

BHARAT SANCHAR NIGAM LIMITED

(A Government of India Enterprise)

Recruitment of Junior Telecom Officers(Telecom.), Junior Telecom Officers(Civil) and Junior Telecom Officers(Electrical)

(1-11/2008-Rectt.)

CLOSING DATE OF RECEIPT OF APPLICATION : 06.04.2009

EXAMINATION DATE : 21.06.2009

Bharat Sanchar Nigam Ltd. [BSNL] will recruit about **3945** [subject to variation depending on the availability of vacancies] Junior Telecom Officers through an open competitive examination to be held on **21.06.2009** on All India basis, as per the details given below:-

JTO(Telecom)	SC: 459	ST: 239	OBC: 989	OC: 1858	TOTAL: 3545
JTO(Civil)	SC:23	ST:16	OBC:69	OC:92	Total:200
JTO(Electrical)	SC:15	ST:30	OBC:55	OC:100	Total:200

3% of the total vacancy (1.5% for Locomotive and 1.5% for Hearing Impairment) will be reserved for PH quota.

Reservation as per Central Govt. guidelines will be applicable for SC/ST/OBC/Physically Handicapped [PH]. In respect of Physically Handicapped persons, candidates with following physical disability will be permitted:

- i. Hearing Impairment - Partially Deaf
- ii. Locomotive Impairment - one arm or one leg or both legs affected

(The minimum degree of disability is 40% in order for a person to be eligible for any concession/benefits)

1. Scale of Pay

The post of J.T.O. is in the IDA pay-scale of Rs. 9850-250-14600.

(The pay scale is likely to be revised upwards)

2. Selection for a Particular Circle & Service liability

The BSNL comprises a number of territorial Circles and functional Circles. The recruitment will be made centrally by BSNL and JTOs so recruited will be allotted territorial/functional Circles depending on vacancies, their choice and merit. A list of the existing territorial Circles, their respective headquarters etc., appears in *Annexure 'A'*.

The Junior Telecom Officer is a Circle-based Cadre and the candidates would be selected against the vacancies in a particular Circle and required to serve minimum of 5 years in that particular Circle only or until they are promoted to All India Cadre, whichever is earlier. However, the officers are liable to be transferred anywhere in India in the interest of service. Applicants shall have the option to be considered for a particular Circle [out of *Annexure 'A'* Circles] of his/her choice in order of preference given by him/her in the application for examination. Option once exercised shall be final. Change of Circle afterwards would not be allowed. The applicants should exercise their option very carefully and indicate their choice of Circles in order of their preference. Applicants may opt for 5 [Five] Circles in order of their preference from amongst the Circles at Annexure-'A'. If applicants have opted for 5 Circles in order of their preference then applicants shall give "Any where in India" as their sixth choice but if the number of Circles opted in order of their preference is less than 5 then one of option shall be "Any where in India". In case it is not possible to accommodate them in any of the Circles of their choice, they shall be posted to any of the Circles where vacancies are available.

A successful applicant will, however, get appointment in the Circle of choice strictly depending upon his/her position in the merit-list drawn on the basis of his/her performance in the All India competitive examination and the number of vacancies available in the Circles. In case an applicant does not indicate his/her preference of Circle, he/she will be allotted the Circle wherever the vacancies remain unfilled irrespective of his/her position in the merit-list solely as per requirements of BSNL.

The above notwithstanding, BSNL has, however, the right to post any selected J.T.O. to any of the Circles either temporarily or on permanent basis. The decision of BSNL in this regard shall be final and binding. The service conditions, seniority etc. of selected candidates will be determined as per prevailing rules of the Corporation from time to time.

3. Eligibility

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

3.2. Educational Qualifications:

3.2.1. JTO(Telecom)

Applicant must possess as on 31.12.2009, Bachelor of Engineering/Bachelor of Technology or equivalent Engineering degree in any of the following disciplines from a recognized engineering college/university:

- i. Telecommunication,
- ii. Electronics,
- iii. Radio,
- iv. Computer,
- v. Electrical.
- vi. Information Technology

Candidates appearing in the final year degree examination may also apply provided they possess the required educational qualification by 31.12.2009.

3.2.2. JTO(Civil)

Applicant must possess as on 31.12.2009, Bachelor of Engineering, Bachelor of Technology or equivalent in Civil Engineering from a recognized Institution/University.

Candidates appearing in the final year degree examination may also apply provided they possess the required educational qualification by 31.12.2009

3.2.3. JTO(Electrical)

Applicant must possess as on 31.12.2009, Bachelor of Engineering, Bachelor of Technology or equivalent in Electrical Engineering from a recognized Institution/University.

