



भारत संचार निगम लिमिटेड  
(भारत सरकार का उपक्रम)  
BHARAT SANCHAR NIGAM LIMITED  
(A Govt. of India Enterprise)

No. 7-1/2016-Recctt.  
(RECRUITMENT BRANCH)

**RECRUITMENT FOR THE POSTS OF JUNIOR ENGINEER (JE), (ESRTWHILE TTA), IN  
BSNL FROM EXTERNAL CANDIDATES**

<b>STARTING OF ONLINE REGISTRATION OF APPLICATION</b>	:	<b>10-07-2016</b>
<b>LAST DATE OF ON LINE REGISTRATION</b>	:	<b>10-08-2016</b>
<b>DATE OF ONLINE TEST</b>	:	<b>25-09-2016</b>

Bharat Sanchar Nigam Ltd. (BSNL) will conduct ONLINE EXMINATION for filling up total about 2700 posts of **JUNIOR ENGINEER (JE)**, (erstwhile TTA). All candidates fulfilling the prescribed eligibility conditions and possessing qualification as detailed in **Annexure-A** herewith will be eligible to apply for the above said post.

The detailed number of vacancies in the cadre of Junior Engineer (JE), are as under :-

Sl. No.	Name of the Circle	OC	OBC	SC	ST	PWD	Total
1	Andaman & Nicobar	9	3	0	0	1	12
2	Andhra Pradesh	38	21	12	5	2	76
3	Assam	64	31	8	13	3	116
4	Bihar	20	9	5	0	2	34
5	Chennai Telephones	49	20	11	0	3	80
6	Chhattisgarh	9	1	2	5	1	17
7	Gujarat	105	56	14	31	6	206
8	Haryana	87	43	30	0	5	160
9	Himachal Pradesh	39	19	10	5	3	73
10	Jammu & Kashmir	48	15	7	9	2	79
11	Jharkhand	11	2	2	4	1	19
12	Karnataka	61	32	19	8	4	120
13	Kerala	50	36	13	1	3	100
14	Kolkata Telephones	66	0	10	4	5	80
15	Madhya Pradesh	39	12	12	15	3	78
16	Maharashtra	113	60	34	17	7	224
17	North East - I	79	2	13	38	7	132
18	North East - II	18	9	5	2	1	34
19	NTR	9	4	0	2	1	15
20	Odisha	23	5	6	9	2	43
21	Punjab	200	84	116	0	12	400
22	Rajasthan	56	20	14	10	5	100
23	Tamil Nadu	105	53	38	2	6	198
24	Uttar Pradesh (East)	43	21	16	0	2	80
25	Uttar Pradesh (West)	40	22	17	1	2	80
26	Uttaranchal	21	3	5	0	2	29
27	West Bengal	58	25	26	6	4	115
	<b>Total</b>	<b>1460</b>	<b>608</b>	<b>445</b>	<b>187</b>	<b>95</b>	<b>2700</b>

**Note :** The vacancies indicated above are tentative in nature and may subject to change.

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**1. Scale of Pay:-**

The Junior Engineer (JE) (erstwhile TTA,) shall be appointed in the IDA pay scale **Non-Executive-9 [NE-9]** of `13,600 - 25,420/- with annual increment @ 3% of basic pay plus IDA, HRA, Perks, Medical Benefits, etc. admissible as per BSNL Company rules.

**2. Selection for a Particular Circle & Service liability:-**

The BSNL comprises a number of territorial Circles and functional Circles. A list of the existing Territorial Circles along with their respective headquarters etc., appears in **Annexure 'B'**.

The Junior Engineer (JE) is a Circle-based Cadre and the candidates would be selected against the vacancies of a particular Circle. The first posting of the candidate shall be in the rural areas of the Circle for the minimum period of 5 (five) years. BSNL has the right to post any selected Junior Engineer (JE) 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 Company from time to time.

**The willing candidates shall have to give option for only one Circle, in which he/she desires to serve, consequent upon his/her selection. Option once exercised shall be final and under no circumstances, it will be changed.**

**3. Eligibility:-**

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

**3.2 Educational Qualifications:**

**Applicant must possess the educational qualifications as given in Annexure-A, on the closing date of application for Junior Engineer (erstwhile TTA), Exam in BSNL.**

**4. Age:-**

Candidate shall not be below 18 years and not exceed 30 years as on the last date of receipt of Online applications from the candidates (as on 10<sup>th</sup> August, 2016). However, the upper age limit is relaxable as per the standing instructions of Government of India for the following categories:-

