

Quick Reference Material

E2-E3 Executive Training

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Mode of Examination:

Management Module, the exam will be : Total marks: 100
conducted on last day of the 1st week. Qualifying marks: 50

Technology Module, the exam will be : Total marks: 100
conducted on the last day of the 2nd week. Qualifying marks: 50

There will be 35 Objective type questions, majority of them of Multiple Choice Questions with 4 choices, a few questions may be in the form of matching, and a few questions are fill in the blanks. Each question carry 2 marks and there is no choice.

Total marks: 70

●✎ The choice is to be selected with a tick (✓) mark, once marked, another choice can not be selected. It means overwriting is not allowed. Mark an answer only when you have confidence in it.

The remaining 30 marks are for descriptive type questions. In this section, some questions are given with alternate choice. The answers should be brief, should be written in the space provided and no additional sheets are given. If you attempt both the choices, the choice secured more marks will be taken into consideration. Write the answers point by point for creating a good impression to the examiner.

MANAGEMENT

1. BSNL Vision, Mission, and Telecom Scenario

1. The vision of BSNL is “ To become the largest Telecom Service provider in Asia.”
2. The Mission of BSNL is
 1. To provide world class state-of-art technology telecom services on demand at competitive prices.
 2. To provide world class infrastructure in its area of operation and to contribute to the growth of the country's economy
3. A vision can be defined as an organization's dream to realize in the long run.
4. Mission is the path taken to realize the Vision.
5. The vision of the company should be known to all the employees.
6. TRAI stands for Telecom Regulatory Authority of India
7. NTP stands for National Telecom Policy
8. TDSAT stands for “Telecom Disputes Settlement and Appellate Tribunal,” came into existence in the year 2000.
9. Market share of BSNL in Oct 2005 is 42.88%, as in Feb, 2007 is 31% (25% to 35%)
10. The highest revenue of BSNL is in the year 2005-2006, Rs. 40177 Crores
11. The highest profit of BSNL in the year 2004-2005, Rs. 10183 Crores
12. The target of BSNL for the year 2008
 1. 5 lakh broadband connections every month
 2. 30 lakh GSM connections every month.

2. Time Management

1. What is the objective of the Time Management?
To work effectively, and have time for activities that make life well rounded.
2. What are the Steps involved in Time Management?
 1. Understand how you are using your time at present
 2. Decide how you should spend your time
 3. Identify your time wasters
 4. Master your time wasters to save time
 5. Make plan of action
 6. Follow the plan
3. Identify your time wasters
 1. Interruption
 2. Meetings
 3. Crisis management
 4. Lack of objectives, Priorities and objectives.
 5. Personal disorganization
 6. Ineffective delegation
 7. Indecision and procrastination
 8. Complicated procedure
 9. Commuting.

4. What are the strategies for effective time management?

1. Increase your discretionary time
2. Be time conscious
3. Plan day's work
4. Hold priority time for 'A' jobs
5. Fragment workday
6. Say "Frank No"
7. Do one job at a time
8. Use time saving equipment
9. Delegate work
10. Develop self
11. Keep diary

5. What is 80/20 (Pareto) Principle?

80% time is wasted against 20% activities

3. Communication Skills

1. What is a communication?

Communication is the method by which people share their ideas, information, opinions, and feelings

2. What are the methods of communication?

1. Person to Person
2. In a small group
3. In a meeting
4. Using mass media
5. Other methods (Training, Teaching, Entertaining)

3. What are the examples of verbal communication breakdown?

1. Inattention
2. Physical barriers
3. Poor expression
4. Premature evaluation
5. Emotions
6. Gate keeper
7. Communication chain
8. Denial
9. Lack of questioning

4. What are the examples of non-verbal communication?

1. Yawns
2. Tears
3. Frown
4. Crossing arms
5. Averting eyes

5. What are the types of non-verbal communication?
 1. Body language
 2. Physical characteristics and appearance
 3. Voice
 4. Space
 5. Environment
 6. Time
 7. Silence
6. What are the steps to help when writing work space documents?
 1. The purpose
 2. Draft
 3. Edit
 4. Final draft
 5. Check
 6. Make changes
7. What are the modes of listening?
 1. Competitive or Combative
 2. Passive or attentive
 3. Active or reflective
8. What are the communication barriers?
 1. Jargon
 2. Disabilities
 3. Age
 4. Status
 5. Lack of empathy
 6. Stereotyping
 7. Unclear or incomplete message
 8. Distance
 9. Lack of time
 10. Poor spelling
9. What are the steps to overcome communication barriers?
 1. Feedback
 2. Consider the words used
 3. Use repetition
 4. Use empathy
 5. Timing
 6. Select the best location
 7. Check written communication

Points to remember:

1. Making a phone call is an example of Person to Person communication
2. While preparing a draft Natural language should be used.
3. In a passive or attentive listening, we are genuinely interested in hearing and understanding the other person's point of view.
4. The most useful and important listening skill is "Active or Reflective listening."
5. In a verbal communication breakdown, Gatekeeper means the sender/receiver's message is communicated through a third party which may result in breakdown or misinterpretation of the message.
6. Silence is an example of non-verbal communication
7. In business time is money.

4. Managing Change

1. What are the causes of change?
 1. Liberalization, Globalization, and Privatization
 2. Technological changes
 3. Competition is increasing and becoming more global
 4. Customers, share holders demand more value
2. What are the various natures of change?
 1. Individual change and organizational change
 2. Evolutionary change and Revolutionary change
3. What are the strategies to increase member's acceptance of a change?
 1. Express the need for a change
 2. Communicate the potential benefit
 3. Protect the interest of concerned people
 4. Get people involved in the process.
4. What are the tactics for use by change agents in dealing with resistance?
 1. Education and communication
 2. Participation
 3. Facilitation and support
 4. Negotiation
 5. Manipulation and co-operation
 6. Coercion
5. The organizational change will focus on Structure, Systems and Procedures and Culture
6. Change will not occur in respect of time

5. Project Management

1. What is a project?

A project has definite start and definite end.

2. BPR stands for Business Process Reengineering

3. TQM stands for Total Quality Management

4. Project life cycle

Preparation → Startup → Feasibility → Definition and Planning → Implementation → Close down

5. PERT stands for Project Evaluation and Review Technique

6. What are the responsibilities of a Project Manager?

1. Gaining approval for the project aim and terms of reference
2. Selecting and leading the team and setting individual objectives
3. Ensuring a feasibility study is complete
4. Ensuring that the project is planned in appropriate detail
5. Allocating and monitoring the work and cost
6. Motivating the team
7. Reporting progress back to the organization
8. Helping the team to solve project problems
9. Achieve the goals, through the team
10. Reviewing and closing down.

