



राष्ट्रीय प्रौद्योगिकी संस्थान नागालैंड
NATIONAL INSTITUTE OF TECHNOLOGY NAGALAND
(An Institute of National Importance under Ministry of Education, Govt of India)
Chumukedima, Dimapur
Nagaland - 797 103

Advt. No. NIT-N/RECT-NT/2022/10

Date: 27/09/2022

INDICATIVE VACANCY NOTIFICATION FOR NON – TEACHING POSTS

National Institute of Technology Nagaland is one among 31 NITs established at Chumukedima, Nagaland by the Government of India by an Act of the Parliament offering UG, PG and Ph.D programs in Engineering / Technology and Sciences. The Institute invites applications from Indian Nationals possessing the requisite qualifications and experience as per the extant Recruitment Rules duly approved by the Ministry of Human Resources Development, Government of India for appointment to the following Non-Teaching (Administrative, Technical and Ministerial) posts on direct recruitment / deputation basis.

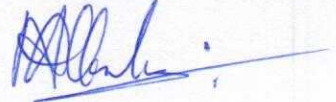
Sl.No	Name of the post	Discipline/ Trade/ Laboratory Trade	Pay Level and Entry pay as per 7 th CPC	Number of Post				
				UR	SC	ST	OBC	Total
1	Superintendent		Level 6 (Rs.35,400/-)	2	-	-	-	2
2	Stenographer		Level 4 (Rs. 25,500/-)	1	-	-	-	1
3	Junior Assistant		Level 3 (Rs. 21,700/-)	1	-	-	-	1
4	Technician	Electronics and Instrumentation Engineering Trade: Electrical / Electronics / Instrumentation.	Level 3 (Rs. 21,700/-)	1	-	-	-	1
5	Technical Assistant	Civil Engineering	Level 6 (Rs.35,400/-)	1	-	-	-	1
Mode of Appointments: On Direct Recruitment / Deputation basis as per NIT Recruitment Rules								


(REGISTRAR)

Registrar/कुलसचिव
National Institute of Technology,
राष्ट्रीय प्रौद्योगिकी संस्थान
Nagaland/नागालैंड

GENERAL INFORMATION

1. The application form must be submitted in the prescribed format as available in the Institute's Website. Application Form can be downloaded from the Institute website www.nitnagaland.ac.in.
2. Application must be sent in the prescribed format only through speed post/registered post to "**The Registrar, National Institute of Technology Nagaland, Chumukedima, Nagaland-797103**".
3. Internal candidates including contract/ outsourced staff can submit their application form in hand.
4. On the envelope please inscribe "Application for Recruitment for the post ofAdvt.No.....(please fill in name of post applied)"
5. Last date of receiving and submission of filled in application is **45 days from the date of publication of advertisement in the Employment News** and application received thereafter on account of what so ever reasons may be; shall not be entertained and no correspondence in this regard shall be entertained. However, if the above said last date is happened to be a General Holiday for the NIT Nagaland and for the Departments/ Offices of the State Government of Nagaland and Central Government in the State of Nagaland; the next working day is deemed to be the last date for the receipt of the application till 17:30 Hrs. on that day.
6. Applications sent through e-mail will not be entertained. NIT Nagaland shall not be held responsible for any delay in receipt of the application forms from the candidates.
7. The last date of application shall be considered for fixing any kind of eligibility criteria.
8. The Application Form should be enclosed with prescribed application fee of Rs.500/- (Five Hundred Only) for General/ OBC category in the form of Demand Draft/ Indian Postal Order in favour of **IRG, NIT Nagaland payable at State Bank of India, Chumukedima Branch, Dimapur**. However, SC/ST/ DIVYANG (PH) candidates are exempted from payment of the prescribed fees subject to submission of relevant certificate issued by the competent authority.
9. Internal candidates including contract / outsource are exempted from application fee. However, their application should be routed through proper channel well in time.
10. Candidate applying for more than one post should submit separate application forms for each post along with application Fee.
11. Government Rules and norms will be applicable for every post and category of the post. Candidates belonging to SC/ST/OBC/ DIVYANG (PH) categories should attach certificate from the competent authority. The category benefit will be given subject to candidate has claimed in the application form.
12. Mere fulfilment of the required qualifications and experience, does not entitle a candidate to be called for interview / selection. The Institute reserves the right to fix the criteria of shortlisting after scrutiny by duly constituted committee and their decision of the committee will be made applicable for mode of selection with the approval of the competent Authority.
13. For the post at Sl. No. 1, if the numbers of shortlisted applicants are more based on the data furnished by the candidates in the applications, a "Written Test" will be conducted for further shortlisting of the candidates for the final Selection Process including Interview by a Selection Committee.



