

No. R&E/2-82/DR TTA/SRD/2010 dtd 27-08-2010

**BHARAT SANCHAR NIGAM LIMITED**  
(A Government of India Enterprise)  
O/o CGMT .KARNATAKA TELECOM CIRCLE, No.1, S V Road, Halasuru,  
Bangalore-560 008.

**Direct Recruitment of Telecom Technical Assistants (TTAs) under Special  
Recruitment Drive (SRD-2010) for SC and Persons with Disabilities (OC-PWD)**

**CLOSING DATE OF RECEIPT OF APPLICATION: 30.09.2010**

**EXAMINATION DATE: 19/12/2010 (SUNDAY)**

Bharat Sanchar Nigam Ltd. [BSNL], KARNATAKA.Telecom Circle will fill up about 08 [subject to variation depending on the availability of vacancies] backlog vacancies of Telecom Technical Assistants reserved for SC and Persons with Disabilities (OC-PWD) through an open Competitive Examination to be held on **19<sup>TH</sup> Dec. 2010 (SUNDAY)** in the following SSAs as per the details given below:-

SI No	Name of SSA Where Vacancy exists	Category wise break up of Vacancies					Address where application is to be submitted
		OBC	SC	ST	PWD IN OC	Total	
1	GMTD BELLARY		01				O/o GM, Bellary TD, BSNL, STATION ROAD. BELLARY-583101
2	TDM, BIDAR				01		O/o TDM, Bidar TD, BSNL Raghavendra Road Near Ranga mandir, BIDAR-585401
3	GMTD KOLAR				01		O/o GM, Kolar TD, BSNL, NEAR KSRTC Bus Stand, Antharanga Road, KOLAR-563 101
4	GMTD MADIKERI				03		O/o GM, Kodagu TD, BSNL, Padmavathi complex, Gowli Street, MADIKERI-571201
5	GMTD MANDYA				01		O/o GM, Mandya TD, BSNL.OPP TO KALAMANDIR, MANDYA-571401
6	GMTD SHIMOGA				01		O/o GM, Shimoga TD, BSNL Sagar Road (opp APMC) SHIMOGA-577201

In case of PH candidates, only such persons would be eligible for reservation in services/posts who suffer from not less than 40 percent of relevant disability. A person who wants to avail of benefit of reservation would have to submit a Disability Certificate issued by a competent authority in the format given in Annexure-A.

In respect of Physically Handicapped persons, candidates with following physical disability will be permitted:

**(i) For Hearing Impairment:**

Physical Requirements.	Category of the Disabled suitable for the Job.
(1) S-work performed by Sitting. (2) B-Work performed by Bending	(1) PD – Partially deaf.

**(ii) Locomotor disability:**

Physical Requirements	Category of the Disabled suitable for the Job.
(1) S-work performed by Sitting. (2) B-Work performed by Bending	(1) BL-Both Legs affected but not arms. (2) OL-One Leg affected (R or L).

**1. Scale of Pay:**

The Telecom Technical Assistant shall be appointed in the IDA pay scale of Rs.13600-25420 with annual increment @ 3% of basic pay. In addition, HRA, Perks, Medical Benefits, LTC etc. will be admissible as per company rules.

The emolument at the minimum of the pay scale will be around Rs.18360/- excluding HRA, perks, medical benefits, LTC etc.

**2. Jurisdiction:**

Normally selected candidates will be posted at the same SSA but under special circumstances they will be posted anywhere in Telecom Circle and anywhere in India under territorial/Army Act 1948.

**3. Eligibility**

**3.1. Nationality:** Only Indian Nationals would be eligible to apply.

**3.2. Educational Qualifications:**

The Applicant must possess, as on the closing date of receipt of applications from candidates, the educational qualifications in any of the following disciplines from a recognized Institute/University:

- a) Three Years Engineering Diploma in
  - Telecommunications Engineering
  - Electronics Engineering
  - Electrical Engineering
  - Radio Engineering
  - Computer Engineering
  - Instruments Technology
  - Information Technology.
  
- b) M.Sc. (Electronics) from a recognized institution/University.

Note 1:

- I. No equivalence in the Educational qualification is provided.
- II. Candidates possessing higher qualification in the eligible stream are allowed to appear in the examination.
- III. Candidates possessing Three year Diploma certificates are eligible to appear in the Exam irrespective of percentage of marks obtained by them.