7. WBS stands Work Breakdown Structures

6. Transaction Analysis

1. What is ego? What are the types of ego?

Ego is a state of mind

There are 3 types of egos

1. Parent 2. Child 3. Adult

2. Mention the types of analysis of human behaviour

1. Structural analysis
2. Transaction analysis
3. Script analysis
4. Game analysis

3. What do you understand by Stroke?

The stroke is a transaction seen from the point of view of the individuals expectations from a communication.

4. What are the 4 basic life positions? (or) What are the 4 basic mental attitudes of a human being?

1. I am not OK, You are OK
2. I am OK, You are not OK
3. I am not OK, You are not OK

4. I am OK, You are OK
5. What are the various types of transactions?
 1. Simple
 - a. Complimentary
 - b. Cross
 - c. Ulterior
 2. Complex
 - a. Angular
 - b. Duplex
6. Does transactional analysis help to influence customers?
Yes
7. How do you define state of mind?
State of mind is flexible, it is situational and the thinking process affect the state of mind
8. Man is of multiple nature. Is there any logic behind this?
Yes. Different people posses different states of mind. Egos are not constant.
9. “It is a bad mistake” will indicate Parent ego.

7. Balanced Business Score Card

1. BBSC stands for Balanced Business Score Card
2. What is a BBSC?
The BBSC is a measurement as well as management system that enables organization to clarify their vision and strategy and translate them into action.
3. What are the perspectives of BBSC?
 1. Financial perspective
 2. Customer perspective
 3. Internal business process perspective
 4. Learning and growth perspective
4. What is the meaning of negative or positive performance parameter?
A +ve performance parameter is one where an increase is desirable (Ex: Revenue, No. of connections). A –ve performance parameter is one where a decrease is desirable (Ex: Expenditure, Fault rate).
5. Score cards of SSAs and other officers to be kept same as the sample score cards provided by the BSNL CO (The statement is False)
6. Learning and growth constitute the essential foundation for success of any knowledge-worker organization (The statement is True)

8. BSNL CDA Rules

1. The misconduct of an employee of BSNL is defined under Rule 5.
2. Mentions few acts of misconduct
 1. Furnishing false information regarding name, age, father's name, qualifications
 2. Habitual late or irregular attendance
 3. Gambling within in the premises of the Company
 4. Smoking within the premises of the Company where it is prohibited.
 5. Sleeping while on duty
 6. Absence from the employee's appointed place of work without permission or sufficient cause.
 7. Misuse of any amenity provided by the Company.
 8. An act of sexual harassment of woman at her work place.

3. Gift tax

Group C and D → Rs. 2,000

Group B and up to JAG → Rs. 5,000

SAG and HAG → Rs. 8,000

CMD and Board of Directors (Full time) → Rs.10,000

4. At the time of appointment information regarding possession of immovable property should be intimated if such value exceeds

Non-executive employees → Rs.20,000

Executive employees → Rs.30,000

5. Authorities

Cadre	Appointing Authority	Disciplinary Authority		Appellate Authority		Review Authority	
		Minor	Major	Minor	Major	Minor	Major
JTO	GM	DGM	GM	GM	CGM	CGM	CMD
SDE	DIRECTOR	GM	CGM	CGM	DIRECTOR	CMD	CMD
Sr. SDE	DIRECTOR	GM	CGM	CGM	DIRECTOR	CMD	CMD
DE	DIRECTOR	GM	CGM	CGM	DIRECTOR	CMD	CMD

9. Motivation

1. Define motivation

Motivation is the willingness to do something and is conditioned by this action's ability to satisfy some needs of the individual.

2. What are the Maslow's Hierarchy of needs?

1. Physiological
2. Safety
3. Love
4. Esteem
5. Self actualization

3. What are the 4 personality types?

1. Dominating
2. Influencing
3. Steady
4. Careful

4. What are the basic rules of Motivation?

1. Recognize the individual differences
2. Match people to jobs
3. Set goals which are perceived as attainable
4. Link rewards to performance
5. Check system for equity

Points to remember:

1. According to Douglas McGregor, employees inherently **like** work and whenever possible will attempt to avoid it. (False) (Replace **like** with **dislike**)
2. According to Herzberg's motivation-hygiene theory the intrinsic factors are Achievement, Recognition, Responsibility, Advancement. The Extrinsic factors are Company policy, Supervision, Administration, Working conditions.
3. Motivation theory today is Effort → Performance → Rewards → Goal
4. Job Performance = Ability X Motivation

10. Reservation Policy

1. Equality before law is stated under Article 14
2. The % of reservation to SC/ST/OBC candidates for recruitment is 15% / 7.5% / 27%
3. The age relaxation of upper age limit for SC/ST candidates is 5 years.
4. A 100 point roster is being followed in BSNL.

11. Staff Welfare

1. What are the objectives of Staff Welfare Board?
 1. Grants to Sports Control Board
 2. Aid to Staff Welfare Institutions
 3. Financial assistance to BSNL Welfare associations, and BSNL Woman's Welfare Associations
 4. Organization of Art and Crafts competitions, Exhibitions
 5. Scholarships and other financial assistance to children and dependents of BSNL employees.
2. Regarding incentive for meritorious students 3rd rank is also considered for 10+2 Level and University Exam.
3. Sanchar Krida Awards are given for outstanding who have achieved excellence by representing India in International competitions and also to those who achieve 1st, 2nd, and 3rd positions in Nationals.

12. Cost Management

1. Cost is a measurement in monetary terms, of the amount of resources used for the purpose of production of goods or rendering services.
2. Prepaid rent is an example of deferred cost
3. Cost unit is a form of measurement of volume of product or service
4. Cost Accounting is the process of accounting for costs.
5. Cost audit is the verification of cost accounts and a check on the adherence to the cost accounting plan.
6. OCC stands for Operational Cost Centre
7. SCC stands for Service Cost Centre

13. Maintenance of Assets Register in BSNL

1. Assets are classified into Fixed and Current assets
2. Fixed assets
 1. Tangible ex: A&P, Land and buildings
 2. Intangible ex: Software, goodwill
3. Current Assets → Cash on hand, Bank balance etc.
4. Write down any 6 fixed assets of BSNL
 1. Land and buildings
 2. Apparatus and plant
 3. Cables, lines and wires
 4. Motor vehicles and launches
 5. Subscriber installations
 6. Electrical fittings and computers

5. What do you understand by decommissioning of assets?

Whenever the asset is decommissioned, the fixed asset and the accumulated depreciation is to be relieved to that extent by passing Journal slip entry and the same may be transferred to decommissioned asset.

6. What is meant by depreciation?

Depreciation means a fall in quality, quantity or value of an asset

7. Physical verification of fixed assets is the responsibility of the management and the periodicity is once in year. In case of buried cables it may be once in 3 years.