Candidates appearing in the final year degree examination may also apply provided they possess the required educational qualification by 31.12.2009

3.3 Age: **The applicant for JTOs(Telecom), JTOs(Civil) and JTOs(Electrical) should not be more than 30 years of age on the closing date for receipt of applications from candidates. However, this age is relaxable as per standing instructions on this subject for:-**

- i) Govt. servants upto 5 years in accordance with the instructions or orders issued by the Central Govt.;

- ii) BSNL employees upto 5 years in accordance with the instructions or orders issued by the BSNL;
- iii) For Scheduled Castes & Scheduled Tribes candidates upto 5 years;
- iv) For OBC Candidates upto 3 years;
- v) For General Category PH candidates upto 10 years ; (for SC/ST 15 years and for OBC 13 years)
- vi) For certain other categories like ex-servicemen, displaced persons from East Pakistan[now Bangladesh], repatriates from Burma and Ceylon [now Srilanka],residents of Goa, Daman & Diu, persons migrated from Kenya, Uganda, Republic of Tanzania as per instructions issued by the Central Government from time to time in this regard.
- (vii) For Residents of J&K – Relaxation shall be in accordance with DoP&T's Notification No.15012/7/1991-Estt.(D) dtd. 7.12.2007 pertaining to "Residents of State of Jammu and Kashmir (Relaxation of Upper Age Limit for Recruitment to Central Civil Services & Posts) Rules 1997".

3.4. Further in respect of apprentices who have undergone apprentice training in BSNL successfully, there will be following provision:-

- (a) An apprentice will be required to compete in the common competitive examination conducted by BSNL along with other direct candidates and preference to the apprentices over non-apprentices direct candidates will be given only if apprentices secures equal place in merit in select zone and all other eligibility conditions being equal.
- (b) The apprentices would not be required to get her/his name sponsored by any employment exchange.
- (c) The apprentices would be entitled to age relaxation to the extent of the period for which the apprentice had undergone training as apprentice in the BSNL.

4. Mode of selection and nature of Question Paper

The mode of selection is through an All India Competitive Examination. The examination will be of three hours duration with one Question Paper containing the following three sections:-

For JTOs(Telecom)

Section-I : Engineering stream : 50 questions

Section-II : Engineering stream : 50 questions

Section-III : General Ability Test : 20 questions

For JTOs(Electrical)

Section-I : Electrical Engineering stream : 50 questions

Section-II : Electrical Engineering stream: 50 questions

Section-III : General Awareness : 20 questions

For JTOs (Civil)

Section-I : Civil Engineering stream : 50 questions

Section-II : Civil Engineering stream : 50 questions

Section-III : General Ability Test : 20 questions

The Question Paper will be fully objective type with multiple options as answers to each question. The standard of paper in engineering subjects will be that of Engineering Examination of an Indian University.

However, there would be no separate time fixed for attempting the separate sections. Detailed syllabus for JTOs(Telecom), JTOs(Civil) and JTOs(Electrical) appear at Annexures 'B' , 'C' and 'D' respectively.

5. Minimum qualifying standards

BSNL shall fix minimum qualifying marks for OC/OBC/SC/ST/PH candidates for each section as well as in the aggregate. Candidates obtaining less than minimum-qualifying marks in any of the sections or in aggregate shall not be considered for inclusion in the merit-list. The merit-list will be drawn up on the basis of candidates' performance in the exam and the number of vacancies. The appearance of the name in the merit-list does not confer any right to the candidate for employment. A final call letter/appointment letter will be issued to the candidate after completion of all other formalities.

6. Choice of Examination Centre

Applicants are required to indicate their choice of Examination Centre [item 15] of application form] at which they wish to appear. An applicant can opt for any one of the examination centers out of the Circles indicated in the Annexure 'A' and submit the application form to the Office of the CGM of the Circle concerned at whose examination centre the applicant wishes to appear. (e.g. a candidate wishing to appear at Hyderabad centre should submit his/her application to the DGM/G.M.(Admn), Office of Chief General Manager, Andhra Pradesh). A list

of centers and the Deputy General Managers/General Managers to whom the application is to be submitted, is given in Annexure "A".

Admit cards will be issued to eligible applicants by the Office of the CGM concerned. The examination centre will be the Circle Headquarters city of the CGM concerned as given in Annexure 'A'.

7. Fee for examination and application form

The specimen of the application form is included in this advertisement. Neatly typed [only on one side of paper] copy in A4 size [30 cms. X 20 cms.] may be used for making application. The completed application form should be sent by Registered post to the CGM concerned. The envelope containing application form should be marked "Application for J.T.Os(Telecom) Examination-2008" **OR** "Application for J.T.Os (Civil) Examination-2008" **OR** "Application for J.T.Os(Electrical) Examination-2008", as the case may be, in bold letters on top of the envelope.

Original advertisement or photocopy of the format in the advertisement must not be used for applying and in case a candidate submits such an application the same will not be entertained. The given application format must be separately typed.

An examination fee of Rs.750/- (Rupees Seven Hundred and fifty only) is payable in the form of demand draft drawn in favour of Senior Accounts Officer/Accounts Officer payable at the respective stations as given in *Annexure 'A'*. The amount of fee shall not be accepted in any other form. Fees once paid shall NOT be refunded under any circumstances nor can it be held in reserve for any other examination or selection.

8. No Fee payable by SC/ST/PH

Applicants belonging to SC/ST/PH categories only are exempted from the examination fee. In the case of Physically handicapped candidates, this exemption will, however, be available to only those handicapped persons who would otherwise be eligible for appointment to the post on the basis of the standards of medical fitness prescribed for the post (including any concessions specifically extended to the physically handicapped) and who enclose with the application form, a necessary certificate from a Govt. Hospital/Medical Board in support of his claim for being handicapped.