14. For the posts at Sl. No. 2 to 5, both "Written Test" as well as "skill test" shall be conducted for selection of the suitable candidates.
15. Details of Pay, essential required Qualifications and Experience are given in the **Annexure - I**
16. The syllabus and mode of the examinations are given in the **Annexure - II**
17. The list of screened - in candidates will be made available on the website. Only the screened - in candidates will be allowed for Test/Interview and those candidates shall be communicated through e-mail or SMS.
18. Candidates in Govt./Semi-Govt./ reputed private institutions should send their applications through proper channel. However, an advance copy shall reach NIT Nagaland before the last date. Further, such candidates are required to produce "No Objection Certificate" at the time of interview from their employers, failing which they may not be considered for **written test**/ interview. It is the sole responsibility of the candidates to comply the above be it not communicated to the candidates while requisitioning them for attending the "Written Test for Screening" / Selection Process / test / Interview..
19. Experience of working in IITs/NITs/CFTIs will be a desirable qualifications.
20. One-Time Age relaxation shall be made applicable to the eligible departmental candidates including the employees working on outsourced basis in NIT Nagaland, in accordance with the communication of Ministry of Education, Government of India Ref. No. F.35- 5/2018-TS.III Dt. 20/2/2019.
21. Canvassing in any form will be a disqualification for the post.
22. Legal disputes, if any, with NIT Nagaland will be restricted within the jurisdiction of the Courts of Nagaland only.
23. TA/DA will not be paid for attending the interview.
24. The Institute reserves the right to defer or cancel the advertisement at any stage of processing without assigning any reasons, if required.
25. Self attested copies of the following documents must be attached along with application:
 - a) Reservation category certificate (if reservation/ fee concession claimed). For OBC candidates, OBC Status and Non-Creamy Layer Status duly issued by the competent authority on or after 1st April 2021
 - b) Certificates and marks sheet/grade card of all degrees, 10th and 12th standard
 - c) Experience certificate
 - d) Certificates of all other additional qualifications claimed, if any
 - e) Age Proof (HSLC/HSC or equivalent certificate issued by competent authority)
26. Claims of educational qualifications, experience or any other technical qualifications must be supported by relevant self attested certificates as well as mark sheets. Applications not supported by relevant documents shall be summarily rejected.
27. All Degree / diploma certificates should be from UGC recognized Universities/ Institutes which is the basic criteria for consideration.
28. Selected Candidates should be ready to join within the stipulated time.
29. Applications not submitted in prescribed format will not be considered.
30. It is desired that the applicants will provide correct information. If it is found, at a later date, that any information given in the application is incorrect / false or any information if suppressed, the candidature / appointment is liable to be cancelled / terminated without assigning any reason.



31. Notwithstanding anything contained in guideline recruitment rules, as communicated by Department of Higher Education, MHRD, Govt. of India vide letter No. F.35-5/2018 - TS.III, dated 4th April 2019 will be applicable. The candidates are advised to refer to all other related MHRD/ MoE notifications regarding, the Non-Teaching recruitment rules.
32. The RRs issued by MHRD is the guiding document and shall be relied upon for any case of discrepancies. In case of any change in the Recruitment Rules of Non-Faculty of NITs by MHRD in its Anomaly Report, the Institute may incorporate the changes during its recruitment process & notify the same on the Institute website.
33. Any addendum/corrigendum and related notifications will be published on the Institute website: www.nitnagaland.ac.in only. Applicants are advised to regularly check the Institute website for any update/notification.