8. The factors that cause depreciation

1. Wear and tear due to actual use
2. Efflux of time
3. Obsolescence
4. Accident
5. Fall in market price

9. Method of providing depreciation in BSNL is “Written Down Value Method” (WDV)

10. If an equipment is installation but it is not commissioned, it comes under “Works in Progress.”

14. Audit

1. The object of auditing is Reporting, detection and prevention of frauds and errors.

2. Auditing of BSNL is as per Section 619 of Companies Act.

3. Different types of audits are

1. Government audit
2. Commercial audit including EDP audit
3. Internal audit
4. Cost audit
5. Management audit
6. Performance/Proprietary audit
7. Balance sheet audit

15. Capital Budgeting and Revenue Budgeting

1. RE and BE stands for Revenue Estimate and Budget Estimate

2. RE and BE figures are to be sent to Corporate Office by 15th September every year.

3. The actual expenditure up to August (5 months) and estimated expenditure from Sept to March (7 months) are required to be furnished under RE

4. Working expenses are expressed in thousands of rupees

5. Revenue receipts are expressed in lakhs of rupees

6. In RE and BE, no demand under “Stores” may be made, as there is no store item in corporate setup. The demands may be made in cash only.
7. Proposals in respect of Capital budgeting are to be forwarded by each circle to Corporate office in Statement ‘A’ to ‘G’

Statement ‘A’: Works costing Rs. 5 crores above (New works and works in progress)

Statement ‘B’: Works costing less than Rs. 5 crores

Statement ‘C’: Works originally estimated to cost less than Rs.5 crore but where the expenditure has exceeded Rs.5 crores

Statement ‘D’: Consolidation of A to C

Statement ‘E’: Material input wise break up of requirement on capital works should be furnished in duplicate separately for the total projections made in RE and BE. Without this statement, funds will not be allotted.

Statement ‘F’: For the purpose of USO funding

Statement ‘G’: For provision of VPTs.

16. Marketing:

1. What are the two major factors of marketing?
 1. Acquisition of new customers
 2. Retention and expansion of relationship with existing customers
 2. What is a marketing mix (or) what are 7 P’s?
 1. Product
 2. Price
 3. Promotion
 4. Place
 5. People
 6. Process
 7. Physical evidence
 3. SWOT stands for Strengths, Weaknesses, Opportunities, Threats
 4. STP stands for Segment, Target, Positioning
 5. What are 4 A’s reflecting a consumer-centered perspective?
Acceptability, Affordability, Awareness, and Availability
- These can be matched to the marketing mix as follows:

Product → Acceptability.

Price → Affordability

Promotion → Awareness

Place → Availability

17. Customer Care

1. What are the types of services offered in BSNL portal?
 1. Basic telephone services including WLL
 2. Add-on facilities
 3. BSNL mobile service
 4. IN services
 5. Leased line, ISDN, Broadband services
 6. Complaint handling
2. CRM stands for Customer Relation Management
3. CIC stands for Commercially Important Customer
4. Toll free number for BSNL Mobile services is 9400024365
5. Toll free number for Basic and Broadband services: 1500
6. Toll free number for Internet and Broadband services: 1800-424-1600
7. Toll free number for MPLS and other data services: 1800-425-1957

18. Business Development

1. What is BD?

It is an approach to generate high volume business by developing clients. BD specially targets selected clients where high revenue is expected.

2. What are the functions of BD Cell?

1. Address the communication needs of the large, medium and small enterprises and government bodies.
2. Liaison with prospective business customers
3. Prepare technical and commercial proposals
4. Participate in Bid/Tenders
5. Appointment of System Integrators, Subcontractors, and suppliers and process their work orders and payments
6. Special thrust on MOU partner's telecom needs
7. Look for new business opportunities
8. Single window solution to corporate

3. What are the benefits of MOU approach? (MOU stands for Memorandum Of Understanding)

1. Synergy of operation
2. Win-Win situation for both the partners
3. Serves mutual business interest
4. Work jointly to evolve business solutions
5. Other organizations get single window total business telecom solution

4. System integrator means who finds a solution for

1. Hardware
2. Software
3. Integration

5. A typical WAN solution may require
 1. Hardware
 2. Software
 3. Bandwidth

19. Official Language:

1. On 14-9-1949, Hindi is declared as Official Language of India and script is in Devanagari.
2. According to article 343, Hindi is the official language.
3. Hindi Act 1976.

”A” Region → H.P., U.P., M.P., Bihar, Haryana, Rajasthan, Delhi, Andaman and Nicobar islands

“B” Region → Punjab, Gujarat, Maharashtra, Chandigarh

“C” Region → Other states

(In the above, the newly formed states may be taken in to the region according to their separation from their parent state)

20. Consumer Protection Act:

1. CPA stands for Consumer Protection Act is a three tiered system as defined under Indian Consumer Act 1986.
 2. For claims
 - District forum < 20 lakhs
 - State forum $\geq$ 20 lakhs but < 1 crore
 - National commission $\geq$ 1 crore
 2. A person has bought the goods for resale or for a commercial purpose can not be treated as a consumer
 3. A complaint can be filed by
 1. A consumer
 2. Any voluntary consumer organization registered under companies act 1956
 3. State / Central Government
 4. One or more consumers when there are numerous consumers
 4. Complaint can be filed within 2 years (normally) from date of any problem caused, and appeal is to be filed within 30 days.

21. Right To Information Act

1. RTI stands for Right To Information Act
2. Time limit to get the information is 30 days. If the information is concerning the life and liberty of a person the time limit is 48 hours, if a third party is involved the time limit is 40 days.
3. PIO stands for Public Information Officer
4. SIO stands for State Information Centre
5. CIC stands for Central Information
6. PIO is assisted by APIO. The APIO, on receipt of the application will forward the same to the PIO within 5 days.