9. Travelling Allowance to SC/ST Candidates

The applicants belonging to SC/ST 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) dtd. 17.02.1978.

10. Closing date for receipt of Application Forms

Application forms complete in every respect must reach on or before **06.04.2009**. Applications received after the closing date or not accompanied by the demand draft [wherever applicable] for the prescribed examination fee or incomplete in any respect shall be summarily rejected and no communication in respect of the rejected application forms shall be entertained. Fees paid shall also NOT be refunded. BSNL shall not be responsible for any postal delay.

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.

11. Training and Bond

All candidates provisionally recruited shall execute Bonds in the format specified by the BSNL indicating their willingness to serve the Circle allotted and Corporation for a period of at least 5 years from the date of their appointment as JTOs. All candidates shall, before their appointment as JTOs have to successfully undergo prescribed training as per the training plan laid down and amended by the Company from time to time.

12. List of enclosures

- a. Three identical passport size photographs out of which one should be pasted (not stapled or pinned) on the application form, duly attested, and the other two attached to the application (not to be pasted or attested)
- b. Two self addressed unstamped envelopes of 27 x 12 cms size
- c. Bank Draft for Rs.750/- (payable at par at the station of submitting the application) - [Not required for SC/ST/PH candidates]
- d. Medical certificate in respect of Physically Handicapped candidates

e. Certificate of Apprentice training if undertaken in BSNL successfully.

13. Any dispute in regard to the recruitment will be subject to the Courts/Tribunals having jurisdiction over the place of concerned Circle office of BSNL where the candidate submits his/her application.

9. Whether undergone Apprentice Training in BSNL successfully ? If so, enclose documentary proof :

10. Gender: [Male/Female]

11. Choice of Circle of allotment in order of preference.

[A candidate can choose upto a maximum of five Circles in order of preference. Sixth choice must be "Anywhere in India". If candidate chooses less than five Circles one of the choice must be written as "Anywhere in India"].

[Name of Circle]

i) Choice 1:

ii) Choice 2:

iii) Choice 3:

iv) Choice 4:

v) Choice 5:

vi) Choice 6:

12. a) Nationality :

b) Whether by birth / by domicile :

13. Marital status: [Married/Unmarried]

14. Details of Education/Technical qualifications

[Give details of Degrees obtained only of B.E./B.Tech & above]

14.1 Name of degree with discipline [BE/B. Tech & above]

14.2 Name of University/ Institute

14.3 Month and year of obtaining Engineering Degree

[Name of Circle]

15. Choice of Examination Centre :

[An applicant can opt for any of the examination centers out of the Circles indicated in Annexure 'A' and submit the application form to the Office of the CGM of the Circle concerned at whose examination centre the applicant wishes to appear]

16. Details of application fee particulars

16.1 Demand draft No. and Date :

Annexure-A

List of the Territorial Telecom Circles with the address to whom the applicants should send their completely filled up forms and in whose favour the Demand Draft should be drawn

(In case of any query/clarification, following Officers as at (3) may be contacted)

Sl.No (1)	Name of the Territorial Circle (2)	Address to whom the application is to be sent/Examination Centre City (3)	Demand Draft to be drawn in favour of (4)
1.	Andhra Pradesh	DGM (Admn), O/o the CGM Telecom, BSNL, Andhra Pradesh Telecom Circle, 2 nd floor, Doorsanchar Bhavan, Nampalli Station Road, Hyderabad – 500 001.	A. O.(Cash), BSNL, O/o the CGMT, A.P. Hyderabad
2.	Andaman & Nicobar	DGM (Admn.), O/o the CGM Telecom, BSNL, A&N Telecom Circle, Telephone Bhavan, Port Blair – 744 101.	A.O.(Cash)BSNL, A&N Telecom Circle, Port Blair
3.	Assam	DGM (Admn), O/o the CGM Telecom, BSNL, Assam Telecom Circle, Panbazar, Guwahati – 781 001.	Sr.Accounts Officer (A&P), O/o CGMT, BSNL, Assam Circle, Guwahati
4.	Bihar	DGM (Admn), O/o the CGM Telecom, BSNL, Bihar Telecom Circle, Sanchar Sadan, Patna – 800 001.	Accounts Officer(B&A), BSNL, O/o CGM, Bihar Telecom Circle, Sanchar Sadan, Patna – 800 001
5.	Calcutta Telephones District	DGM(Admn.), BSNL, Calcutta Telephones, 34, BBD Bag, Tel. Bhavan, 5th floor, Kolkata-700 001.	A.O., BSNL, Calcutta
6.	Chattisgarh	DGM (Admn), O/o CGM Telecom, BSNL, Chattisgarh Telecom Circle, Raipur – 492 001.	A.O.(A&B), BSNL, O/o CGMT, Raipur
7.	Chennai Telephone District	DGM (A), BSNL, Chennai Telephones, 89, Millers Road, Chennai-600 010.	Accounts Officer(C&A), HQ, BSNL, Chennai Telephones
8.	Gujarat	DGM (NC), O/o the CGM Telecom.	Sr.A.O.(Cash),