Note:

Candidates belonging to OBC category shall also submit photocopy of non-creamy layer certificate of the year 2021-22 without which they will be considered only for OPEN category. The appointment under ST/SC/OBC quota is provisional and is subject to the community certificate being verified through the proper channels. If the verification reveals that the claim of the candidate belong to ST/SC/OBC is false, his/her services will be terminated forthwith without assigning any further reasons and without prejudice to such further action as may be taken under the provisions of Indian Penal Code for production of false certificates



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Annexure – I

DETAILS OF PAY, ESSENTIAL QUALIFICATIONS AND EXPERIENCE

Recruitment Rules (2019) for the post of SUPERINTENDENT in NITs

Sl.No.	Particular	Criteria
1.	Name of the Post	Superintendent
2.	Number of Post(s)	As per Sanctioned strength.
3.	Classification	Group B
4.	Scale of Pay (Grade Pay, Band Pay)	PB : 2 (Rs.9,300 - 34,800/-) with Grade Pay of Rs.4200/-
5.	Whether Selection Post or non-Selection Posts	Not Applicable
6.	Age limit for direct recruits	30 years. Note:- Relaxable for Departmental Candidates upto five years in accordance with the instructions or orders issued by the Central Government
7.	Educational and other qualifications required for direct recruits	<u>Essential:</u> i) First Class Bachelor's Degree or its equivalent from a recognized University or Institute in any discipline Or Master's Degree in any discipline from a recognized University or Institute with at least 50% marks or equivalent grade ii) Knowledge of Computer applications viz., Word processing, Spread Sheet.
8.	Whether age and educational qualifications prescribed for direct recruits will apply in the case of promotees	Age bar: Not applicable <u>Educational Qualification:</u> No, but must possess at least Bachelor's Degree or its equivalent from a recognized University or Institute in any discipline
9.	Period of probation, if any	1 year for direct recruits as per NIT Statutes
10.	Method of Recruitment whether by direct recruitment or by promotion or by deputation or transfer & percentage of the vacancies to be filled by various methods	75% by direct Recruitment 25% by promotion, failing which by deputation (including short term contract)
11.	In case of recruitment by promotion / deputation / transfer, grades from which promotion / deputation / transfer to be made	<u>Promotion:</u> Assistant (SG-I) with 2 years regular service with Grade Pay of Rs.4200/- through DPC and working performance record (APAR), through prescribed test and interview.

Sl.No.	Particular	Criteria
		Deputation (including short term Contract): Officers of the Central/State Govt. or similar organized services/semi-Govt./PSU/autonomous organization/ University/ Institute of national importance: a) i) holding analogous post; or ii) 2 years regular service with Grade Pay of Rs.4200/- as Assistant (SG-I) or its equivalent post. b) Possessing educational qualification as prescribed in Row 7.
12.	If DPC exists, what is its composition	As per provisions contained in the NITSER Act, 2007, First Statutes and the subsequent Statutes.
13.	Circumstances in which UPSC is to be consulted in making recruitment	Not Applicable