Mail your valuable Comments / Suggestions to nprabhakar@bsnl.co.in

Technology Module

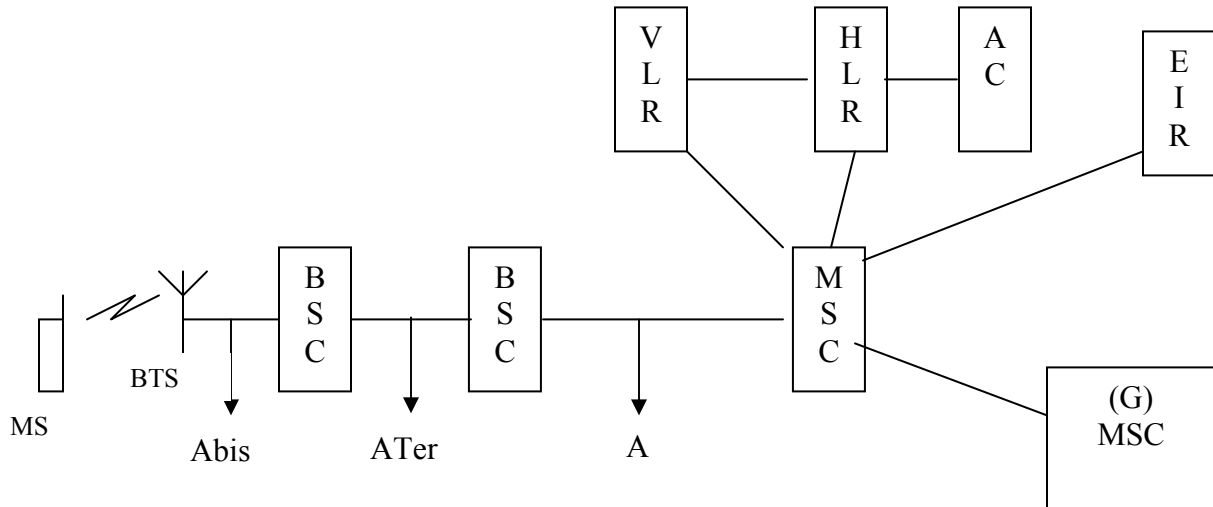
I. GSM and CDMA

1. GSM and GSM Services

1. Expand the following:
 1. GSM – Global System for Mobile Communication
 2. CEPT – European Post Offices and Telecommunication
 3. SMS – Short Message Service
 4. UMTS – Universal Mobile Telecommunication System
 5. HSCSD – High Speed Circuit Switched Data
 6. GPRS – General Packet Radio Service
 7. LBS – Location Base Service
 8. MMS – Multimedia Messaging Service
 9. LDA – Location Dependent Addressing
 10. PLMN – Public Land Mobile Network
 11. VLR – Visitor Location Register
2. First official call in the world with GSM on 1st July, 1991
3. Cell – The area where wireless transmission between mobile and base station takes place is known as Cell. Cell is the basic unit of Cellular telephony.
4. The transmission of user data from the base station to the mobile phone is called “Down link.” The transmission from the mobile telephone to the base station is called “Up link.”
5. ME + SIM = MS
ME → Mobile Equipment
MS → Mobile Station
6. Paging is done in the LA (Location Area)
7. The concept handover is change of active control call from one BTS to another BTS under the supervision of BSC
8. The process, where the mobile phone informs the network about its new location is called Location Update Procedure (LUP)
9. Mobile network operators group cells in administrative units called Location Area (LA)
10. GSM Network is organized into 3 subsystems
 1. Base Station Subsystem (BSS)
 2. Network Switching Subsystem (NSS)
 3. Network Management Subsystem (NMS)
11. Band of operation

GSM Technology	Up Link Frequency	Down Link Frequency
GSM 850	824 – 849 MHz	869 – 894 MHz
GSM 900	890 – 915 MHz	935 – 960 MHz
GSM 1800 (DCS)	1710 – 1785 MHz	1805 – 1880 MHz
GSM 700 (UMTS)	747 – 762 MHz	777 – 792 MHz

12. Block diagram of GSM



13. The Network Switching Subsystem (NSS) contains

1. MSC
2. GMSC (Gateway Mobile Switching System)
3. VLR
4. HLR
5. AC
6. ETR

14. The functions of NSC are

1. Call control
2. Charging
3. Mobility Management
4. Signaling
5. Subscriber data handling

15. The functions of Mobile Switching Subsystem (MSC) are

1. Call control
2. Charging
3. Mobility Management
4. Initiation of paging

16. HLR – Home Location Register holds the permanent data of the customer

17. VLR – Visitors Location Register holds the temporary data

18. EIR – Equipment Identity Register – provides security information to the network. It will check mobile telephone and IMEI (International Mobile Equipment Identity)
The EIR contains 3 lists.

White list – Mobile set is allowed to operate normally

Gray list – Mobile is suspected to be faulty. Under monitor.

Black list – Mobile is reported stolen, or otherwise not allowed to operate

19. Base Station Subsystem (BSS) consists of 3 elements
1. BSC (Base Station Controller)
 2. BTS (Base Transceiver Station)
 3. TRAU (Transcoder and Rate Adaptation Unit) or TC

20. The functions of BSS are
1. Radio path control
 2. Synchronization
 3. Air and A interface signaling

21. GSM Services are classified into
1. Basic
 2. Supplementary

Basic services are further divided into

1. Teleservices (in the interest of customer)
2. Bearer (for network service provider)

22. The Basic services are
1. Speech
 2. Emergency calls
 3. Facsimile Group 3
 4. DTMF
 5. SMS
 6. SMSCB (SMS Cell broadcast)
 7. FAX mail

24. The supplementary services are
1. Call forwarding
 2. Barring of O/G and I/C calls
 3. Advice of charge
 4. Account codes
 5. Call waiting
 6. Call hold
 7. Multiparty service
 8. CLI
 9. CUG

25. Innovative services are
1. Single personal number
 2. Dual numbering
 3. Immediate call itemization
 4. Regional call itemization
 5. Geographically differentiated charging

26. LBS – Location based service can be described as an application that is depending on a certain location. These can be of 2 categories viz. User requested, Triggered

27. ARC method

1. BTS will measure the distance of MS in terms of TA unit (Time Advance)
2. For this purpose 3 cells (i.e., 3 BTSs) are taken.
3. Information is sent to network side, where it has got a complete map.

28. GPS – Global Positioning System began in 1978 by US DOD (Department of Defense)

29. GPRS – General Packet Radio Service follows 2.5G

30. GPRS – Advantages to the users

1. High bit rate
2. Long message sending capabilities
3. Internet connectivity
4. Multimedia services

31. GPRS – Advantages to the network operators

1. Provision of multimedia services
2. Revenue generation
3. Smooth migration to 3G

32. Elements of GPRS

1. PCU – Packet Control Unit
2. SGSN – Serving GPRS Support Node.
3. GGSN – Gateway GPRS Support Node
4. Intra-PLMN backbone
5. CG – Charging Gateway
6. LIG – Legal Interception Gateway
7. DNS – Domain Name System

33. GPRS mobile sets classes

1. Class A – GPRS and GSM at a time
2. Class B – GPRS or GSM automatic
3. Class C – GPRS or GSM (Manual)

2. Overview of CDMA

34. The frequency of operation of CDMA

Uplink – 824 – 849 MHz

Downlink – 869 – 894 MHz

Duplexing method: Frequency Division Duplexing (FDD)

