

# Knowledge Consortium of Gujarat

## Syllabus for the recruitment examination for the post of IT Manager

### July 2017

#### **Networking**

Overview of Internetworking Principles and Underlying Network Technologies, Internetworking Concept and Architectural Model. Networks, Network Protocols and Standards, Network Hardware, Network Operating Systems, Network Addresses.

Distributed systems and Networks, Peer – to – Peer and Client – Server Networks, Connection Oriented Networks :- X.25, Frame Relay, Network Categories, Components, The Connection Layers and Services, The Protocols, Applications of Computer Networks, Security Issues.

##### **1. The Physical Layer**

Introduction, The Duties of Physical Layer, Infrared and Millimeter waves, The ISM Bands, The Optical Light and Free Space Optics, Wired Physical Layer, Wireless Physical Layer, Teledesic and Globalstar, Physical Layer Based on Telephone Line, Whitespaces.

##### **2. The Data Link Layer**

The Duties of Data Link Layer, The Error, The Protocols.

##### **3. The Medium Access Control Sub Layer**

Introduction, Wired MAC Layer, 802.2 – The LLC Layer, Wireless LAN Protocol – 802.11, The MAC Layer, The Generic Frame Structure, Limited Contention Protocols, Connecting Devices at the Data Link Layer, Bridges, Connecting Heterogeneous Networks, Virtual LANs, The IEEE 802.1q Standard, The VLAN Operation.

##### **4. The Network Layer**

Introduction, Duties of Network Layer, Connection – Oriented Forwarding Using Virtual Circuits, Connectionless Forwarding using Datagrams, Connection – Oriented Vs. Connectionless Forwarding, Forwarding Examples, Routing Algorithms, Hierarchical Routing, Broadcast Routing, Multicast Routing, Congestion, Network Layer Switching, Internetworking Issues, Security Issues at the Network Layer and IPSec.

##### **5. The Transport Layer**

Introduction, Duties of the Transport Layer, Connection Management at the Transport Layer, Client – Server Communication, Client – Server Programs

## **6. The Application Layer**

Bootstrap and Auto-Configuration, Domain Name System, Remote Login and Desktop, File Transfer and Access, Electronic mail, World Wide Web.

## **7. TCP/IP Networks**

Performance Measurement and related tools, Network Simulation, Tools provided by the Operating Systems, Network Management (SNMP).

# **Security**

## **PGP (Pretty Good Privacy)**

Introduction, Overview, Key Distribution, Efficient Encoding, Certificate and Key Revocation, Signature Types, Your Private Key, Key Rings, Anomalies, Object Formats.

## **Email Security**

Distribution Lists, Store and Forward , Security Services for Electronic Mail, Establishing Keys ,Privacy ,Authentication of the Source, Message Integrity ,Non-Repudiation ,Proof of Submission ,of Delivery ,Message Flow Confidentiality , Anonymity, Containment , Annoying Text Format Issues, Names and Addresses , Verifying When a Message was Really Sent

## **Malicious Software**

Viruses and Related Threats, Virus Countermeasures, Distributed Denial of Services Attacks

## **Firewalls**

Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation

## **Intrusion Detection**

Intruders, Intrusion Detection, Password Management

# **Mobile Networks**

## **Wireless networks and Wireless LANs**

Satellite communication, wireless system operations and standards (cordless, WLL, Wimax, IEEE 802.16 broadband) wireless access standards. Introduction to mobile computing. Infrared, spread spectrum, microwave LANs. Wireless LAN standards: Wi-fi, IEEE 802.11, Bluetooth.

**Mobile network and transport layer** Mobile IP, Dynamic host configuration protocol, mobile adhoc networks, traditional TCP networks, classical TCP improvements, TCP over 2.5/3G wireless networks.

## **Wireless Application Protocol**

Architecture, WAP client, WAP gateway, WAP Application server, WAP internal structure, WTA and PUSH features, wireless datagram protocol, WML and WML script. WAP 2.0

## **Linux Server Administration:**

### **Introduction**

Overview of Linux Distros, Installation & Package Management, File System Management (Partitioning, LVM, RAID)

### **Network Related Configurations**

Network Interfaces, Network Management & Configurations, Configuring DHCP, Linux Permissions, Controlling Access to Services, Runlevels, Authentication Configuration, Open SSH, DNS Services, HTTP Services, FTP Services, Mail Services (Postfix), Proxy Server

### **System Configurations**

Boot Sequence, Configuring Environment Settings, Process Management, Automated Tasks, System logging & Log Files, Archiving