Note 2:

The appearance of the candidates in the examination will be purely on a provisional basis and failure to produce the certificate as to the above qualification at the time of scrutiny of documents will make the candidate ineligible in the examination. No extension of time in this regard or any request for relaxation in qualification would be entertained under any circumstances.

**4. Age:**

- (a) The applicant should be between 18 to 27 years of age as on closing date of receipt of applications from candidates. However, this age is relaxable for following categories of applications:
  - (i) For Scheduled Castes up to 5 years
  - (ii) For PWD candidates up to 10 years for OC candidates,
- (b) For departmental candidates:
  - up to 40 years in respect of general candidates.
  - up to 45 years in respect of SC candidates in accordance with the instructions or orders issued by the Central Government.
- (c) For Residents of J&K – Relaxation shall be in accordance with DOP&T O.M.No. 15012/7/1991-Estt.(D) dtd. 6.12.2005 pertaining to “Residents of State of Jammu and Kashmir (Relaxation of Upper Age Limit for Recruitment to Central Civil Services & Posts) Rules 1997”.

**Note:** The date of birth entered in matriculation or Secondary School Leaving Certificate or in a certificate recognized by an Indian University as equivalent to Matriculation or in an extract from a Register of Matriculates maintained by a University which extract must be certified by the proper authority of the University or in the Higher Secondary or an equivalent examination certificate. The certificates are required to be submitted only at the time of appointment. No other document relating to age like horoscopes, affidavit, birth extracts from Municipal Corporation, Service records and the like will be accepted.

**5. Probation Period:** 2 years.

## 6. Bond & Training:

Selected candidates will have to sign a two years bond for the amount as decided by BSNL in favour of BSNL. Candidates must undergo the prescribed training of 10 weeks. During the training period they will get stipend of Rs. 4970+ IDA per month as per rule. Appointment orders will be issued after successful completion of Training and Medical fitness.

## 7. Syllabus & Question Paper :

(a) There shall be only one Paper of multiple choice objective type of three hours duration as per syllabus with the following details:

Part		Marks
Part- I	General Ability Test	20
Part- II	Basic Engineering	90
Part- III	Specialization	90

(b) Total number of Questions in the paper would be 200 and each question shall carry one mark.

(c) The standard of paper in General Ability test will be such as may be expected of an Engineering Diploma holder. The standard of papers in other subject will approximately be that of Diploma level of an Indian Polytechnic. In the Specialization Part-III, a candidate has to attempt a common set of questions from the consolidated syllabus prescribed under Specialization Part-III.

DETAILED SYLLABUS IS GIVEN IN ANNEXURE-C.

## 8. Minimum qualifying standards :

BSNL may fix at its discretion minimum qualifying marks for each part as well as in the aggregate. Candidates obtaining less than minimum-qualifying marks in any of the parts or in aggregate shall not be considered for inclusion in the merit-list.

BSNL reserves the right to change the number of vacancies of TTAs.

The appearance of the name in the merit-list does not confer any right on the candidate for employment. A final call letter/ appointment letter will be issued to the candidate after completion of all other formalities.

No request for revaluation of answer books shall be entertained under any circumstance.

## 9. Choice of Examination Centre

The examination centre will be intimated in due course. Candidates are requested to visit [www.karnataka.bsnl.co.in](http://www.karnataka.bsnl.co.in) for information from time to time.

## 10. Application form and Fee for examination

- (i) The specimen of the application form is included in this advertisement and the same can be filled up ON LINE. The same should be taken printout and submitted to the concerned SSA (District) along with all necessary documents.
- (ii) The completed application form should be sent by Registered post/Speed post or in person so as to reach on or before the closing date, 30/09/2010. The envelope containing application form should be marked “**Application for the post for TTA (SRD-2010) in BSNL \_\_\_\_\_ SSA**” in bold letters on the top of the envelope. Two identical Photos should be pasted on the space available for that purpose. One identical photo should be pinned along with the application. Candidates are requested to keep the original receipt obtained from post office in case of non-receipt of application by BSNL.
- (iii) Original advertisement or photocopy of the format in the advertisement published must not be used for applying and in case a candidate submits such an application the same will not be entertained.
- (iv) An applicant is allowed to appear for examination against the vacancy of one SSA only.
- (v) Selection will be through a competitive examination i.e. merit in SSA concerned followed by in medical test, pre-appointment formalities etc. Posting will be given subject to successful completion of training.