K. Raju



Recruitment Rules (2019) for the post of STENOGRAPHER in NITs

Sl.No.	Particular	Criteria
1.	Name of the Post	Stenographer
2.	Number of Post(s)	As per sanctioned strength.
3.	Classification	Group - C
4.	Scale of Pay (Grade Pay, Band Pay)	PB:1 (Rs.5,200-20,200) with Grade Pay of Rs.2400/-
5.	Whether Selection Post or non-Selection Posts	Not applicable
6.	Age limit for direct recruits	27 years
7.	Educational and other qualifications required for direct recruits	<p>Essential: Senior secondary (10+2) from a recognized board with minimum speed in short hand 80 w.p.m. in Stenography.</p> <p>Desirable: Proficiency in Computer Word processing and spread sheet with advance skills.</p>
8.	Whether age and educational qualifications prescribed for direct recruits will apply in the case of promotees	Not applicable
9.	Period of probation, if any	1 year for direct recruits as per NIT Statutes
10.	Method of Recruitment : whether by direct recruitment or by promotion or by deputation or transfer & percentage of the vacancies to be filled by various methods	100% Direct Recruitment.
11.	In case of recruitment by promotion / deputation / transfer, grades from which promotion / deputation / transfer to be made	Not Applicable
12.	If DPC exists, what is its composition	Not applicable.
13.	Circumstances in which UPSC is to be consulted in making recruitment	Not Applicable

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Recruitment Rules (2019) for the post of JUNIOR ASSISTANT in NITs

Sl.No.	Particular	Criteria
1.	Name of the Post	Junior Assistant
2.	Number of Post(s)	As per sanctioned strength.
3.	Classification	Group - C
4.	Scale of Pay (Grade Pay, Band Pay)	PB : 1 (Rs.5,200 - 20,200/-) with Grade Pay of Rs.2000/-
5.	Whether Selection Post or non-Selection Posts	Not Applicable
6.	Age limit for direct recruits	27 years Note:- Relaxable for Departmental Candidates upto five years in accordance with the instructions or orders issued by the Central Government
7.	Educational and other qualifications required for direct recruits	Senior secondary (10+2) from a recognized board with a minimum Typing speed of 35 w.p.m. and proficiency in Computer Word Processing and Spread Sheet. <u>Desirable:</u> Proficiency in other computer skills; stenography skills.
8.	Whether age and educational qualifications prescribed for direct recruits will apply in the case of promotes	Age bar: Not applicable Qualifications and Experience: No, but must possess at least 10+2 and having proficiency in Computer Word Processing.
9.	Period of probation, if any	1 Year for direct recruits as per NIT Statutes
10.	Method of Recruitment whether by direct recruitment or by promotion or by deputation or transfer & percentage of the vacancies to be filled by various methods	75% Direct recruitment. 25% by Promotion.
11.	In case of recruitment by promotion / deputation / transfer, grades from which promotion / deputation / transfer to be made	<u>Promotion:</u> Office Attendant (SG-II) with at least 2 years, regular service with Grade Pay of Rs.2000/- through DPC and working performance record (APAR), through prescribed test and interview.

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Sl.No.	Particular	Criteria
12.	If DPC exists, what is its composition	As per the provisions contained in the NITSER Act, 2007, First Statutes and the subsequent Statutes.
13.	Circumstances in which UPSC is to be consulted in making recruitment	Not Applicable

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Recruitment Rules (2019) for the post of TECHNICIAN

Sl.No.	Particular	Criteria
1.	Name of the Post	Technician
2.	Number of Post(s)	As per sanctioned strength.
3.	Classification	Group - C
4.	Scale of Pay (Grade Pay, Band Pay)	PB :1 (Rs.5,200 - 20,200/-) with Grade Pay of Rs.2000/-
5.	Whether Selection Post or non-Selection Posts	Not Applicable
6.	Age limit for direct recruits	27 years Note:- Relaxable for Departmental Candidates upto five years in accordance with the instructions or orders issued by the Central Government
7.	Educational and other qualifications required for direct recruits	Essential: Senior secondary (10+2) with Science from a Government recognized board with at least 60% marks Or Senior secondary (10+2) from a Government recognized board with at least 50% marks and ITI Course of one year or higher duration in appropriate trade. Or Secondary (10) with at least 60% marks and ITI Certificate of 2 years duration in appropriate trade. Or Diploma in Engineering of three year's duration in relevant field from a Government recognized Polytechnic / Institute.
8.	Whether age and educational qualifications prescribed for direct recruits will apply in the case of promotees	Age bar: Not applicable Educational Qualifications: No. However, must possess at least Senior Secondary with Science or Secondary and ITI certificate of 2 years duration in appropriate trade.
9.	Period of probation, if any	1 year for direct recruits as per NIT Statutes
10.	Method of Recruitment : whether by direct recruitment or by promotion or by deputation or transfer & percentage of the vacancies to be filled by various methods	i) 75% Direct recruitment ii) 25% by Promotion.