## **Windows Server Administration:**

### **Introduction**

Overview of Windows Server, Installation

### **Windows Network Infrastructure**

Configuring Addressing and Services, Configuring Name Resolution, Configuring Network Access, Monitoring and Managing a Network Infrastructure, Configuring File and Print Services, Overview of Active Directory Infrastructure, Configuring Active Directory Roles and Services

### **Windows Application Infrastructure**

Configuring Remote Desktop Services, Configuring Web Service Infrastructure, Configuring Network Application Services

## **Database Design**

Relational structure - tables (relations), rows (tuples), domains, columns (attributes), keys: super key, candidate keys, primary key, entity integrity constraints, referential integrity constraints, Database design process, Anomalies in a database, Functional Dependencies (Lossless decomposition, Dependency preservation, Closure set of FD,

Canonical cover, Lossless Joins ), Finding Candidate keys using Armstrong rules, Stages of Normalisation: 1NF ,2NF ,3NF, BCNF ( with general definition also) and Multi-valued Dependency : 4NF & 5NF( Project Join NF)

Translation of E-R schemes (logical design) to relational schemes (physical design): A case study.

### **Relational Algebra**

Basic operators (Select, project, union, set, difference, cartesian product and rename)  
Additional operators (Set interaction, Natural Join, Division and Assignment operator)  
, Insert, Update, Delete operators

### **Query languages**

Introduction to SQL, Advantages of using SQL, Data definition language and Data manipulation language commands using SQL, Basic and Advanced queries in SQL, Views.

### **Data Dictionary**

Introduction to data dictionary, Usage of data dictionary

### **Query Processing and Optimization**

Overview, Query interpretation, Equivalence of expressions, Join strategies for parallel processing, Algorithm for executing query operations, Heuristics of Query Optimization cost estimation of queries, Basic query optimization strategies: Selection operation, Sorting, Join operation

### **Transaction Processing and Concurrency control**

Transaction concepts: Transaction execution and Problems, Transaction execution and control with SQL, Transaction properties, Transaction log, Concurrency control , Locking methods for concurrency control, Timestamp methods for concurrency control, Optimistic methods for concurrency control ( Read phase, validation phase, Write phase), Deadlock handling - detection and resolution

### **Database backup and Recovery**

Need of Database backup, Database backup techniques, Types of Database failures, Types of Database recovery (Forward recovery, Backward recovery, Media recovery), Recovery techniques (Deferred Update, Immediate update, Shadow Paging, Checkpoints), Buffer management.

### **Implementing Security in Databases**

Security & integrity threats, Defense mechanisms, Statistical database auditing & control, Granting/revoking of privileges using SQL

### **Introduction to Other Databases**

Overview of parallel databases, Overview of Distributed databases, Overview of Object oriented databases.

### **Procedural SQL Practical only**

Understanding the main features of PL/SQL,PLSQL Architecture, advantages of using procedures, Basic code structure, variables, conditional statements, looping (loop statements, while loops, for loops, Cursor FOR loops) PL/SQL Stored procedures ( functions, procedures, packages and triggers )

### **Quantitative Aptitude, verbal and non-verbal reasoning**

- a. Operations on Numbers-Divisibility-Arithmetic-Geometric progression-Multiplication-Decimal Fraction-Square Roots and Cube Roots- Simple and Compound interest –Probability-Time and Distance-Measurement and Conversions
- b. Thinking and Reasoning-Barriers-Clarity-Consistency and Structure- Reading Between lines- Identifying Flaws in the Argument-Evaluating Sources of evidence- Critical writing and its evaluation-Thinking outside the box-The Art of Reflection
- c. Working with Others-Team Work-Learning style-Successful self-management-SWOT Analysis-Time Management
- d. Office Management- Day Planner-Task Management- Creative Thinking

### **English Grammar**

- A. Study of Grammar an overview
  - a. Verbs and the Verbs Phrases
  - b. Simple Sentence-Sentence Connections-Complex Sentences
  - c. The verb and its complementation
  - d. Focus, Theme and Emphasis
  - e. Sentence Patterns
  - f. Transferring the basic pattern
  - g. Sentence Modifiers
  - h. The Structure classes
- B. Essay and Report Writing
  - i. Application Writing
    - a. Theme Writing and Evaluation
    - b. Translation of Hindi into English and English into Hindi
    - c. Office Procedure
    - d. Filing System
    - e. Noting, Document, tendering etc.
  - f. Essay Writing
  - g. Report Writing- Minutes of Meeting Writing
  - h. General Speech
  - i. Press /Meeting/Press Note
  - j. Specie Writing
  - k. Expansion and Contraction of Idea or Theme