## 11. No Fee payable by SC and PH

Applicants belonging to SC and PH categories are exempted from the examination fee.

## 12. Closing date for receipt of Application Forms

- (i) Application forms complete in every respect must reach on or before **30-09-2010 to the concerned SSA.** Applications received after the closing date or incomplete in any respect shall be summarily rejected and no communication in respect of the rejected application forms shall be entertained.
- (ii) Any cutting or overwriting in any part of the application form will render it liable to be rejected. Candidates are, therefore, advised to take special care while filling the application form.
- (iii) The applicants would be admitted to the examination on the basis of the information furnished by them in their application form. They are, therefore, advised to ensure that they fulfill all eligibility conditions before applying. In case it is found at a later stage that the information furnished by an applicant is false or an applicant does not fulfill any of the eligibility conditions, the candidature of such applicants would be cancelled and no correspondence in this

regard would be entertained. Issuance of an admit card for the examination will NOT confer any right for appointment. Appointment will be solely subject to fulfillment of all eligibility conditions. The decision of BSNL in this regard shall be final & binding.

- (iv) BSNL will NOT be responsible for postal delay or loss of application in transit.

### **13. Travelling Allowance to SC candidates:**

The applicants belonging to SC categories will be entitled to T.A. as per provisions of Ministry of Finance (Deptt. of Expenditure) O.M. No.19014/3/77-E.IV (B) dated 17.02.1978. SC/ST candidates shall be eligible for Travelling Allowance by second class sleeper passenger train fare by the shortest route from the railway station nearest to their normal place of residence, or from which they actually performed the journey, whichever is nearer to the place of examination centre, and back to the same station provided the distance travelled by train each way exceeds 30 K.Ms. The candidates are required to produce the following documents on the exam date.

- (a) Filled up TA Forms in the format attached (Annexure-B)
- (b) Unemployment certificate issued by M.P./M.L.A. or Gazetted Officer of the place where the candidate normally resides;
- (c) Copy of Rail/Bus Ticket of the journey performed by the candidate.

### **14. Admit Cards:**

Admission card will be issued to eligible candidates by the concerned SSA through Registered Post, during 1<sup>st</sup> week of December 2010. Candidates can approach the concerned SSA where they have applied for duplicate admit cards, along with proof of sending the application like post office receipts, etc., during 15<sup>th</sup> and 18<sup>th</sup> of December 2010.

### **15 Disqualifications: No person**

15.1 Who has entered into or contracted a marriage with a person having a spouse living, or

15.2 who, having a spouse living, has entered into or contracted marriage with any person, shall be eligible for appointment to the post of TTA

Provided that BSNL may, if satisfied that such marriage is permissible under the personal law applicable to such person and the other party to the marriage and there are other grounds for so doing, exempt any person from the operation of this rule.

16. No request for withdrawal of candidature received from a candidate after he has submitted his application will be entertained under any circumstances. Any dispute regarding the recruitment will be subject to the Courts/Tribunals having jurisdiction over the place of concerned Circle office of BSNL from where the candidate is appearing in the examination.

**NOTE:**

1. Candidates in their interest are advised to refer to the BSNL circle website ([www.karnataka.bsnl.co.in](http://www.karnataka.bsnl.co.in)) from time to time for any further instruction/information.

2 For any Inquiry, the applicant may contact on telephone number 080-25574430/25301742 during office hours.

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## 13. Educational Qualification (Diploma in Engg &amp; Above).

Name of Engg Diploma/Degree with discipline	University/Institute	Month & Year of Passing	As per the Advertisement whether eligible (Yes/No)

## 14. Permanent Address (in capital letters)

Name:									
Father's/Husband's Name:									
Address:									
	<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>								
	:								
City	:								

Please affix one recent passport size Photograph <b>without</b> <b>attestation</b>
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**DECLARATION TO BE SIGNED BY THE APPLICANT**

I do hereby declare that all the statements made in the application are true, complete and correct to the best of my knowledge and belief. I understand that in the event of any particular information given above being found false or incorrect, my candidature for the post of Telecom Technical Assistant is liable to be rejected or cancelled and in the event of any mis-statement or discrepancy in the particulars being detected after my appointment, my services are liable to be terminated forthwith without any notice to me.