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Sl.No.	Particular	Criteria
11.	In case of recruitment by promotion/deputation/absorption, grades from which promotion/ deputation/ absorption to be made	<u>Promotion:</u> Lab Attendant (SG-II) with at least 2 years regular service with Grade Pay of Rs.2000/- through DPC and working performance record (APAR), through prescribed test and interview.
12.	If DPC exists, what is its composition	As per provisions contained in the NITSER Act, 2007, First Statutes and the subsequent Statutes.
13.	Circumstances in which UPSC is to be consulted in making recruitment	Not Applicable

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Recruitment Rules (2019) for the post of TECHNICAL ASSISTANT in NITs

Sl.No.	Particular	Criteria
1.	Name of the Post	Technical Assistant
2.	Number of Post(s)	As per sanctioned strength.
3.	Classification	Group - B
4.	Scale of Pay (Grade Pay, Band Pay)	PB -2 (Rs.9,300 - 34,800/-) with Grade Pay of Rs.4200/-
5.	Whether Selection Post or non-Selection Posts	Not Applicable
6.	Age limit for direct recruits	30 years. Note:- Relaxable for Departmental Candidates up to five years in accordance with the instructions or orders issued by the Central Government
7.	Educational and other qualifications required for direct recruits	Essential: First Class or equivalent Grade in B.E. / B.Tech. / MCA in relevant subject from a recognized University / Institute. Or First Class Diploma in Engineering in relevant Field with excellent academic record Or First Class Bachelor's Degree in Science from a recognized University or Institute Or Master's Degree in Science from a recognized University or Institute with at least 50% marks or equivalent grade
8.	Whether age and educational qualifications prescribed for direct recruits will apply in the case of promotees	Age bar: Not applicable Educational Qualification: No. However must possess any of the qualifications mentioned in Row 7 without insisting on percentage of marks/class.
9.	Period of probation, if any	1 Year for direct recruits as per NIT Statutes.
10.	Method of Recruitment whether by direct recruitment or by promotion or by deputation or transfer & percentage of the vacancies to be filled by various methods	75% by direct Recruitment 25% by Promotion, failing which by deputation (including short term contract).

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Sl.No.	Particular	Criteria
11.	In case of recruitment by promotion / deputation / transfer, grades from which promotion / deputation / transfer to be made	<p>Promotion: At least 2 Years regular service with Grade Pay of Rs.4200/- as Technician (Selection Grade-I) through DPC and working performance record (APAR), through prescribed test and interview.</p> <p>Deputation (including short term Contract): Officers of the Central/State Govt. or similar organized services/semi-Govt./PSU/ autonomous organization/ University/ Institute of national importance: a i) holding analogous post; or ii) 6 years regular service with Grade Pay of Rs.2800/- as Technician (SG-II) or its equivalent post. b) Possessing educational qualification as prescribed in Row 7.</p>
12.	If DPC exists, what is its composition	As per the provisions contained in the NITSER Act, 2007, First Statutes and the subsequent Statutes.
13.	Circumstances in which UPSC is to be consulted in making recruitment	Not Applicable