Sl.No (1)	Name of the Territorial Circle (2)	Address to whom the application is to be sent/Examination Centre City (3)	Demand Draft to be drawn in favour of (4)
		BSNL, Gujarat Telecom Circle, 6 th flr., Telephone Bhavan,C.G. Road, Navrangpura, Ahmedabad – 380 006.	O/o CGMT, Ahmedabad
9.	Haryana	GM (Admn), O/o the CGM Telecom, BSNL, Haryana Telecom Circle, 107, The Mall, Ambala Cantt-133 001.	A.O.(Cash), O/o CGMT, Haryana Circle, Ambala
10.	Himachal Pradesh	GM (Admn) O/o the CGM Telecom, BSNL, H.P. Telecom Circle, Block No.11, SDA Complex, Kasumpti, Shimla – 171 009.	A.O. (Cash), O/o CGMT, H.P. Circle, Shimla
11	Jammu & Kashmir	DGM (Planning), O/o the CGM Telecom., BSNL, J&K Telecom Circle, 4 th floor, North Block, Bahu Plaza, Rail Head Complex, Jammu – 180 012.	Accounts Officer(Cash), O/o CGM, BSNL J&K Circle, Jammu
12.	Jharkhand	DGM (Admn) O/o CGM Telecom, BSNL, Jharkhand Telecom Circle, 5 th floor, Telephone Bhavan, Saheed Chowk, Ranchi - 834 001	A.O.(B&A), O/o CGMT, Jharkhand Telecom Circle, Ranchi
13.	Karnataka	DGM (Staff/Exam), O/o the CGM Telecom, BSNL, Karnataka Telecom Circle, Doora Samparka Bhavan, No.1, Swamy Vivekananda Road, Halasuru, Bangalore-560 008.	Accounts Officer(Cash), O/o CGM Telecom, BSNL, Karnataka Circle, Bangalore – 560 008
14.	Kerala	DGM (Admn) O/o the CGM Telecom. BSNL, Kerala Telecom Circle, Thiruvananthapuram – 695 033.	Accounts Officer (Cash), O/o the CGMT, Kerala Circle, BSNL, Trivandrum– 695 033
15.	Madhya Pradesh	DGM (HRD), O/o the CGM Telecom. BSNL, M.P. Telecom Circle, BSNL Bhavan, 2 nd floor, Room No.213, Hoshangabad Road, Bhopal – 462 015.	Accounts Officer (A&B), O/o CGMT, Bhopal

Sl.No (1)	Name of the Territorial Circle (2)	Address to whom the application is to be sent/Examination Centre City (3)	Demand Draft to be drawn in favour of (4)
16.	Maharashtra	DGM (Admn), O/o the CGM Telecom, BSNL, Maharashtra Telecom Circle, Admn. Bldg., 3 rd floor, B-Wing, Juhu Road, Santacruz(West), Mumbai – 400 054.	Accounts Officer (F&A), BSNL, Maharashtra Telecom Circle, Mumbai 400 054
17.	Northern Telecom Region [New Delhi]	DGM (Admn), O/o the CGM (Mtce.), BSNL, Northern Telecom. Region, Kidwai Bhawan, Room No.257, IInd floor, Janpath, New Delhi-110 001.	A.O. (Cash) O/o CGM, NTR, New Delhi
18.	North East-I [Meghalaya, Mizoram & Tripura]	DGM (Admn), O/o the CGM Telecom, BSNL, N.E.-I Telecom Circle, Shillong-793 001.	AO (Cash), BSNL O/o the CGMT, N.E.-I Circle, Shillong-793 001
19.	North East-II [Arunachal Pradesh, Nagaland & Manipur]	DGM(Wireless) , O/o CGM Telecom, BSNL, N.E. – II Telecom Circle, OCB Telephone Exchange Building, Dimapur – 797 112.	Accounts Officer (Cash), O/o CGMT, NE-II Circle, Dimapur-797 112, Nagaland
20.	Orissa	DGM (Admn) O/o the CGM Telecom, BSNL, Orissa Telecom Circle, Bhubaneswar-751 001.	Sr. A.O. (A&P), O/o the CGM, BSNL, Orissa Telecom Circle, Bhubaneswar-751 001.
21.	Punjab	DGM (Admn.), O/o the CGM Telecom. BSNL, Punjab Telecom Circle, Sanchar Sadan, Plot No.2, Sector-34-A, Chandigarh – 160 022.	Accounts Officer (Cash), O/o CGMT, Punjab Circle Chandigarh
22.	Rajasthan	DGM (Admn), O/o CGM Telecom, BSNL, Rajasthan Telecom Circle, Sardar Patel Marg, 'C' Scheme, Jaipur – 302 008.	Accounts Officer (Cash), BSNL, O/o the CGMT Rajasthan Telecom. Circle, Jaipur
23.	Tamilnadu	DGM (Admn), O/o the CGM Telecom, BSNL, Tamilnadu Telecom Circle, Room No. 325, 80 Anna Salai, Chennai – 600 002.	Accounts Officer (Cash), BSNL, Tamilnadu Circle, Chennai - 600 002
24.	Uttar Pradesh	DGM (BD&Rectt.)	Sr.Accounts Officer

