

**BHARAT SANCHAR NIGAM LIMITED**

(A Government of India Enterprise)

Office of the Chief General Manager

M.P.Telecom Circle

Bhopal-462015

No.RE/11-01/JTO SRD/2011/04

Dated:-21.11.2011

**Recruitment of Junior Telecom Officers (Telecom/Civil) through Special Recruitment Drive(SRD) to fill up backlog vacancies reserved for Persons with Disabilities(PWD)**

**CLOSING DATE OF RECEIPT OF APPLICATION: 12.12.2011**

**EXAMINATION DATE: 19.02.2012**

Bharat Sanchar Nigam Ltd. [BSNL] will fill up about **06** [subject to variation depending on the availability of vacancies] backlog vacancies of Junior Telecom Officers reserved for Persons with Disabilities(PWD) through an open competitive examination to be held on **19.02.2012** as per the details given below:-

Number of vacancies	PWD(LI)	PWD(HI)	Total
JTO(Telecom)	01	04	05
JTO(Civil)	00	01	01

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

- Hearing Impairment (HI) - Partially Deaf
- Locomotive Impairment(LI) - one arm or one leg or both legs affected

**(Only such persons would be eligible for reservations/concessions/benefits who suffer from not less than 40% of relevant disability. The vacancies are interchangeable i.e. if vacancy of one category of disability remains unfilled, it may be filled by person of other category of disability)**

- 1. Scale of Pay:** The Junior Telecom Officer shall be appointed in the IDA pay scale of Rs 16400-40500 with annual increment @ 3% of basic pay plus HRA, Perks, Medical Benefits, LTC etc. as admissible as per company rules.

The emolument at the minimum of the pay scale will be around Rs 20, 500/- excluding HRA, perks, medical benefits, LTC etc.

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

The BSNL comprises a number of territorial Circles and functional Circles.

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, BSNL has 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 **31.12.2011**, 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,
- vii. Instrumentation.

Candidates appearing in the final year degree examination may also apply provided they possess the required educational qualification by **31.12.2011**.

##### **3.2.2. JTO(Civil)**

Applicant must possess as on **31.12.2011**, 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 **31.12.2011**.

**3.3(a) Age:** The external applicant for JTOs (Telecom), JTOs (Civil) should not be more than 30 years of age on the closing date for **receipt** of applications. However, the upper age-limit is relaxable as per standing instructions of Government of India on this subject for:-

- i) For PWD candidates upto 10 years for OC candidate; 15 years for SC/ST and 13 years for OBC
- ii) Ex-Service Men will get the benefit of age relaxation as per central government rules;
- iii) 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".

**3.3(b) i)** For BSNL employees the upper age-limit is relaxable by upto 5 years in accordance with the instructions or orders issued by the BSNL;

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

Note I: Candidates belonging to SC/ST/OBC who are also covered under any other clause of 3(a) above, viz those coming under the category of Ex-Servicemen, Persons domiciled in the state of J&K will be eligible for grant of cumulative age relaxation under both the categories. The candidates covered under clause 3(b) will get the maximum benefit that he or she will be getting under clause 3(a) or 3(b).

Note II: 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.

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 secure 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 (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) and JTOs (Civil) at Annexure 'A' and 'B' respectively.

## **5. Minimum qualifying standards**

BSNL may fix at its discretion minimum qualifying marks 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.

BSNL reserves the right to change the number of vacancies of Junior Telecom Officer in Telecom or Civil cadre.

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 reevaluation of answer books shall be entertained in any case or under any circumstances.

## **6. Choice of Examination Centre**

The examination centre will be at Bhopal, the Circle Headquarters city of the CGMT M.P. Circle. Examination centre may be shifted if required at the sole discretion of BSNL.

## **7. 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 along with the enclosures specified in para 11 of this advertisement, should be sent by Registered post to the following address on or before **12.12.2011**:

**The DGM (HR)  
O/o the CGM Telecom, BSNL,  
M.P. Telecom Circle,  
BSNL Bhawan, 2nd floor, Room No. 213, Hoshangabad Road,  
Bhopal-462015**

The envelope containing application form should be marked "Application for J.T.Os (Telecom) Examination-2011 for PWD" **OR** "Application for J.T.Os (Civil) Examination-2011 for PWD", 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.