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Annexure – II

A. Syllabus for the Practical Examination and Written Examination for the Post of Superintendent:

i. Syllabus For Practical Examination

S. No.	Areas	Syllabus For Practical Examination
1	Computer operations	Operation of PCs and the associated devices and gadgets for performing regular office work as Superintendent.
2	Word Processing	Using Microsoft Word for the preparation of scientific manuscripts with tables, footnote, figures and equations – Basic level, header and Footer.
3	Spread Sheet	Using Microsoft Excel Spread Sheet for the preparation and analysis of Scientific data, Accounts application, Academic / Examination Section Applications; using of formulae and performing basic mathematical operations, sorting of data, etc., – Basic level

ii. Syllabus for the Theory (written) Examination:

General studies and current affairs: General Knowledge about India, North East and Nagaland; Current events of national and international importance; General issues on Environmental Ecology, Bio-diversity and Climate Change; Functioning of Government Organisations, Five Year Plans in India; Science & Technology in India.

English Language: English usage and grammar, Vocabulary and synonyms/ antonyms and Letter/ short essay/ noting & drafting and Precis writing and Comprehension at Senior Secondary (10 + 2) level.

Computer awareness: Basic knowledge of Computer Applications, MS Word, MS Excel, Power Point etc. Internet, e-mail, MS-DOS, Windows etc.

Qualitative aptitude: Areas and Volume; Averages; Heights and distances; L.C.M and H.C.F; Percentage; Points, lines and angles; Ratio and Proportions; Speed, Distance and Time; Time and Work. History, Geography, Accountancy, Economics and Science at Senior Secondary (10 + 2) level.

Government of India Rules and Procedures for Educational Institutions: Procedures followed in Central Government Educational Institutes, Government Offices, Rules and Regulations like Fundamental Rules and Supplementary Rules, General Financial Rules, Purchase Procedure, CCS (Conduct) Rules 1964, CCS (CCA) Rules 1965. Rules regarding: Leave, LTC, CPDA, NPS, Children Educational Allowance, HRA, Medical claim, ESI, TA, Retirement and Recruitment. Constitution and functioning of statutory bodies especially educational Institutions, Regulations for students, Scholarships and Sponsored Projects.

Management: Principle of Management, Human Behavior, Minimum Wages Act, First Aid, Time and Motion Study, Optimal utilization of resources. Management of Students Hostel, Strategy management



B. Syllabus for the Practical Examination and Written Examination for the Post of Stenographer

i. Syllabus for Practical Examination:

S. No.	Areas	Syllabus For Practical Examination
1	Computer operations	Operation of PCs and the associated devices and gadgets for performing office work.
2	Word Processing	Using Microsoft Word for the preparation of scientific manuscripts with tables, figures and equations – Advance level
3	Spread Sheet	Using Microsoft Excel Spread Sheet for the preparation and analysis of Scientific data, Accounts application, Academic / Examination Section Applications; using of formulae and performing basic mathematical operations, sorting of data, etc., – Advance level

ii. Syllabus for the Theory (written) Examination:

General studies and current affairs: General Knowledge about India, North East and Nagaland; Current events of national and international importance; General issues on Environmental Ecology, Bio-diversity and Climate Change; Five Year Plans in India; Science & Technology in India.

English Language: English usage and grammar, Vocabulary and synonyms/ antonyms and Letter/ short essay/ noting & drafting and Precis writing and Comprehension at Senior Secondary (10 + 2) level.

Computer awareness: Basic knowledge of Computer Applications, MS Word, MS Excel, Power Point etc. Internet, MS-DOS, Windows

Qualitative aptitude: Areas and Volume; Averages; Heights and distances; L.C.M and H.C.F; Percentage; Points, lines and angles; Ratio and Proportions; Speed, Distance and Time; Time and Work. History, Geography, Accountancy, Economics and Science at Senior Secondary (10 + 2) level.