Sl.No (1)	Name of the Territorial Circle (2)	Address to whom the application is to be sent/Examination Centre City (3)	Demand Draft to be drawn in favour of (4)
	[East]	O/o the CGM Telecom, BSNL, UP (East) Telecom Circle, Hazratganj, Lucknow-226 001.	(Cash), O/o CGMT UP (East) Telecom Circle, Lucknow – 226 001
25.	Uttar Pradesh [West]	DGM (Admn.), O/o the CGM Telecom , BSNL, UP (West) Telecom Circle, Shastri Nagar Telephone Exchange, Tej Garhi Chauk, Meerut	A.O. (Cash), O/o CGMT UP (West) Telecom Circle, Meerut
26.	Uttaranchal	DGM (A&P) O/o CGM Telecom, BSNL, Uttaranchal Telecom Circle, Room No.411, 4 th floor, Windlass Complex, Rajpur Road Dehradun – 248 001.	A.O. (Cash), O/o CGMT UAL Telecom Circle, Dehradun
27.	West Bengal	DGM (Admn), O/o the CGM, Telecom. BSNL, West Bengal Telecom Circle, 1, Council House Street, 2nd floor, Kolkata – 700 001.	Sr. Accounts Officer (Cash), O/o the Chief General Manager, BSNL, West Bengal Telecom Circle, Kolkata

**Scheme and Syllabus for the Recruitment of
Junior Telecom Officers(Telecom)**

For Direct Recruitment of Junior Telecom Officers, an objective type Examination of 3 hours duration consisting of following sectional papers will be conducted:

SCHEME

- A. Engineering Stream Section - I
 - B. Engineering Stream Section - II
 - C. General Ability Test Section - III
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- 1. The standard of paper in Engineering subjects will be that of Engineering Degree Examination of an Indian University.
 - 2. In the general ability test, special attention will be paid to assess the candidate's capacity for general awareness. The standard of paper in general ability test will be such as may be expected of an Engineering Graduate.
 - 3. The syllabus for engineering stream papers will be as given below.

SYLLABUS**SECTION - I****1. Materials and components**

Structure and properties of Electronic Engineering materials, Conductors, Semiconductors and Insulators, Magnetic, Ferroelectric, Piezoelectric, Ceramic, Optical and Superconducting materials. Passive components and characteristics, Resistors, Capacitors and Inductors; Ferrites, Quartz crystal, Ceramic resonators, Electromagnetic and Electromechanical components.

2. Physical Electronics, Electron Devices and ICs

Electrons and holes in semiconductors, Carrier Statistics, Mechanics of current flow in a semi-conductor, Hall effect; Junction theory; Different types of diodes and their characteristics; Bipolar Junction transistor; Field effect transistors; Power switching devices like SCRs, CTOs, power MOSFETs; Basics of ICs-bipolar, MOS and CMOS types; Basics of Opto Electronics.

3. Network theory

Network analysis techniques: Network theorem, transient and steady state sinusoidal response, Transmission criteria: delay and rise time Elmore's and other definition, effect of cascading. Elements of network synthesis.

4. Electromagnetic Theory

Transmission lines: basic theory, standing waves, matching applications, microstrip lines; Basics of waveguides and resonators; Elements of antenna theory.

5. Electronic Measurements and instrumentation

Basic concepts, standards and error analysis; Measurements of basic electrical quantities and parameters; Electronic measuring instruments and their principles of working: analog and digital, comparison, characteristics, applications. Transducers; Electronic measurements of non-electrical quantities like temperature, pressure, humidity etc. Basics of telemetry for industrial use.

6. Power Electronics

Power Semiconductor devices, Thyristor, Power transistor, MOSFETs, Characteristics and operation. AC to DC convertors; 1-Phase and 3-phase DC to DC Convertors. AC regulators. Thyristor controlled reactors, switched capacitor networks. Inverters: Single-phase and 3-phase. Pulse width modulation. Sinusoidal modulation with uniform sampling. Switched mode power supplies.

SECTION-II

1. Analog Electronic Circuits

Transistor biasing and stabilization, Small Signal analysis. Power amplifiers. Frequency response, Wide band techniques, Feedback amplifiers. Tuned amplifiers. Oscillators. Rectifiers and power supplies. Operational Amplifier, other linear integrated circuits and applications. Pulse shaping circuits and waveform generators.

2. Digital Electronic Circuits

Transistor as a switching element; Boolean algebra, simplification of Boolean functions, Karnaugh Map and applications; IC Logic gates and their characteristics; IC logic families: DTL, TTL, ECL, NMOS, PMOS and CMOS gates and their comparison; Combinational logic circuits; Half adder, full adder; Digital Comparator; Multiplexer Demultiplexer; ROM and their applications. Flip-flops, R-S, J-K, D and T flip-flops; Different types of counters and registers; waveform generators. A/D and D/A convertors. Semiconductor memories.

3. Control Systems

Transient and steady state response of control systems; Effect of feedback on stability and sensitivity, Root locus techniques; Frequency response analysis. Concepts of gain and phase margins; Constant-M and Constant-N Nichol's Chart; Approximation of transient response from Constant-N Nichol's Chart; Approximation of transient response from closed loop frequency response; Design of Control Systems, Compensators; Industrial controllers.