- i. Upto five (5) years for SC/ST candidates
- ii. Upto three (3) years for OBC candidates
- iii. Upto ten (15) years for SC/ST-PWD candidates
- iv. Upto eight (13) years for OBC-PWD candidates
- v. Upto five (10) years for OC-PWD candidates
- vi. Upto five (5) years for BSNL employees
- vii. Ex-Servicemen will get the benefit of age relaxation as per Central Govt. Rules
- viii. For Residents of J & K – Relaxation shall be in accordance with DOP&T's Notification No. 15012/7/1991-Estt. (D) dated 07/12/2007 pertaining to "Residents of State of Jammu & Kashmir (Relaxation of Upper Age Limit for Recruitment to Central Civil Services & Posts) Rules 1997"

**Note :** In respect of PWD persons (3%), candidates with following disabilities will be permitted :-

Hearing Impairment (1.5%)	-	Partially deaf
Locomotor Impairment (1.5%)	-	One arm or one leg or both legs affected

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**Degree of Disability for PWDs :-** In case of PWD candidates, only such persons would be eligible for reservation in service/posts, who suffer from not less than 40 percent of relevant disability. Candidates would have to submit a Disability Certificate issued by a Competent Authority in the Annexure-C.

**(i) For Hearing Impairment :**

Physical Requirement	Category of the Disabled suitable for the job
S-Work performed by Sitting B-Work performed by Bending SE-Work performed by Seeing RW-Work performed by Reading & Writing	PD- Partially Deaf

**(ii) For Locomotor Impairment :**

Physical Requirement	Category of the Disabled suitable for the job
(1) S-Work performed by Sitting (2) B-Work performed by Bending (3) SE-Work performed by Seeing (4) RW-Work performed by Reading & Writing	(1) BL-Both Legs affected but not arms (2) OA-One Arm affected (R or L) (a) Impaired reach (b) Weakness of grip (c) Ataxic (3) OL-One Leg affected (R or L) (4) BH-Stiff Back and hips (cannot sit or stoop)

**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 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 document verification. No other document relating to age like horoscopes, affidavit, birth extracts from Municipal Corporation, Service records and the like will be accepted.

**5. Disqualifications:** No person

- (i) Who has entered into or contracted a marriage with a person having a spouse living, or
- (ii) Who, having a spouse living, has entered into or contracted marriage with any person; shall be eligible for appointment.

Provided that the Appointing Authority 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.

**6. Mode of selection and nature of Question Paper:**

The mode of selection is through an **All India Online Competitive Examination (May be in multiple session depending up on the number of candidates)**. The examination will consist of a single paper of three hours duration (per session in case of multiple sessions) having objective type multiple choice questions, which is to be conducted through online examination mode.

The list of the candidates, who have secured minimum qualifying marks as mentioned at Para 8 below, **would be displayed in BSNL Examination Website** after the All India Online Competitive Examination. Thereafter, **all such candidates are required to give their option for the Circle in which they desire to serve consequent upon their selection.** Thereafter, Circle-wise Merit List would be prepared for final selection of the candidates.

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## 7. Scheme of examination & Syllabus:

The pattern of the question paper will be multiple choice objective types with negative marking. All candidates will undergo a common multiple-choice type examination of three hours duration consisting of the following three parts :

Paper	Subjects	Number of Questions	Marks	Duration
Part - I	General Ability Test	20	20	3 hours 10.00 A.M. to 1.00 P.M.
Part - II	Basic Engineering	90	90	
Part-III	Specialization	90	90	
<b>Total</b>		<b>200</b>	<b>200</b>	

Syllabus for each of the three sections has been detailed in Annexure-D.

## 8. Minimum qualifying standards

**The minimum qualifying marks for each of the above three parts of the question paper will be 30% for candidates belonging to OC category and 20% for candidates belonging to SC/ST/OBC category. Further, the minimum qualifying marks in aggregate will be 40% for candidates belonging to OC category and 33% for candidates belonging to SC/ST/OBC category. Candidates obtaining less than minimum-qualifying marks in any of the three parts as well as in aggregate shall not be considered for inclusion in the merit-list.**

BSNL reserves the right to change the number of vacancies of Junior Engineer (JE), as per Circle's requirement.

