement Learning; Regression, Classification, Clustering
- Overfitting, Bias-Variance, Feature Engineering, Evaluation Metrics (Accuracy, Precision, Recall, F1, ROC-AUC)
- Neural Networks, CNN, RNN, LSTM and Deep Learning Frameworks (PyTorch, TensorFlow)

2. Generative AI, LLMs, RAG & Agentic AI

– Generative AI and LLMs:

- Transformer Architecture, Attention, Tokenization and Embeddings
- Pre-training, Fine-tuning (LoRA, QLoRA), RLHF, Quantization
- Prompt Engineering (Zero-shot, Few-shot, Chain-of-Thought), Hallucination

– RAG and Agentic AI:

- Retrieval-Augmented Generation: Chunking, Vector Databases, Similarity Search
- AI Agents: Planning, Memory, Tool Calling, Multi-agent Systems, MCP
- Frameworks like LangChain, LangGraph, LlamaIndex (basic awareness)

– Application Development:

- HTTP/HTTPS, REST APIs (get, post, put, delete), JSON
- Version control systems like Git; Monolith vs Microservice architecture

3. MLOps, LLMOps & DevSecOps

– MLOps and LLMOps:

- ML Lifecycle, Experiment Tracking, Model Registry, Feature Store (MLflow and similar tools)
- Pipeline Orchestration, Model Deployment (Batch, Real-time), Canary and Blue-Green Deployment
- Model Monitoring: Data Drift, Concept Drift, Performance Decay, Retraining
- LLMOps: Prompt Versioning, Model Serving, Latency and Cost Management, Guardrails

– DevOps and DevSecOps:

- Continuous Integration and Continuous Delivery (CI/CD), Git workflows, Jenkins, GitHub Actions
- Docker, Kubernetes, Infrastructure as Code (Terraform, Ansible)
- Shift-left Security: SAST, DAST, Dependency Scanning, Secrets Management, Container Security

4. AI Security, Governance & Responsible AI

– AI Security:

- Adversarial Attacks, Data Poisoning, Model Theft, Model Inversion
- Prompt Injection, Jailbreaking, Data Leakage; OWASP Top 10 for LLM Applications
- Guardrails, Red Teaming, Access Control and Data Privacy (PII masking)

– AI Governance and Responsible AI:

- Fairness, Bias, Transparency, Explainability (SHAP, LIME), Accountability
- Model Risk Management and Model Validation
- Frameworks and Regulations: NIST AI RMF, EU AI Act, ISO/IEC 42001, DPDP Act 2023, RBI guidelines on AI/ML (FREE-AI)

5. Software Testing & AI Quality Engineering

– Software Testing:

- Software Development Lifecycle Phases and Testing Life Cycle
- Basic Software Testing Concepts (Black Box Testing, White Box Testing, Unit/Integration/Regression Testing, and UAT)
- Test Automation tools (Selenium, PyTest, Postman, JMeter), Defect Life Cycle

– Testing of AI / ML / LLM Applications:

- Data Quality Testing, Model Validation, Bias and Robustness Testing
- Evaluation of LLMs: BLEU, ROUGE, LLM-as-a-Judge, Golden Datasets, Human Evaluation
- RAG Evaluation (Faithfulness, Relevance, Groundedness) and Agent Testing

6. Cloud, Infrastructure, Databases, Networking & Security Basics

– Cloud:

- Characteristics of Cloud Computing; Types of Cloud Services (SAAS, PAAS, IAAS); Public vs Private Cloud
- Virtualization, Virtual Machines vs Containers, Type 1 vs Type 2 Hypervisor

– Databases:

- Relational DBMS, ER Diagram, Transactions (ACID Properties), Keys, Indexes, Normalization and Joins
- DDL, DML and TCL commands; Basic SQL Functions; Views, Triggers and Cursors; NoSQL and Vector Databases

– Operating Systems and Networking:

- Processes, Threads, Deadlock, Memory Management, CPU Scheduling Algorithms; Windows and Unix/Linux environments
- OSI and TCP/IP Model, TCP, UDP, IPv4 vs IPv6, DNS, HTTP, Types of Networks

– Security:

- Web application attacks: Cross-Site Scripting (XSS), Cross-Site Request Forgery (CSRF), Injection Attacks, DDoS, Brute Force Attack; OWASP 10
- Symmetric and Asymmetric Keys, Public-Private Key Encryption, Digital Signatures
- Firewall, Access Control, Remote Access VPN; Backup and Recovery practices

(B) DEPUTY MANAGER (DATA SCIENTIST)