4. Communication systems

Basic information theory: Modulation and detection in analogue and digital systems; Sampling and data reconstruction. Quantization & Coding; Time division and frequency division multiplexing; Equalisation; Optical Communication: in free space & fibre optic; Propagation of signals at HF, VHF, UHF and microwave frequency; Satellite communication.

5. Microwave Engineering

Microwave Tubes and solid state devices, Microwave generation and amplifiers, Waveguides and other Microwave Components and Circuits, Microstrip circuits, Microwave antennas, Microwave Measurements, MASERS LASERS; Microwave Propagation. Microwave Communication Systems-terrestrial and satellite based.

6. Computer Engineering

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. Personal computers and their typical uses.

7. Microprocessors

Microprocessor architecture - Instruction set and simple assembly language programming. Interfacing for memory and I/O. Applications of Microprocessors in Telecommunications and power system.

SECTION-III

General ability test

The candidate's comprehension and understanding of General English shall be tested through simple exercises. Questions on knowledge of current events and of such matter of everyday observation and experience in their scientific aspects as may be expected of an educated person. Questions will also be included on events and developments in Telecommunications, History of India and Geography. These will be of a nature, which can be answered without special study by an educated person.

**Scheme and Syllabus for the Recruitment of
Engineer Junior Telecom Officers(Civil)**

For Direct Recruitment of Junior Telecom Officer(Civil), an objective type Examination of 3 hours duration consisting of following sectional papers will be conducted:

SCHEME

- A. Civil Engineering Stream Section - I : 50 questions
- B. Civil Engineering Stream Section - II : 50 questions
- C. General Ability Test Section - III : 20 questions

1. The standard of paper in Engineering subjects will be that of Engineering Degree Examination of Indian University.
2. In the general ability test, special attention will be paid to assess the candidate's capacity for general awareness. The standard of paper in general ability test will be such as may be expected of an Engineering Graduate.
3. The syllabus for Civil Engineering stream paper will be as given below.

SYLLABUS:

SECTION-I - CIVIL ENGINEERING STREAM

1. BUILDING MATERIAL:

Timber: Different types and species of structural timber, density-moisture relationship, strength in different directions, defects, influence of defects on permissible stress, preservation, dry and wet rots, plywood, codal provision for design.

Bricks: Types, Indian standard classification, absorption, saturation factor, strength in masonry, influence of mortar strength and masonry strength.

Cement: Compounds, different types, setting times, strength.

Cement Mortar: Ingredients, proportions, water demands, mortar for plastering and masonry.

Concrete: Importance of W/C ratio, strength, ingredients including admixtures, workability, testing, elasticity, non-destructive testing mix design method.

2. SOLID MECHANICS

Elastic constants, stress, plane stress, Mohr's circle of stress, strains, plain strain, Mohr's circle of strain, combined stress. Elastic theories of Failure, simple and shear bending, Torsion of circular and rectangular section and simple members.

3. STRUCTURAL ANALYSIS

Analysis of determinate structures- different methods including graphical methods. Analysis of indeterminate skeletal frames- moment distribution, slope deflection, stiffness and force methods, energy methods. Muller-Breslau principal and application. Plastic analysis of indeterminate beams and simple frames-shape factors.

4. DESIGN OF STEEL STRUCTURES

Principle of working stress method. Design of connections of simple members. Built up sections and frames. Design of Industrial roofs. Principles of ultimate load design. Design of members and frames.

5. DESIGN OF CONCRETE AND MASONRY STRUCTURES.

Limit state design for bending, shear, axial compression and combined forces, Codal provisions for slabs, beams, walls and footings. Working stress method of design of R.C. members.

Principles of prestressed concrete design, material, method of prestressing losses. Design of simple members and determinates structures. Introductions to prestressing of indeterminate structures.

Design of brick masonry as per I.S. codes.

6. CONSTRUCTION PRACTICE, PLANNING AND MANAGEMENT.

Concreting Equipment:

Weight batcher, Mixer, vibrator, batching plant, concrete pump.

Cranes, hoists, lifting equipment.

Earthwork Equipment:

Power shovel, hoe, dozer, dumper, trailers and tractors, rollers, sheep foot rollers, pumps.

Construction, planning and Management:

Bar chart, linked bar chart, work break down structures, Activity-on-arrow diagrams.

Critical path, probabilistic activity durations; Event-based networks.

PERT network: Time-cost study, crashing; Resource allocation.

SECTION- II - CIVIL ENGINEERING STREAM

1. (a) FLUID MECHANICS, OPEN CHANNEL, PIPE FLOW:

Fluid properties, pressure, thrust, Buoyancy, Flow Kinematics, integration, of flow equation, Flow measurement, Relative motion, Moment of momentum, Viscosity, Boundary layer and control, Drag, Lift, Dimensional analysis, Modeling, Cavitations, Flow oscillations, Momentum and Energy principles, in open channel flow, Flow control, Hydraulic jump, Flow section and properties, Normal flow, Gradually varied flow, Flow development and losses in pipe flows, Measurements, Siphons, Surges and Water hammer, Delivery of Power Pipe networks.