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 re-evaluation of answer books shall be entertained under any circumstance.**

## 9. Bond and Training

- (i) The candidates selected shall execute a Bond in the format as specified by the Company to serve in BSNL for a **period of two years** from the date of their appointment as Junior Engineer (JE) (erstwhile TTA,) or for a period as specified by BSNL for the post from time to time.
- (ii) The candidates selected shall have to successfully undergo training as per the training plan laid down by the Company. If the official do not qualify the pre-appointment training in 1<sup>st</sup> attempt, he/she will be given one more chance to qualify the pre-appointment training examination, failing which he/she will not be appointed as Junior Engineer (JE) and his/her candidature/selection shall be cancelled.
- (iii) During the period of training, the Direct Recruited Junior Engineer (JE) will be entitled to Stipend (Training Allowance) as decided by the BSNL from time to time.

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## 10. Choice of Examination Centre

The Junior Engineer (JE) Exam will be held in **25** BSNL Territorial Circles only at their respective headquarters. The details of the Territorial Circle where the examination will be conducted are given in **Annexure-B**. The candidates may appear in the Online examination from any of the aforesaid Examination Centre, irrespective of their option for working in a particular Circle.

## 11. Online Application and Fee for examination:

Candidates applying for Junior Engineer (JE) posts are required to apply online for which link shall be provided through BSNL web site [www.externalexam.bsnl.co.in](http://www.externalexam.bsnl.co.in). Applications will be considered only through the online registration process which is to start from 10-07-2016 and will be closed on 10-08-2016. Therefore, candidates are advised to visit our web site ([www.bsnl.co.in/](http://www.bsnl.co.in/)) for any updates regarding Examination. All candidates applying for Junior Engineer (JE) posts are required to read all the instructions provided on website [www.externalexam.bsnl.co.in](http://www.externalexam.bsnl.co.in) before filling the online application form. Candidates will have to provide valid Email ID and Mobile Number at the time of online Registration.

### **Fee:-**

The prescribed examination fee Rs. **1000/-** (Rupees One Thousand only) for OC/OBC candidates and Rs. **500/-** (Rupees Five Hundred only) for SC/ST candidates shall be paid through online mode i.e. Internet Banking, Credit Card, Debit Card only.

**The amount of the fee shall not be accepted in any other form. Fee once paid shall NOT be refunded under any circumstances nor can be held in reserve for any other examination or selection or otherwise. Hence, the candidates are requested to ensure their eligibility for this Direct Recruitment of Junior Engineer examination before applying for the same.**

## 12. Closing date for receipt of Online Registration Forms

- (i) Registration forms complete in every respect must be submitted Online on or before 10-08-2016. Candidates are advised to complete their registration process well before last date to avoid last day. Registration process will not be allowed after last date and all incomplete registrations will be treated as rejected. Candidates will have to download their Admit Card from the BSNL website [www.bsnl.co.in](http://www.bsnl.co.in) / [www.externalexam.bsnl.co.in](http://www.externalexam.bsnl.co.in) at least before 5 days from the date of the Online Test by using their user name & password. **It will not be sent either by post or by e-mail.** BSNL shall not be responsible for server crash problems or delays occurring on last day of registration.
- (ii) The applicants would be admitted to the examination on the basis of the information furnished by them in their registration 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.

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### 13. Travelling Allowance

- 12.1 The candidates belonging to SC/ST categories will be entitled to TA as per provisions of Ministry of Finance (Department of Expenditure) O.M. No. 19014/3/77-E.IV (B) dated 17/02/1978, as amended from time to time.
- 12.2 The unemployed SC/ST candidates called for the Online Test shall be entitled for reimbursement of second class (Sleeper) rail fare from their place of residence to the nearest Examination Centre, **subject to production of valid ticket.**
- 12.3 The SC/ST candidates also have to produce a certificate of unemployment issued by MP/MLA or a designated Government Officer of the place where the candidate normally reside.
- 12.4 The form for reimbursement of TA in respect of SC/ST candidates for attending Online Test is given at **Annexure-E.**

14. No request for withdrawal of candidature received from a candidate will be entertained under any circumstances. Any dispute in regard to the recruitment will be subject to the Courts/Tribunals having jurisdiction at New Delhi.

15. BSNL reserves the right to modify/amend any of the terms & conditions of this recruitment at any point of time.

### 16. Disqualification

'Violation of any of the instructions issued along with the admission certificate or at any other stage will be liable the candidate to be disqualified in the examination.'

#### NOTE :

1. Candidates in their interest are advised to refer to the BSNL website ([www.bsnl.co.in](http://www.bsnl.co.in)) or examination website ([www.externalexam.bsnl.co.in](http://www.externalexam.bsnl.co.in)) from time to time for any further instruction/information.
2. For any query, the applicant may contact AGM (Rectt-I), BSNL Corporate Office, New Delhi at his Telephone No. 011-23352491 or 011-23765386 during office hours.