RF Spacing: 1.25 MHz

Bandwidth: 25 MHz

Total carriers: 20

35. Three types of codes are used

1. Walsh code (Orthogonal code) – used to differentiate the customers on the up link

2. Long PN code – Used on the downlink. Repeats every 41 days, clock rate @ 1.2288 MCPs
 3. Short PN code – Used to differentiate the BTS. Repeats every 26.67 msec, clock @ 1.2288 MCPs
36. Types of CDMS channels
- Forward channels
 1. Pilot channel
 2. Sync channel
 3. Paging channel
 4. Traffic channel
 - Reverse link channels
 1. Access channel
 2. Traffic channel
37. CDMA mobile uses rake receiver. Its purpose is to reduce multipath fading.
38. Salient features of CDMS 2000 1x network
1. Backward compatibility
 2. Support high data rates
 3. Higher capacity for voice communication
 4. Increased battery life
38. Power control methods
1. Open loop
 2. Closed loop
 - a. Forward Link Power Control
 - b. Reverse Link Power Control
39. EVDO stands for Evolution for Data Optimized
40. The features of EVDO are
1. Uses both CDMA and TDMA
 2. Uses its own dedicated 1.25 MHz carrier
 3. Forward link speed 2.4 Mbps
 4. Backward link speed 153.6 Kbps
 5. No power control on forward link is required.

II. Transmission:

1. OFC Characteristics and Laying:

1. The transmission of light in optical fiber is commonly explained using the principle of “Total internal reflection.”
2. The optical fiber consists of core and cladding
3. The numerical aperture is defined as the light gathering capability of the fiber.
4. Core diameter of single mode fiber is less than core diameter of multimode fiber

5. In a step index fiber the refractive index of the core medium is uniform throughout its width and length.
6. In a graded index the refractive index of the core medium will vary from centre to outer.
7. The attenuation of a fiber is decay of signal. The causes are
 1. Absorption
 2. Scattering – due to impurities or mal construction of fiber
 3. Dispersion – prominent in 3rd window i.e., 1550 nm (C-band)
8. Types of Single-mode fiber
 1. Non-dispersion-shifted fiber (NDSF)
 2. Dispersion-shifted fiber
 3. Non-Zero dispersion-shifted fiber – used in DWDM applications
9. Single mode (NDSF) cable is being used in BSNL
10. 1st window – 850 nm
2nd window – 1310 nm
3rd window – 1550 nm

2. Testing and Measuring instruments

1. Main tests in OFC
 1. Cable loss
 2. Splice loss
 3. Connector loss
 4. Fiber length
 5. Continuity of fiber
 6. Fault localization/break fault
2. Main instruments required
 1. Calibrated light source
 2. Optical power meter
 3. Optical attenuator
 4. Optical Time Domain Reflectometer (OTDR)
3. OTDR is useful for
 1. Fiber loss
 2. Splice loss
 3. Connector loss
 4. Fiber length
 5. Continuity of fiber
 6. Fault localization
4. BERR (Bit Error Rate) is measured by using variable attenuator

3. SDH Overview:

1. There are 3 types of transmission
 1. Asynchronous – Where the stations will maintain individual clocks and there may be a difference between them.
 2. Plesiochronous – In this type, the signal transitions occur at almost the same rate, with any variation being constrained within tight limits.
 3. Synchronous – In this type, the digital transitions in the signals occur at exactly the same rate. All the clocks are traceable to one Primary Reference Clock (PRC) which runs very accurate.
2. PDH stands for Plesiochronous Digital Hierarchy
3. SDH stands for Synchronous Digital Hierarchy
4. Limitations of PDH
 1. Inability to identify individual channels in a higher order bit stream
 2. Insufficient capacity for Network management
 3. No standard definition above 140 Mbps
5. Advantages of SDH:
 1. Ability to drop and introduce lower tributary
 2. Can accommodate both existing and future signal types
 3. Improved service quality
 4. Advanced Network management and maintenance capabilities
 5. Dynamic Network capacity management
 6. Multivendor networking
6. STM stands for Synchronous Transfer Mode
7. The structure STM-N is made up of 3 parts
 1. Regeneration Section Overhead (RSOH) – 1 ~ 3 rows, 9 columns
 2. Administrative Unit pointer (AU-PTR) – 4th row, 9 columns
 3. Multiplex Section Overhead (MSOH) – 5 ~ 9 rows, 9 columnsPlus Payload – 261 X 9 columns
7. The frame capacity is $270 \times 9 \times 8 \times 8000 = 155.52$ Mbps
Frame repetition rate = 125 μ sec
Transportation capacity of one byte = 64 Kb
8. Components of SDH:
 1. Terminal Multiplexer (TM) – to multiplex low speed signals of tributary to higher order tributary (STM-N0)
 2. Add-Drop Multiplexer (ADM) – to multiplex low speed tributary signals to lines in cross-connection mode and vice versa
 3. Regenerator (REG) – for reshaping of attenuated signals
 4. Digital cross-connection system (DXC) – for cross connection of STM-N signals and is equivalent to a cross-connect matrix

9. Topologies
 1. Line topology
 2. Star topology
 3. Tree topology
 4. Ring topology
 5. Mesh topology

3. Protection schemes in SDH:

1. Linear protection
 1. 1+1 protection
 2. 1:1 protection
 3. 1:N protection
2. Ring Protection
 1. Path protection
 2. Line protection
3. Self healing rings
 1. Unidirectional Self Healing Ring (USHR)
 2. Bi Unidirectional Self Healing Ring (BSHR)
4. Important features of SDH rings
 1. There can be either 2 or 4 fibers running between the nodes on a ring
 2. The operating signals can travel either clockwise only (Unidirectional ring) or in both directions (Bidirectional)
 3. Protection switching by line switching or path switching scheme
 4. In BSHR, APS (Automatic Protection System) protocol is used
 5. MSSPRING stands for Multiplex Selection Share Protection RING. The no. of ADMs connected are 16 (0 ~ 15)

5. Synchronization:

1. The internal clock of a SDH terminal may derive its timing signal from the Synchronization Supply Unit (SSU)
2. PRC stands for Primary Reference Clock