(b) HYDRAULIC MACHINES AND HYDROPOWER

Centrifugal pumps, performance parameters, scaling, pumps in parallel, Reciprocating pumps, air vessels, performance parameters;

2. (a) HYDROLOGY:

Hydrological cycle, precipitation and related data analysis, PMP, unit and synthetic hydrographs, Evaporation and transpiration, floods and their management, PMG, Streams and their gauging, River morphology. Routing of floods, Capacity of reservoirs.

(b) WATER RESOURCES ENGINEERING:

Water resources of the globe: Multipurpose uses of Water, Soil Plant water relationships, irrigation systems, water demand assessment, Storage and their yields, ground water yield and well Hydraulics, Water logging, drainage design, Irrigation revenue, Design of rigid boundary canals, Lacey' and Tractive force concepts in canal design, lining of canals; Sediment transport in canals; Non-Overflow and overflow sections of gravity dams and their design, Energy dissipaters and tail water rating,

Design of head works, distribution work, falls, cross-drainage work, outlets, River training.

ENVIRONMENT ENGINEERING

3. (a) WATER SUPPLY ENGINEERING.

Sources of supply, yield, design of intakes and conductors, Estimation of demand, Water quality standards, Control of water born diseases. Primary and secondary treatment, detailing and maintenance of treatment units. Conveyance and distribution systems of treated water, leakage and control, Rural water supply, Institutional and Industrial water supply.

(b) WASTE WATER ENGINEERING

Urban rain water disposal, system of sewage collection and disposal, Design of sewers and sewerages systems, pumping, Characteristic of sewage and its treatment, Disposal of products of sewage treatment, stream flow rejuvenation, Institutional and industrial sewage management, plumbing system, Rural and semi-urban sanitation.

(c) SOLID WASTE MANAGEMENT

Sources, classification, collection and disposal, Design and Management of landfills.

(d) AIR AND NOISE POLLUTION AND ECOLOGY.

Sources and effects of air pollution, monitoring of Air pollution, Noise-pollution and standards; Ecological Chain and balance, Environmental assessment.

4. (a) SOIL MECHANICS

Properties of soils, classification and interrelationship, Compaction behavior, method of compaction and their choice, Permeability and seepage, flow nets, Inverter filters, Compressibility and consolidation, shearing resistance, stresses and failure, SO testing in laboratory and in-situ, Stress path and applications, Earth pressure theories, stress distribution in soil, soil exploration, samplers, load tests, penetration tests.

(b) FOUNDATION ENGINEERING

Type of foundations, Selection criteria, bearing capacity, settlement, laboratory and field test, Types of piles and their design and layout, Foundations on expansive soils, swelling and its prevention, foundation on swelling soils.

5. **(a) SURVEYING**

Classification of surveys, scales, accuracy, Measurement of distances-direct and indirect methods, optical and electronic devices, Measurement of directions, prismatic compass, local attraction, Theodolites-types Measurement of elevations, Spirit and trigonometric leveling, Relief representation, Contours, Digital elevation modeling concept, Establishment of control by triangulations and traversing measurements and adjustment of observations, computation of coordinates, Field astronomy, concept of global positioning system, Map preparation by plane tabling and by photogrammetry, Remote sensing concepts, map substitutes.

(b) TRANSPORTATION ENGINEERING

Planning of highway systems, alignment and geometric design, horizontal and vertical curves, grade separation, Materials and construction methods for different surfaces and maintenance, Principles of pavement design, Drainage.

Traffic surveys, intersections, signalling, Mass transit systems, accessibility, networking.

Planning of railway systems, terminology and designs, relating to gauge, track controls, transits, rolling stock, tractive power and track modernization, Maintenance Appurtenant works, Containerisation.

SECTION-III - GENERAL ABILITY TEST

The candidate's comprehension and understanding of general English shall be tested through simple exercises. Questions on knowledge of current events and of such matter of everyday observation and experience in their scientific aspects as may be expected of an educated person. Questions will also be included on events and developments in Tele Communications, History of India and Geography. These will be of a nature, which can be answered without special study by an educated person.

Scheme and Syllabus for the Recruitment of Junior Telecom Officers(Electrical)
Examination - 2008

SCHEME

For direct recruitment of JTOs(Electrical), an objective type examination of one paper of three hours duration consisting of following sections will be conducted :-

- Section-I : Electrical Engineering : 50 questions
- Section-II : Electrical Engineering : 50 questions
- Section-III : General Awareness : 20 questions

The questions will be so designed as to assess the ability of the candidates to apply their technical knowledge to the solution of the problems.

The syllabus for JTOs(Electrical) Paper will as given below.

SYLLABUS

SECTION-I - ELECTRICAL ENGINEERING

1. **EM Theory**

Electric and magnetic fields. Gauss's Law and Amperes Law. Fields in dielectrics, conductors and magnetic materials. Maxwell's equations. Time varying fields. Plane-Wave propagating in dielectric and conducting media. Transmission lines.