## **8. No Fee payable by SC/ST/PWD**

Since the examination is exclusively for Persons with Disabilities (PWD), there will be no examination fees for such candidates. However, the disabled 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 disabled) and who enclose with the application form, a necessary certificate from a Govt. Hospital/Medical Board in support of his/her claim for being disabled.

## 9. Closing date for receipt of Application Forms

Application forms complete in every respect must reach on or before **12.12.2011**. 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. 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 fulfil 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 fulfil 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 fulfilment of all eligibility conditions.

## 10. 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.

## 11. 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. Medical certificate in respect of Physically Disabled candidates (Strictly as per **Annexure 'C'**)
- d. Certificate of Apprentice training if undertaken in BSNL successfully.
- e. In case of Govt. Service/Ex-servicemen certificate to be enclosed.

## 12 Disqualifications: No person

12.1 who has entered into or contracted a marriage with a person having a spouse living, or

12.2 who, having a spouse living, has entered into or contracted marriage with any person;

shall be eligible for appointment to the post of JTO :

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.

**13.** No request for withdrawal of candidature received from a candidate after he has submitted his application will be entertained under any circumstances. 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 appearing in the examination

**NOTE:**

1. Candidates in their interest are advised to refer to the MP BSNL website [www.mp.bsnl.co.in](http://www.mp.bsnl.co.in) from time to time for any further instruction/information.
2. For any Inquiry, the applicant may contact on telephone number 0755-2812237/2551508 during office hours i.e. 10 AM to 5.30 PM.
3. The application form of unsuccessful candidates and also that of ineligible candidates shall be retained for a period of three months from the date of declaration of the result.
4. After the examination is conducted, the Provisional Answer Keys of JTO SRD Exam of both the streams will be uploaded on the BSNL website [www.bsnl.co.in](http://www.bsnl.co.in) in order to bring transparency and invite comments, if any from the candidates by e-mail at E-mail Id [recttcell@bsnl.co.in](mailto:recttcell@bsnl.co.in) within a period of 10 days after uploading of Answer Keys. The provisional Answer Key will be finalised after considering the representation/feedback received.

Asstt. General Manager(HR)  
O/o CGMT,BSNL,  
M.P. Telecom Circle,  
Bhopal(M.P.)

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13. Educational Qualification (B.E./B. Tech & Above).

Name of Degree/ Course with stream	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 :	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Please affix one recent passport size Photograph <b>without</b> <b>attestation</b>
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15. Declaration to be given by OBC candidate only, eligible to avail reservation applicable to OBC:

I .....son/daughter of Shri  
 .....resident of  
 village/town/city.....District.....  
 .....State ..... hereby declare that I belong to the .....community which  
 is recognized as a backward class by the Government of India for the purpose of reservation in  
 services as per orders contained in Department of Personnel and Training Office Memorandum No.  
 36012/22/93-Estt.(SCT), dated 8.9.1993. It is also declared that I do not belong to persons/sections  
 (Creamy Layer) mentioned in column 3 of the Schedule to the above referred Office Memorandum  
 dated 8.9.1993 and amended vide OM No. 36033/3/2004-Estt.(Res.) Dated 14.10.2008.

**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 Junior Telecom Officer 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 am willing to serve anywhere in India. I agree BSNL has the right to post/transfer me to any part of the country at their discretion. I understand that if appointed I would have to serve the Circle allotted for the period of five years.

I also understand that if appointed, I would rank junior to any JTO who had been appointed earlier by the erstwhile DoT/DTS/DTO or BSNL or any other candidate who had already qualified in the JTO examination but not appointed as JTO by BSNL so far.

Place:

Date:

(Signature of the Applicant)

**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
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, Electronic 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 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. Rooting 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.

**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

(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.**