III. Switching

1. Digital Switching Systems- concepts:

1. Sampling theorem: If a band limited signal is sampled at regular intervals of time at a rate equal to or more than twice the highest signal frequency in the band, then the sample contains all the information of the original signal

$$F_s \geq 2F_h$$

2. The no. of Level – I TAXs – 21

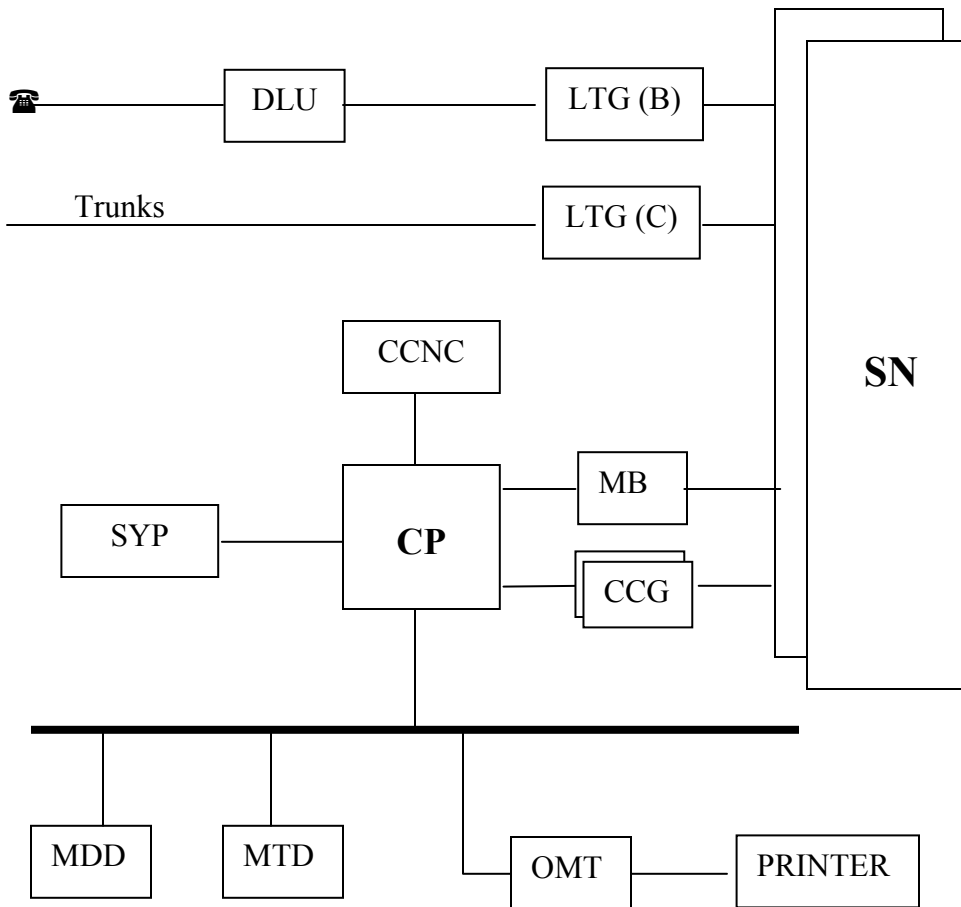
3. The no. of Level – II TAXs – 301
4. In PCM, the sampling frequency used is 8 KHz.
5. The recurrence of time slot is $1/8000 = 125 \mu\text{sec}$
6. Duration of the time slot is $125 \mu\text{sec} / 32 = 3.9 \mu\text{sec}$

2. Switching Systems in BSNL and introduction to NGN

1. 5 ESS contains 3 major modules
 1. SM / SM-2000 (Switching Module)
 2. CM (Communication Module)
 3. AM (Administrative Module)
2. NCT stands for Network Control and Timing
3. 5 ESS system is designed by Bell Labs, Lucent technologies, U.S
 1. BHCA – 8,00,000
 2. Traffic handling capacity – 25,000 Erlangs
4. The functions of SM (Switching Module)
 1. Line and Trunk scanning
 2. Tone and cadence generation
 3. Digit analysis
 4. Call routing
 5. Circuit switching
 6. Packet switching
 7. Announcements
 8. Call progress supervision
 9. Routing maintenance and Self maintenance
5. Types of SM
 1. LSM
 2. HSM
 3. RSM
 4. PSM
6. Communication Module (CM) has got the following subsystems
 1. MSGS (Message Switch)
 - a. MSCU (Message Switch Control Unit) – which controls MSPU
 - b. MSPU (Message Switch Peripheral Unit) – It stores control function of different SMs
 2. ONTC (Office Network and Timing Complex)
 - a. CMCU (Communication Module Control Unit) – It controls TMSU and clock generation is available
 - b. TMSU (Time Multiplexed Switching Unit) – Where NCT links are terminated

7. Functions of AM
 1. Call routing for intermodule and intramodule calls
 2. Administrative data processing / billing data
 3. Traffic measurements reports / System performance reports
 4. Memory management
 5. System maintenance
 6. Allocation of trunks for call processing.
8. The Units of AM
 1. CU (Control Unit)
 2. IOP (Input/Output Processor)
 3. DFC (Disk File Controller)
9. OCB-283 is by M/s Alcatel, France
 1. Traffic – 25,000 Erlangs
 2. BHCA – 12 Lakhs
 3. Has got a single stage “T” switch
10. OCB-283 has got 3 functional subsystems
 1. Subscriber Access Subsystem
 2. Connection and Control Subsystem
 3. Operation and Maintenance Subsystem
11. PU/PE is for CCS#7 signaling
12. Other functional units of OCB-283 are
 1. LR – Connection link
 2. MR – Call Handler
 3. TR – Translator
 4. TX – Charging unit
 5. MQ – Message distributor
 6. GX – Matrix System handler
13. Token rings are used for communication between different control connections and OM stations.
14. MIS stands for Interstation Communication Multiplex
15. MAS stands for Access Subsystem Communication Multiplex
16. EWSD (Electronic Switching System Digital) by M/s Siemens, Germany
 1. No. of customers – 2.5 Lakhs
 2. No. of Trunks – 60,000
 3. Traffic – 25,000 Erlangs
 4. BHCA – 14 Lakhs

17. Draw the block schematic of EWSD switching system and neatly label the parts



18. Definition of NGN – A Next Generation Network (NGN) is a packet-based network able to provide telecommunication services to users and able to make use of multiple broadband.

19. Features:

1. Packet based transfer
2. Support of wide range of services
3. Broadband capabilities with end-to-end QoS and transparency
4. Internetworking with legacy networks via open interfaces
5. Generalized mobility

3. CCS#7 Signaling:

1. The types of trunk signaling

1. DC
2. SF (Tone / No tone)
3. MF 2 out of 6. In India, 2 out of 5 is used

2. The purpose of signaling is
 1. Supervisory (line) signaling is used for lines, i.e., idle, busy, faulty etc.
 2. Address (Register) signaling
3. In CAS (Channel Associated Signaling), TS16 is used for signaling. In TS16, 4 bits are used for each customer. Out of 4 bits, 3 bits are used. In CCS#7 all the 8 bits are used.
4. The features of CCS#7 (Common Channel Signaling)
 1. Works basically on separation of speech circuit from the signaling link
 2. Speech circuit has got no signaling function except when a continuity check is done.
 3. CCS#7 results in faster call setup
 4. Efficient use of speech circuits
5. The functional blocks of CCS#7
 1. MTP (Message Transfer Part)
 2. TUP (Telephone User Part)
 3. ISUP (ISDN User Part)
 4. SCCP (Signaling Connection Control Part)
 5. TC (Transaction Capabilities)
6. There are 4 layers in CCS#7

UP	Level 4
MTP	Level 3
	Level 2
	Level 1

Level 1: Defines the physical, electrical functional characteristics of the signal link

Level 2: Defines functions relevant to individual signaling links, including control and monitoring of link. Responsible for reliable transfer of signaling information between two directly connected signaling points.