1. Programming, Data Science & Machine Learning Fundamentals

- **Programming Fundamentals:**
  - Programming concepts, data types, operators, control structures, functions and exception handling
  - Object-Oriented Programming concepts and basic data structures
  - Python fundamentals and commonly used libraries for data handling and AI/ML
  - Version control and source-code management using Git
- **Data and Database Basics:**
  - Data preprocessing, data quality, feature preparation and exploratory data analysis
  - Relational databases, ACID properties, keys, indexes, normalization and joins
  - SQL basics; NoSQL and vector-database concepts
  - Batch and real-time data-processing concepts
- **Machine Learning and Deep Learning:**
  - Supervised and unsupervised learning; regression, classification and clustering
  - Training, validation and testing; cross-validation, overfitting and regularization
  - Common evaluation metrics: accuracy, precision, recall, F1 score, ROC-AUC and RMSE
  - Neural networks, deep learning, transformers, tokenisation and embeddings - overview

2. Generative AI, RAG & Agentic AI Fundamentals

- **Generative AI and Large Language Models:**
  - Large Language Model concepts, prompts, context windows, parameters and model responses
  - Prompt-engineering basics: zero-shot, few-shot and structured output
  - Hallucination, non-determinism, limitations and model-evaluation fundamentals
  - Open-source and proprietary models; small language models - overview
- **Retrieval-Augmented Generation:**
  - RAG architecture and flow
  - Document ingestion, chunking, embeddings, vector search, retrieval and reranking
  - Groundedness, relevance, faithfulness and knowledge freshness - basic concepts
- **Agentic AI:**
  - AI-agent concepts, planning, memory and tool/function calling
  - Human-in-the-loop, task completion and guardrails
  - Model Context Protocol overview: hosts, clients, servers, tools and resources
  - Indicative banking applications of GenAI, RAG and agentic AI

- **Responsible AI:**

  - Fairness, transparency, explainability, privacy, safety and human oversight
  - Bias, toxicity, sensitive-information leakage and appropriate use of AI

3. Application Development, APIs & Integration Basics

- **Application Development Fundamentals:**

  - Client-server architecture and web-application concepts
  - Monolithic, layered and microservices architectures
  - HTTP/HTTPS, JSON, XML and data-serialization concepts
  - Synchronous, asynchronous and streaming communication
  - Input validation, error handling, logging, caching and application monitoring

- **API and Integration Fundamentals:**

  - REST and SOAP concepts; methods, status codes and request/response formats
  - API design, documentation, versioning, authentication, rate limiting and lifecycle management
  - Enterprise integration, API gateways, service-oriented architecture and message queues
  - Data transformation, validation, routing, orchestration and event-driven integration
  - Integration of enterprise applications and AI/ML services through APIs

- **User Interaction Fundamentals:**

  - Basic user-interface and user-experience concepts
  - Responsive design, accessibility and secure handling of user inputs
  - Presentation of AI-generated responses, citations, alerts and human-approval steps

4. Security, Testing, Cloud & Deployment Basics

- **Security Fundamentals:**

  - Authentication and authorisation; IAM, OAuth 2.0, tokens and Single Sign-On
  - Encryption, hashing, certificates, secrets management and secure data handling
  - Common web and API risks: injection, Cross-Site Scripting, Cross-Site Request Forgery and insecure access control
  - AI-security basics: prompt injection, data leakage, insecure tool use and excessive agency
  - Guardrails, least privilege, audit logging and privacy controls

- **Software and AI Testing:**

  - Software-testing lifecycle; unit, functional, integration, API, regression and User Acceptance Testing
  - Test cases, test data, defect lifecycle and basic performance testing
  - Testing AI/ML and GenAI outputs for quality, relevance, groundedness, safety and non-determinism

- **Cloud and Deployment:**

  - Cloud-computing characteristics; public, private and hybrid cloud; IaaS, PaaS and SaaS
  - Virtual machines, containers and Kubernetes basics
  - Continuous Integration and Continuous Delivery/Deployment concepts
  - Availability, scalability, observability, backup, recovery and production-support fundamentals

G. CALL LETTER FOR ONLINE EXAMINATION AND INTERVIEW:

- **For Online Written Examination:** The candidates should download their call letter for online examination and an "Acquaint Yourself" booklet by entering their registration number and password/date of birth, from the Bank's website. NO HARD COPY OF THE CALL LETTER/ ACQUAINT YOURSELF BOOKLET WILL BE SENT BY POST.
- **For Interview:** Intimation/call letter for interview will be uploaded on bank's website or sent by email, as decided by the Bank. NO HARD COPY WILL BE SENT.

H. Proof of Identity to be submitted at the Examination: The candidates must bring one photo identity proof such as Passport/Aadhar/ PAN Card/Driving License/Voter's Card/ Bank Passbook with duly attested Photograph in original as well as a self-attested Photocopy thereof. The photocopy of Identity proof should be submitted along with call letter to the invigilators in the examination hall, failing which or if identity of candidates is in doubt the candidate will not be permitted to appear for the test.