C. Syllabus for the Practical Examination and Written Examination for the Post of Junior Assistant

i. Syllabus for Practical Examination:

S. No.	Areas	Syllabus For Practical Examination
1	Computer operations	Operation of PCs and the associated devices and gadgets for performing office work.
2	Word Processing	Using Microsoft Word for the preparation of scientific manuscripts with tables, footnote, figures and equations – Basic level
3	Spread Sheet	Using Microsoft Excel Spread Sheet for the preparation and analysis of Scientific data, Accounts application, Academic / Examination Section Applications; using of formulae and performing basic mathematical operations, sorting of data, etc., – Basic level

ii. Syllabus for the Theory (written) Examination:

General studies and current affairs: General Knowledge about India, North East and Nagaland; Current events of national and international importance; General issues on Environmental Ecology, Bio-diversity and Climate Change; Functioning of Government Organisations, Five Year Plans in India; Science & Technology in India.

English Language: English usage and grammar, Vocabulary and synonyms/ antonyms and Letter/ short essay/ noting & drafting and Precis writing and Comprehension at Senior Secondary (10 + 2) level.

Computer awareness: Basic knowledge of Computer Applications, MS Word, MS Excel, Power Point etc. Internet, e-mail, MS-DOS, Windows etc.

Qualitative aptitude: Areas and Volume; Averages; Heights and distances; L.C.M and H.C.F; Percentage; Points, lines and angles; Ratio and Proportions; Speed, Distance and Time; Time and Work. History, Geography, Accountancy, Economics and Science at Senior Secondary (10 + 2) level



D. Syllabus for the Practical Examination and Written Examination for the Post of Technician - Electronics and Instrumentation Engineering

i. Syllabus for Practical Examination / Laboratory Experiments/Procedure:

Senior secondary (10+2)/ ITI/ Diploma in Engineering level in Electronics and Instrumentation Engineering and allied areas of Electronics and Instrumentation Engineering

ii. Syllabus for the Theory Examinations (Written):

Electricity, Circuits and Machines

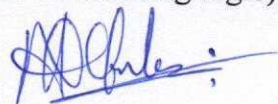
Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

Voltage and current sources - independent, dependent, ideal and practical; v-i relationships of resistor, inductor, mutual inductance and capacitor; transient analysis of RLC circuits with dc excitation. Kirchoff's laws, mesh and nodal analysis, superposition, Thevenin, Norton, maximum power transfer and reciprocity theorems. Peak-, average- and rms values of ac quantities; apparent-, active- and reactive powers; phasor analysis, impedance and admittance; series and parallel resonance, locus diagrams, realization of basic filters with R, L and C elements. transient analysis of RLC circuits with ac excitation. One-port and two-port networks, driving point impedance and admittance, open-, and short circuit parameters.

Single phase transformer - equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor tests, equivalent circuit, starting and speed control; Types of losses and efficiency calculations of electric machines.

Analog and Digital Electronics

Characteristics and applications of diode, Zener diode, BJT and MOSFET; small signal analysis of transistor circuits, feedback amplifiers. Characteristics of ideal and practical operational amplifiers; applications of opamps: adder, subtractor, integrator, differentiator, difference amplifier, instrumentation amplifier, precision rectifier, active filters, oscillators, signal generators, voltage controlled oscillators and phase locked loop, sources and effects of noise and interference in electronic circuits. Combinational logic circuits, minimization of Boolean functions. IC families: TTL and CMOS. Arithmetic circuits, comparators, Schmitt trigger, multi-vibrators, sequential circuits, flipflops, shift registers, timers and counters; sample-and-hold circuit, multiplexer, analog-to-digital (successive approximation, integrating, flash and sigma-delta) and digital-to-analog converters (weighted R, R- 2R ladder and current steering logic).



Characteristics of ADC and DAC (resolution, quantization, significant bits, conversion/settling time); basics of number systems, Embedded Systems: Microprocessor and microcontroller applications, memory and input-output interfacing; basics of data acquisition systems, basics of distributed control systems (DCS) and programmable logic controllers (PLC).