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**ESSENTIAL QUALIFICATIONS FOR JUNIOR ENGINEER (JE) ( ESRTWHILE TTA)  
CANDIATES**

<b>Name of the Post</b>	<b>Essential Qualification for External Candidates</b>
<b>Junior Engineer (Erstwhile TTA)</b>	<p>Three years Engineering Diploma/B. Tech/B.E. in any of the following disciplines :-</p> <ol style="list-style-type: none"><li>1. Telecommunications</li><li>2. Electronic</li><li>3. Electrical</li><li>4. Radio</li><li>5. Computer</li><li>6. Instrumentation</li><li>7. Information Technology</li></ol> <p>From a Central Govt./State Govt. recognized Institution</p> <p>Or</p> <p>B. Sc. (Electronics) /B. Sc. (Computer Science)</p> <p>Or</p> <p>M. Sc. (Electronics)</p> <p>From a recognized University incorporated by the Act of the Central or State Legislature in India or an Educational Institution established by an Act of Parliament or declared to be deemed as a University under Section 3 of the UGC Act 1956</p>

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**Annexure-B**

**List of the Examination Centres for the External Candidates of Junior Engineer (JE),  
Examination**

<b>Sr. No</b>	<b>Name of the BSNL Coordinating Circle authorized to coordinate for the Junior Engineer (JE) Exam (External) for Circles as mentioned</b>	<b>Name of Circles</b>	<b>Name of the Examination Centre</b>
1	Andhra Pradesh	Andhra Pradesh	Hyderabad
2	Andaman & Nicobar	Andaman & Nicobar	Port Blair
3	Assam	Assam	Guwahati
4	Bihar	Bihar	Patna
5	Chhattisgarh	Chhattisgarh	Raipur
6	Gujarat	Gujarat	Ahmedabad
7	Haryana	Haryana	Ambala
8	Himachal Pradesh	Himachal Pradesh	Shimla
9	Jammu & Kashmir	Jammu & Kashmir	Jammu
10	Jharkhand	Jharkhand	Ranchi
11	Karnataka	Karnataka	Bangalore
12	Kerala	Kerala	Thiruvananthapuram
13	Madhya Pradesh	Madhya Pradesh	Bhopal
14	Maharashtra	Maharashtra	Mumbai
15	Northern Telecom Region [New Delhi]	Northern Telecom Region [New Delhi]	New Delhi
16	North East – I	North East – I	Shiling
17	North East – II	North East – II	Dimapur
18	Odisha	Odisha	Bhubaneshwar
19	Punjab	Punjab	Chandigarh
20	Rajasthan	Rajasthan	Jaipur
21	Tamilnadu	Tamilnadu & Chennai Telecom. District	Chennai
22	Uttar Pradesh [East]	Uttar Pradesh [East]	Lucknow
23	Uttar Pradesh [West]	Uttar Pradesh [West]	Meerut
24	Uttranchal	Uttranchal	Dehradun
25	West Bengal	West Bengal & Kolkata Telecom. District	Kolkata

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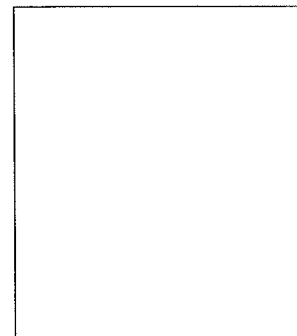


**NAME & ADDRESS OF THE INSTITUTE/HOSPITAL**

Certificate No. \_\_\_\_\_

Date : \_\_\_\_\_

**DISABILITY CERTIFICATE**



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

**A. Locomotor or cerebral palsy :**

- (i) BL-Both legs affected but not arms
- (ii) BA-Both arms affected
  - (a) Impaired reach
  - (b) Weakness of grip
- (iii) BLA-Both legs and both arms affected
- (iv) OL-One leg affected (right or left)
  - (a) Impaired reach
  - (b) Weakness of grip
  - (c) Ataxic
- (v) OA-One arm affected
  - (a) Impaired reach
  - (b) Weakness of grip
  - (c) Ataxic
- (vi) BH-Stiff back and hips (Cannot sit or stoop)
- (vii) MW-Muscular weakness and limited physical endurance

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B. Blindness or Low Vision : **(Not applicable in case of Junior Engineer Cadre in BSNL)**

- (i) B-Blind
- (ii) PB-Partially Blind

C. Hearing impairment :

- (i) D-Deaf
- (ii) PD-Partially Deaf

(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 \_\_\_\_\_ years \_\_\_\_\_ 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 \_\_\_\_\_)  
Member  
Medical Board