I also understand that if appointed, I would rank junior to any TTA who had been appointed earlier by the erstwhile DoT/DTS/DTO or BSNL or any other candidate who had already qualified in the TTA examination but not appointed as TTA by BSNL so far. Similarly, candidates of TTA examination held prior to my appointment will also rank en-bloc senior to me.

Place:

Date:

(Signature of the Applicant)

**Annexure-A**

**NAME & ADDRESS OF THE INSTITUTE/HOSPITAL**

Certificate No.....

Date.....

**DISABILITY CERTIFICATE**

Recent  
Photograph of the  
candidate showing  
the disability duly  
attested by the  
Chairperson of the  
Medical Board.

This is certified that Shri/Smt/Kum.....  
..... son/wife/daughter of  
Shri..... age.....sex.....  
identification marks(s) ..... is suffering from permanent disability  
of following category:

- A. Locomotors or cerebral palsy :
  - (i) BL – Both legs affected but not arms.
  - (ii) OL – One leg affected (right or left)
    - (a) Impaired reach
    - (b) Weakness of grip
    - (c) Ataxic
  - (iii) BH - Stiff back and hips (Cannot sit or stoop)
  - (iv) MW – Muscular weakness and limited physical endurance.
- B. Blindness or Low Vision: .
  - (i) B : Blind
  - (ii) PB: Partially Blind
- C. Hearing Impairment:
  - (i) D - Deaf
  - (ii) PD - Partially Deaf

**B-i & ii and C-i not applicable in BSNL**

(Delete the category whichever is not applicable)

- 2. This condition is progressive/non-progressive/likely to improve/ not likely to improve. Re-assessment of this case is not recommended/ is recommended after a period of \_\_\_\_\_ year's \_\_\_\_\_ months\*.
- 3. Percentage of disability in his/her case is ..... percent.
- 4. Sh./Smt./Kum. .... meets the following physical requirements for discharge of his/her duties:-
  - (i) F-can perform work by manipulating with fingers. Yes/No

- |        |  |        |
|--------|--|--------|
| (ii)   | PP-can perform work by pulling and pushing.    | Yes/No |
| (iii)  | L-can perform work by lifting.                 | Yes/No |
| (iv)   | KC-can perform work by kneeling and crouching. | Yes/No |
| (v)    | B-can perform work by bending.                 | Yes/No |
| (vi)   | S-can perform work by sitting.                 | Yes/No |
| (vii)  | ST-can perform work by standing.               | Yes/No |
| (viii) | W-can perform work by walking.                 | Yes/No |
| (ix)   | SE-can perform work by seeing.                 | Yes/No |
| (x)    | H-can perform work by hearing/speaking.        | Yes/No |
| (xi)   | RW-can perform work by reading and writing.    | Yes/No |

(Dr. _____) _____)	(Dr. _____)	(Dr. _____)
Member Medical Board	Member Medical Board	Chairperson Medical Board

Countersigned by the  
Medical superintendent/CMO/Head of  
Hospital (with seal)

**\*Strike out which is not applicable.**



(A Government of India Enterprise)

Office of Chief General Manager, Karnataka Telecom Circle

**ANNEXURE B**

**Form for reimbursement of Travelling Allowance in respect of SC candidates for attending Written Test Exam. for the post of TTA (SRD-2010) at ----- Centre.**

1. Name of Applicant :
2. Roll Number :
3. Whether SC  
(Attested photocopy of the certificate enclosed) :
4. Residential Address :  
(As given in Application Form)
5. Address from where journey has been performed :
6. Whether employed or not :
7. If employed, whether in Central/State Govt. or Central/State Govt. Corporation, Public Sector Undertaking. Private Sector etc :
8. Details of Journey and Rail/Bus fare etc :

Date of Journey	From	To	Mode of Journey	Class of Travel Bus/ Rail	Distance travelled (one side)	Ticket number	Fare (in Rs.)

**CERTIFIED THAT**

- a) I am unemployed and a certificate of Unemployment issued by MP/MLA or a Gazetted Officer of the place where I normally reside is enclosed.
- b) I have not claimed/will not claim T.A. for this journey from any other source.
- c) I have actually travelled by the shortest route and by the class/mode for which I have preferred the claim.
- d) I do hereby declare that all the statements made in the application are true, complete and correct to the best of my knowledge and belief. I understand that in the event of any particular information given above found false or incorrect, necessary action as deemed fit may be taken by BSNL.