Level 3: Defines network functions such as message routing and network management.

Level 4: Defines applications and user functions.

7. Associated mode of signaling – Speech signal in the same path
8. Quasi associated mode signaling – Speech and signal in different path
9. Information is sent in the form of SU (Signal Unit)

Types of Signal Units

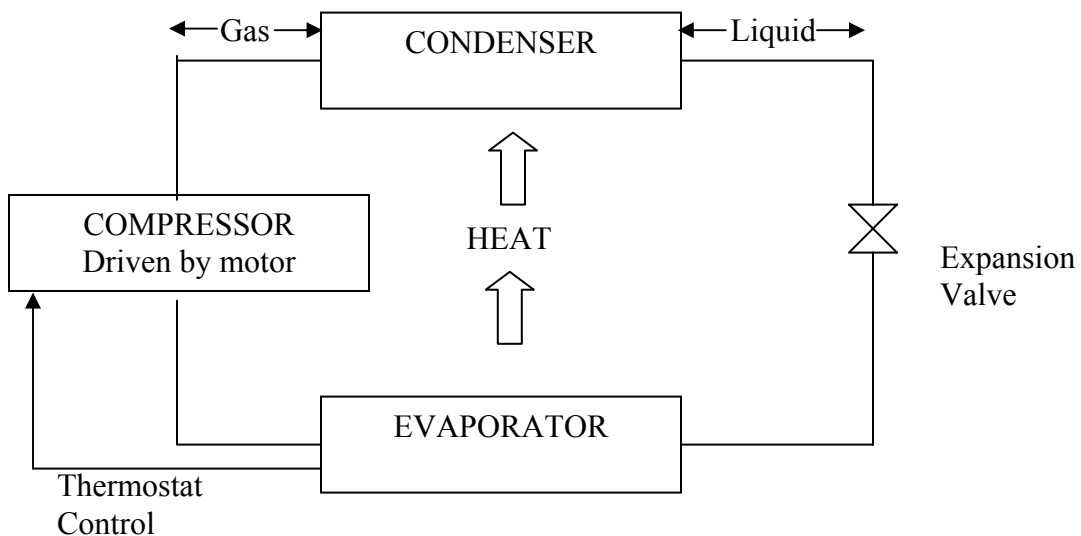
1. MSU (Message Signaling Unit) – carries message
2. FISU (Fill-in Signal Unit) – to maintain link alignment when there is no traffic.
3. LSSU (Link Status Signal Unit) – for transferring signaling information used to indicate and monitor the status of the signaling link.

4. Maintenance of Battery and Earthing:

1. VRLA stands for Valve Regulated Lead Acid battery
2. The float voltage is maintained at 54 V D.C. The adjustment factor is 3 mV/Cell per $^{\circ}\text{C}$
3. A fully charged healthy battery shall not draw a current more than 400 mA at 27 $^{\circ}\text{C}$
4. The purpose of earthing is
 1. Reduction of cross talk and noise
 2. Used as returned path
 3. Protection of equipment from lightning, surge voltage, and foreign voltages
5. Types of earth electrodes
 1. Rod electrode
 2. Plate electrode
 3. Strip electrode
6. Earth resistance should $< 0.5 \Omega$. The periodicity of measurement is once in 6 months, in which one dry season must be included.

5. Air conditioning and Engine Alternator:

1. An Air conditioner uses Freon-22 as a refrigerant.
2. Components of AC
 1. Compressor
 2. Condenser
 3. Expansion Valve
 4. Evaporator
3. Draw the block schematic diagram of an Air Conditioning Unit



4. Types of AC Units
 1. Window type
 2. Split type
 3. Package type
 4. Central AC
5. The Diesel engine, the working is explained in 4 strokes
 1. Admission or induction stroke
 2. Compression stroke
 3. Power stroke
 4. Exhaust stroke
6. Components of Diesel Engine
 1. Fuel System
 2. Lubrication System
 3. Air exhaust System
 4. Cooling System
 5. Starting System
7. Alternator works on the principle of “Faraday’s Law of Electromagnetic Induction.”
8. Indications of a healthy engine
 1. Good compression
 2. Good combustion
 3. Clean exhaust.

6. Intelligent Network (IN):

1. In the IN architecture, the service logic and service control functions are taken out of the individual switches and centralized in a special purpose computer.
2. Components of IN architecture
 1. SSP (Service Switching Point)
 2. SCP (Service Control Point)
 3. SMP (Service Management Point)
 4. IP (Intelligent Point)
3. IN Services

Service	Description	Access code
VCC	Virtual Card Calling	1802
ACC	Account Card Calling	1804
PRM	Premium Rate Service	1867
UAN	Universal Access Number Service	1860
UPN	Universal Personal Number	1868
T-VOT	TeleVoting	1803 (No charge) 1861 (Charge)

FPH	Free Phone Service	1800
VPN	Virtual Private Network	1801

IV. Datacommunication and Networks

1. Broadband technologies- copper based:

1. ADSL stands for Asymmetric Digital Subscriber Line
 2. SDSL stands for Symmetric Digital Subscriber Line
 3. HDSL stands for High data rate Digital Subscriber Line
 4. VDSL stands for Very high data rate Digital Subscriber Line
 5. IDSL – ISDN Digital Subscriber Line
-
2. ADSL uses 16 – 540 Kbps upstream
1.5 – 9 Mbps downstream
 3. ADSL2 uses G 992.3 standard
 4. Requirement of broadband connection at the customer's premises
 1. BSNL Bfone
 2. Ethernet card
 3. ADSL modem and splitter
 4. Broadband account (Username and password)
 5. Components of Broadband Service
 1. CPE
 2. DSLAM
 3. LAN Switches for aggregation
 4. BRAS
 5. RADIUS
 6. Provisioning System
 7. SSSS – Subscriber Service Selection System
 6. The hierarchy of broadband connectivity is
CPE → DSLAM → TIER-II Switch → TIER –I Switch → BRAS → Core Router