(Dr \_\_\_\_\_)  
Member  
Medical Board

(Dr \_\_\_\_\_)  
Chairperson  
Medical Board

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

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

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## SCHEME & SYLLABUS FOR TTA DIRECT RECRUITMENT EXAMINATION

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 subjects will approximately be that of Diploma level of an Indian Polytechnic. There shall be a single multiple choice objective type Paper of 3 hrs. duration as per details given below:

<u>Paper</u>	<u>Marks</u>	<u>Time allowed</u>
PART - I GENERAL ABILITY TEST	20	3 hrs.
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 everyday observation and experiences as may be expected of Diploma holder.

#### PART-II: BASIC ENGINEERING - 90 MARKS

Detailed Syllabus is as under:

- Applied mathematics: 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.
- Applied Physics: Measurement-Units and Dimension; Waves, Acoustics, Ultrasonic; Light; Laser and its Application, Atomic Structure and Energy Levels.
- Basic Electricity: 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.

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4. Electronics Devices and Circuits. Classification of materials into conductor, semi conductor, insulator etc, electrical properties, magnetic materials, various types of relays, switches and connectors, Conventional representation of electrical and electronic circuits elements. Active and passive components; semi conductor Physics; Semiconductor Diode; Bipolar transistor & their circuits; Transistor Biasing Stabilization of operating point; Single stage transistor amplifier; field effect transistor, Mosfet circuits applications.

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.

Block diagram of I.C. Timer (such as 555) and its working; Motivation Circuits; Time Base Circuits, Thyristory and UJT; Regulated Power Supply.

5. Digital Techniques: 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:-

#### 1. Electrical:

3 phases vs. single-phase supply, Star Delta connections, relation between phase & line voltage power factor and their measurements; construction and principles of working of various types of electrical measuring instruments. All types of motor and generator-AC & DC transformers, starters, rectifiers, inverters, battery charges, batteries, servo and stepper motors, contactor control circuits, switchgear, relays, protection devices & schemes, substation, protective relaying, circuits breaker, generator protection, transformer protection, feeder & lightning protection, feeder & bus bar protection, lightning arrestor, earthing, voltage stabilizer & regulators, power control devices & circuits, phase controlled rectifiers, inverters, choppers dual converters, cycloconverters; power electronics application in control of drivers, refrigeration & air-conditioning.

#### 2. Communication:

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.

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.

Microwave Engineering; Microwave Devices; Wave-guides; Microwave Components; Microwave Antennas; Microwave Communication Systems- Block diagram & working principal's of microwave communication link.

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### 3. Network, Filters and Transmission Lines:

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. Instruments and Measurements:

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 & strain, forces & torque measuring devices, pressure measuring devices, flow measuring devices, power control devices & circuits. Types of AC milli voltmeters- 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.

Principles of working and specifications of logic probes, signature analyzer and logic analyzer, signal generator, distortion factor meter, spectrum analyzer.

### 5. Control Systems:

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.

Time response of systems.

Stability Analysis. Characteristics equation, Routh's table, Nyquist criterion, Relative stability, phase margin and gain margin.

Routh Hurwitz criterion, root locus techniques, Bode plot, Power plot, Gain margin and phase margin.

### 6. Microprocessors:

Typical organization of a microcomputer system & functions of its various blocks; Architecture of a Microprocessors; Memories and I/O Interfacing; Brief Idea of M/C assembly languages, Machines & 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.

### 7. Computer:

Computer and its working, types of computers, familiarization with DOS and 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,

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OSI model, functions of data link layer and network layer, networking communications protocols - X.25, TCP/IP.

Database Management System - Basic concepts, entity relationship model, r model, DBMS based on relational model.

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**BHARAT SANCHAR NIGAM LTD**

(A GOVERNMENT OF INDIA ENTERPRISE)  
OFFICE OF CHIEF GENERAL MANAGER  
-----TELECOM CIRCLE

Form for reimbursement of Travelling Allowance in respect of SC/ST candidates for attending \_\_\_\_\_  
For the post of \_\_\_\_\_ held on \_\_\_\_\_ at \_\_\_\_\_ centre

1. Name of Applicant :
2. Roll Number :
3. Whether SC or ST  
(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**

- (i) 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.
- (ii) I have not claimed / will not claim T.A. for this journey from any other source.
- (iii) I have actually travelled by the shortest route and by the class/mode for which I have preferred the claim.
- (iv) 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.  
2. 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**

*ffaker*  
20/6