2. **Electrical Materials**

Band Theory, Conductors, Semi-conductors. and Insulators. Superconductivity. Insulators for electrical and electronic applications. Magnetic materials. Ferro and ferri magnetism. Ceramics, Properties and applications. Hall effect and its applications. Special semi conductors.

3. **Electrical Circuits**

Circuits elements. Kirchoff's Laws. Mesh and nodal analysis. Network Theorems and applications. Natural response and forced response. Transient response and steady state response for arbitrary inputs. Properties of networks in terms of poles and zeros. Transfer function. Resonant circuits. Three phase circuits. Two-port networks. Elements of two-element network synthesis.

4. **Measurements and Instrumentation**

Units and Standards. Error analysis, measurement of current, Voltage, power, Power-factor and energy. Indicating instruments. Measurement of resistance, inductance, Capacitance and frequency. Bridge measurements. Electronic measuring instruments. Digital Voltmeter and frequency counter. Transducers and their applications to the measurement of non-electrical quantities like temperature, pressure, flow-rate displacement, acceleration, noise level etc. Data acquisition systems. A/D and D/A converters.

5. **Control System**

Mathematical modelling of physical systems. Block diagrams and signal flow graphs and their reduction. Time domain and frequency domain analysis of linear dynamical system. Errors for different type of inputs and stability criteria for feedback systems. Stability analysis using Routh-Hurwitz array, Nyquist plot and Bode plot. Root locus and Nicols chart and the estimation of gain and phase margin. Basic concepts of compensator design. State variable matrix and its use in system modelling and design. Sampled data system and performance of such a system with the samples in the error channel. Stability of sampled data system. Elements of non-linear control analysis. Control system components, electromechanical, hydraulic, pneumatic components.

SECTION-II - ELECTRICAL ENGINEERING

1. **Electrical Machines and Power Transformers**

Magnetic Circuits - Analysis and Design of Power transformers. Construction and testing. Equivalent circuits. Losses and efficiency. Regulation. Auto-transformer, 3-phase transformer. Parallel operation.

Basic concepts in rotating machines. EMF, torque, basic machine types. Construction and operation, leakage losses and efficiency.

D.C. Machines. Construction, Excitation methods. Circuit models. Armature reaction and commutation. Characteristics and performance analysis. Generators and motors. Starting and speed control. Testing, Losses and efficiency.

Synchronous Machines. Construction. Circuit model. Operating characteristics and performance analysis. Synchronous reactance. Efficiency. Voltage regulation. Salient-pole machine, Parallel operation. . tiunting. Short circuit transients.

Induction Machines. Construction. Principle of operation. Rotating fields. Characteristics and performance analysis. Determination of circuit model. Circle diagram. Starting and speed control.

Fractional KW motors. Single-phase synchronous and induction motors.

2. **Power systems**

Types of Power Stations, Hydro, Thermal and Nuclear Stations. Pumped storage plants. Economics and operating factors.

Power transmission lines. Modeling and performance characteristics. Voltage control. Load flow studies. Optimal power system operation. Load frequency control. Symmetrical short circuit analysis. ZBus formulation. Symmetrical Components. Per Unit representation. Fault analysis. Transient and steady-state stability of power systems. Equal area criterion.

Power system Transients. Power system Protection Circuit breakers. Relays. HVDC transmission.

3. **Analog and Digital Electronics and Circuits**

Semiconductor device physics, PN junctions and transistors, circuit models and parameters, FET, Zener, tunnel, Schottky, photo diodes and their applications, rectifier circuits, voltage regulators and multipliers, switching behavior of diodes and transistors.

Small signal amplifiers, biasing circuits, frequency response and improvement, multistage amplifiers and feed-back amplifiers, D.C.

amplifiers, Oscillators. Large signal amplifiers, coupling methods, push pull amplifiers, operational amplifiers, wave shaping circuits. Multivibrators and flip-flops and their applications. Digital logic gate families, universal gates-combination circuits for arithmetic and logic operational, sequential logic circuits. Counters, registers, RAM and ROMs.

4. **Microprocessor**

Microprocessor architecture-Instruction set and simple assembly language programming. Interfacing for memory and I/O. Applications of Micro-processors in power system.

5. **Communication Systems**

Types of modulation; AM, FM and PM. Demodulators. Noise and bandwidth considerations. Digital communication systems. Pulse code modulation and demodulation. Elements of sound and vision broadcasting. Carrier communication. Frequency division and time division multiplexing, Telemetry system in power engineering.

6. **Power Electronics**

Power Semiconductor devices. Thyristor. Power transistor, GTOs and MOSFETS. Characteristics and operation. AC to DC Converters; 1phase and 3-phase DC to DC Converters; AC regulators. Thyristor controlled reactors; switched capacitor networks.

Inverters; single-phase and 3-phase. Pulse width modulation. Sinusoidal modulation with uniform sampling. Switched mode power supplies.

SECTION-III - GENERAL ABILITY TEST

The candidate's comprehension and understanding of general English shall be tested through simple exercises. Questions on knowledge of current events and of such matter of everyday observation and experience in their scientific aspects as may be expected of an educated person. Questions will also be included on events and developments in Tele Communications, History of India and Geography. These will be of a nature, which can be answered without special study by an educated person.