2. Broadband Wireless Access Technologies:

1. Wi-Fi based on IEEE 802.11 standard
2. WiMax based on IEEE 802.16 standard
3. The technologies that enables the wireless in **hotspots** is called Wi-Fi
4. WiMax stands for Worldwide Interoperability for Microwave Access uses OFDM (Orthogonal Frequency Division Multiplexing)
5. FITH – Fiber To The Home
6. FTTC – Fiber To The Curb
7. Frequency band used for WiMax 2-11 GHz and 10-66 GHz
8. The CPE (Customer Premises Equipment) required for Internet access via satellite is
 1. Dish antenna

2. Satellite modem

3. TCP / IP Networking, IP addressing:

1. TCP / IP stands for Transmission Control Protocol / Internet Protocol
2. The fragmentation of data is done at the router
3. Socket connection implies Combination of Port number and IP Address
4. The size of the MAC (Media Access Control) Address is 48 bit
5. The size of IP address is 32 bits
6. The size of port address is 16 bits
7. There are 5 layers in TCP/IP
 1. Application layer
 2. Transport layer
 3. Network layer
 4. Data link layer
 5. Physical layer
8. TCP and UDP are the protocols of Transport layer
9. IP is the protocol belongs to Network layer
10. IP header consists of 20 ~ 24 bytes
11. TCP header consists of 20 ~ 24 bytes
12. IANA stands for International Assigned Number Authority
13. By seeing the first digit of an IP address it can be identified to which class it belongs to
 1. Class A – 1 ~ 126
 2. Class B – 128 ~ 191
 3. Class C – 192 ~ 223
 4. Class D – 224 ~ 239
 5. Class E – 240 ~ 254
14. Class D addresses are used for multicast purpose.
15. CIDR stands for Classless Inter Domain Routing, the advantage is less number of routing tables for the routers on the Internet.

4. Routing Protocols:

1. Dynamic Routing Protocols are classified into 2 categories
 1. Distance Vector Routing Protocol – RIP (Routing Information Protocol), IGRP (Interior Gateway Routing Protocol)
 2. Link State Routing Protocol – OSPF (Open Shortest Path First), IS-IS
2. Both RIP and OSPF are Interior Gateway protocols, while BGP (Border Gateway protocol) is an example of Exterior Gateway protocol
3. Features of RIP
 1. Uses UDP (User Datagram Protocol)
 2. The metric is “No. of hops.”

3. Update timer is 30 sec
 4. Route invalidation timer is 180 sec
 5. Garbage collection timer is 240 sec
 6. Hold down timer is 180 sec
 7. Max. hop count is 15
 8. Reverse routing is prevented by
 - a. Simple split horizon
 - b. Split horizon with poisoned reverse
4. Features of OSPF
1. Fast convergence
 2. Types of packets
 - a. Hello packet
 - b. Database description packet
 - c. Link state request packet
 - d. Link state update packet
 - e. Link state acknowledgement packet
 3. Hello packets are sent at an interval of 10 sec
 4. LSAs (Link State Advertisement) are exchanged at every 30 mts.
 5. The cost is "Metric."
 6. Areas are identified by 32 bit ID
 7. To meet the flooding of LSAs "Designated Router" (DR) and BDR (Backup Designated Router) are used.
 8. Uses TCP as protocol

5. MPLS-VPN

1. MPLS header consists of 32 bit
2. Any protocol can be transported by MPLS
3. Ingress router performs PUSH operation and the Egress router performs POP operation, and the intermediate routers perform SWAP operation.
4. LSR stands for Label Switching Router
5. MPLS applications
 1. Improves packet forwarding performance
 2. Easy implementation
 3. Supports all protocols
 4. Integrates IP and ATM networks. ATM – Asynchronous Transfer Mode
 5. Supports IP over ATM
 6. Help to build scalable VPNs
6. What is VPN?

A customer is provided with a highly secured network using resources of public network.
7. VPNv4 address consists of 96 bits.
8. BGP is used to transfer VPN labels.
9. MPLS uses a protocol called LDP (Label Distribution Protocol)

6. Multiplay

1. Services offered through Broadband multiplay are
 1. Video on demand
 2. VoIP
 3. VPN / Leased line
 4. IPTV
 5. High speed Internet

V. Information Technology

1. BSNL applications, DOTSOFT, HRMS:

1. DOTSOFT is an Integrated Database System comprising of
 1. Commercial
 2. TRA (Billing and Accounting)
 3. Directory Enquiry
 4. Fault Repair Service
2. DOTSOFT is developed by Andhra Pradesh Telecom Circle
3. Every customer in DOTSOFT is identified by a 17 digit code, the format is CCCSSAYYYMMxxxxx
4. In DOTSOFT package, the data flows electronically between the Server which is situated at the SSA Headquarters and the field units.
5. The HR package is developed by IT Project Circle, Pune
6. Each employee of BSNL is uniquely identified by a code consisting of 9 digit code, wherein the first four digits indicates the year of appointment of the official.

2. Overview of NOS and RDBMS Package:

1. Examples of NOS (Network Operating System) are
 1. Windows NT
 2. Novell NetWare
 3. Unix
 4. Linux
2. The features of NOS are
 1. Provide basic operating system features such as support for processors, protocols, automatic hardware detection and support multi-processing of applications
 2. Security features
 3. File, Print, Web services are available
 4. Support Internet working

3. Services offered by NOS are
 1. Authentication service
 2. Directory service
 3. DHCP (Dynamic Host Configuration Protocol) Service
 4. DNS Service (Domain Name System)
 5. e-mail service
 6. Network print service
 7. NFS (Network File System) service
4. In RDBMS the data is stored in the form of related tables.
5. A group of tables with related data in them is called a database
6. Normalizing is the process of organizing data into related tables. It's purpose is to eliminate redundant data
7. Rules for normalizing the data
 1. FNF (First Normal Form)
 2. SNF (Second Normal Form)
 3. TNF (Third Normal Form)
8. Examples of relational database objects
 1. Tables
 2. Columns
 3. Data types
 4. Stored procedures
 5. Functions
 6. Triggers
 7. Views
 8. Indexes
9. Database constraints are
 1. Unique
 2. Not Null
 3. Primary Key
 4. Foreign Key
 5. Check
10. SQL stands for Structured Query Language
11. SQL sentences are
 1. DDL (Data Definition Language)
 2. DML (Data Manipulation Language)
 3. DCL (Data Control Language)

3. IT Security Policy:

1. Steps required for information security
 1. Secure physical access
 2. Remove / stop unnecessary services
 3. Ensure perimeter security by installing Firewalls
 4. Ensure proper network administration
 5. Apply software patches in time
 6. Ensure an updated antivirus software
 7. Encrypt sensitive data
 8. Install IDS (Intrusion Detection System)

Mail your valuable Comments / Suggestions to nprabhakar@bsnl.co.in