Dated:

Signature of Applicant

Note: 1. Candidate will have to submit original ticket for inward journey. The payment will be made by BSNL through cheque.

**For use of BSNL**

Verified by

(Signature of Designated Officer of BSNL)

Admissible Amount Rs. \_\_\_\_\_

Signature of DDO

## SCHEME & SYLLABUS

FOR  
**TELECOM TECHNICAL ASSISTANTS ( TTA )**  
( DIRECT RECRUITMENT EXAMINATIONS )

The standard paper in General ability test will be such as may be expected of an Engineering Diploma holder. The standard of papers in other subjects will approximately be that of Diploma level of an Indian Polytechnic. There shall be a single multiple choice objective type Paper of 3 Hours duration as per details given below:

PAPER		MARKS	TIME ALLOWED
PART-I	GENERAL ABILITY TEST	20	3 Hours duration
PART-II	BASIC ENGINEERING	90	
PART-III	SPECIALIZATION	90	

Note-1: The candidate is required to obtain minimum qualifying marks in each of these parts as may be prescribed by the BSNL.

### DETAILED SYLLABUS :-

PART- I :- GENERAL ABILITY TEST : 20 MARKS

The candidate's comprehension and understanding of General English shall be tested through simple exercise, such as, provision of antonyms and synonyms, fill in the blanks and multiple-choice exercise, etc. This shall also include questions on current events, general knowledge and such matters of every day observation and experiences as may be expected of Diploma holder.

PART-II :- BASIC ENGINEERING : 90 MARKS

Detailed Syllabus is as under :

1	<b><u>APPLIED MATHEMATICS</u></b> :	Co-ordinate Geometry: Vector Algebra; Matrix and Determinant: Differential Calculus; Integral Calculus; Differential equation of second order: Fourier series; Laplace Transform; Complex Number; Partial Differentiation.
2	<b><u>APPLIED PHYSICS</u></b> :	Measurement – Units and Dimension; Waves, Acoustics, Ultrasonic; Light; Laser and its Applications, Atomic Structure and Energy Levels.

3	<b><u>BASIC ELECTRICITY :</u></b>	Electrostatics, Coulomb's Law, Electric field, Gauss's theorem, Concept of potential difference; Concept of capacitance and capacitors; Ohm's Law, Power and Energy, Kirchoff's voltage, current laws and their applications in simple DC circuits, Basic Magnetism; Electro Magnetism; Electromagnetic Induction; Concept of alternating voltage & current; Cells and Batteries; Voltage and Current Sources; Thevenin's theorem, Norton's theorem and their applications.
4	<b><u>ELECTRONICS DEVICES &amp; CIRCUITS :</u></b>	<p>Classification of materials into conductor, Semi Conductor, Insulator etc., electrical properties, magnetic materials, various types of relays, switches and connectors, Conventional representation of electric and electronic circuits elements. Active and passive components; semi conductor Physics; Semiconductor diode; Bipolar transistor &amp; their circuits; Transistor Biasing Stabilization of operating point; Single stage transistor amplifier; field effect transistor, Mosfet circuits applications</p> <p>Multistage Transistor Amplifier; Transistor Audio Power Amplifiers; Feedback in Amplifier; Sinusoidal Oscillators; Tuned Voltage Amplifiers; Opto Electronics Devices and their applications; Operational Amplifier; Wave shaping and switching circuits.</p> <p>Block diagram of I.C. Timer ( such as 555 ) and its working; Motivation circuits; Time Base circuits, Thyristory and UJT; Regulated Power Supply.</p>
5	<b><u>DIGITAL TECHNIQUES :</u></b>	Applications and advantages of digital systems; number system ( binary and hexadecimal); Logic Gates; Logic Simplification; Codes and Parity; Arithmetic Circuits; Decoders, Display Devices and Associated Circuits; Multiplexers and De-multiplexers; Latches and Flip Flops; Counters; Shift Registers; Memories; A/D and D/A converters.

**PART-III :- SPECIALIZATION :**

**90 MARKS**

Detailed Syllabus is as under :

<p><b>1</b></p>	<p><b><u>ELECTRICAL :</u></b></p>	<p>3 Phases vs. single-phase supply, Star Delta connections, relation between phase &amp; line voltage power factor and their measurements; construction and principles of working of various types of electrical measuring instruments.</p> <p>All types of motor and generator – AC &amp; DC transformers, starters, rectifiers, inverters, battery charges, batteries, servo and stepper motors, contactor control circuits, switchgear, relays, protection devices and schemes, substation, protective relaying, circuits breaker, generator protection , transformer protection, feeder &amp; lightning protection, feeder &amp; bus bar protection, lightning arrester, earthing, voltage stabilizer &amp; regulators, power control devices &amp; circuits, phase controlled rectifiers, inverters, choppers dual converters, cyclo-converters; power electronics application in control of drivers, refrigeration &amp; air-conditioning.</p>
<p><b>2</b></p>	<p><b><u>COMMUNICATION:</u></b></p>	<p>Modulation and demodulation- principles and operation of various types of AM, FM and PM modulators/demodulators; pulse modulation – TDM, PAM, PPM, PWM, Multiplexing, Principles and applications of PCM.</p> <p>Introduction of Basic block diagram of digital and data communication systems, Coding error detection and correction techniques; Digital Modulation Techniques – ASK, ICW, FSK, PSK; Characteristics / working of data transmission circuits; UART, USART; Modems; Protocols and their functions, brief idea of ISDN interfaces, local areas Network; Carrier Telephony – Features of carrier telephone system.</p> <p>Microwave Engineering; Microwave Devices; Wave-guides; Microwave Components; Microwave Antennas; Microwave Communication Systems – Block diagram &amp; working principal's of Microwave communication link.</p>

3	<b><u>NETWORK, FILTERS &amp; TRANSMISSION LINES:</u></b>	Two port network, Attenuators; Filters; Transmission Lines and their applications: Characteristic impedance of line; concept of reflection and standing waves on a transmission line; Transmission line equation; Principles of impedance matching; Bandwidth consideration of a transmission line.
4	<b><u>INSTRUMENTS &amp; MEASUREMENTS :</u></b>	<p>Specification of Instruments – accuracy, precision, sensitivity, resolution range, Errors in measurements and loading effect; principles of voltage, current and resistance measurements; Transducers, measurement of displacement &amp; strain, forces &amp; torque measuring devices, pressure measuring devices, flow measuring devices, power control devices &amp; circuits. Types of AC millivoltmeters – Amplifier rectifier and rectifier amplifier; Block diagram explanation of a basic CRO and a triggered sweep oscilloscope, front panel controls; impedance Bridges and Q-Meters.</p> <p>Principles of working and specifications of logic probes, signature analyzer and logic analyzer, signal generator, distortion factor meter, spectrum analyzer.</p>
5	<b><u>CONTROL SYSTEMS:</u></b>	<p>Basic elements of control system, open and closed loop system, concept of feedback. Block diagram of control system. Time lag, hysteresis, linearity concepts. Self-regulating and non-self regulating control systems. Transfer function of simple control components, single feedback configuration.</p> <p>Time Response of systems.</p> <p>Stability Analysis Characteristics equation, Routh's table, Nyquist criterion, Relative stability, Phase margin and gain margin.</p> <p>Routh Hurwitz criterion, root locus techniques, Bode plot, Power plot, Gain margin and phase margin.</p>

6	<b><u>MICROPROCESSORS:</u></b>	<p>Typical organization of a microcomputer system &amp; functions of its various blocks; Architecture of a Microprocessors; Memories and I/O Interfacing; Brief idea of M/C assembly languages, Machines &amp; Mnemonic codes; Instruction format and Addressing mode; concept of Instruction set; programming exercises in assembly language; concept of interrupt; Data transfer techniques – sync data transfer, interrupt driven data transfer, DMA, serial output data, serial input data.</p>
7	<b><u>COMPUTER:</u></b>	<p>Computer and its working, types of computers, familiarization with DOS &amp; Windows – concept of file, Directory, Folder, Number Systems, Data representation; Programming – Elements of a high level programming language, PASCAL, C: , Use of basic data structures; Fundamentals of computer architecture, Processor design, Control unit design; memory organization. I/o system organization. Microprocessors – Microprocessor architecture, instruction set and simple assembly level programming. Microprocessors based system design: typical examples. Personal computers and their typical uses, data communication principles, types and working principles of modems, Network principles, OSI model, functions of data link layer and network layer, networking components; communications protocols-X.25, TCP/IP.</p> <p><b>Database Management System</b> – Basic concepts, entity relationship model, relational model, DBMS based on relational model.</p>

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