Measurements

SI units, standards (R,L,C, voltage, current and frequency), systematic and random errors in measurement, expression of uncertainty - accuracy and precision, propagation of errors, linear and weighted regression. Bridges: Wheatstone, Kelvin, Megohm, Maxwell, Anderson, Schering and Wien for measurement of R, L, C and frequency, Q-meter. Measurement of voltage, current and power in single and three phase circuits; ac and dc current probes; true rms meters, voltage and current scaling, instrument transformers, timer/counter, time, phase and frequency measurements, digital voltmeter, digital multimeter; oscilloscope, shielding and grounding.

Sensors and Industrial Instrumentation

Resistive-, capacitive-, inductive-, piezoelectric-, Hall effect sensors and associated signal conditioning circuits; transducers for industrial instrumentation: displacement (linear and angular), velocity, acceleration, force, torque, vibration, shock, pressure (including low pressure), flow (variable head, variable area, electromagnetic, ultrasonic, turbine and open channel flow meters) temperature (thermocouple, bolometer, RTD (3/4 wire), thermistor, pyrometer and semiconductor); liquid level, conductivity and viscosity measurement.



E. Syllabus for the Written Examination for the Post of Technical Assistant – Civil Engineering

i. Syllabus for the Theory Examinations (Written):

Building Materials: Physical and chemical properties, classification, standard tests, uses and manufacture/quarrying of materials e.g. building stones, silicate based materials, cement (Portland), asbestos products, steel, timber and wood based products, laminates, bituminous materials, paints, varnishes.

Estimating, Costing and Valuation: preparation of estimate, dictionary of technical terms, analysis of rates, methods and unit of measurement, Items of work – earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Painting, Flooring, Plastering. Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezoidal formula, etc. Cost estimate of Septic tank, flexible pavements, Tube well, isolates and combined footings, Steel Truss, Piles and pile-caps. Valuation – Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

Surveying: Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, Tacheometric, theodolite traversing, adjustment of theodolite, Levelling, Definition of terms used in levelling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipment, Total station.

Concrete Technology: Properties, Advantages, Tests and uses of concrete, cement aggregates (Coarse and Fine), steel, bricks, importance of water quality, water cement ratio, workability, mix proportioning (design), storage, batching, mixing, placement, compaction, finishing and curing of concrete, quality control of concrete, hot weather and cold weather concreting, repair and maintenance of concrete structures, Non-Destructive Testing.

Geotechnical Engineering: Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses. Index properties of soils, Atterberg's limits, ISI soil classification and plasticity chart. Permeability of soil, coefficient of permeability, determination of coefficient of permeability, Unconfined and confined aquifers, effective stress, quicksand phenomenon, consolidation of soils, Principles of consolidation, degree of consolidation, pre-consolidation pressure, normally consolidated soil, e-log p curve, computation of ultimate settlement. Shear strength of soils, direct shear test, Vane shear test, Triaxial test. Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, standard penetration test.



Hydraulic Engineering: Fluid properties, hydrostatics, measurements of flow, Bernoulli's theorem and its application, flow through pipes, flow in open channels, weirs, flumes, spillways, pumps and turbines. Understanding flow measurement in a pipe flow, energy loss in pipe flow characteristics of turbines characteristics of pumps discharge in open channel flow & fluid properties.

Irrigation Engineering: Definition, necessity, benefits, 2II effects of irrigation, types and methods of irrigation, Hydrology - Measurement of rainfall, run off coefficient, rain gauge, losses from precipitation - evaporation, infiltration, etc. Water requirement of crops, duty, delta and base period, Kharif and Rabi Crops, Command area, Time factor, Crop ratio, Overlap allowance, Irrigation efficiencies. Different type of canals, types of canal irrigation, loss of water in canals. Canal lining - types and advantages. Shallow and deep to wells, yield from a well. Weir and barrage, Failure of weirs and permeable foundation, Slit and Scour, Kennedy's theory of critical velocity. Lacey's theory of uniform flow. Definition of flood causes and effects, methods of flood control, water logging, preventive measure. Land reclamation, Characteristics of affecting fertility of soils, purposes, methods, description of land and reclamation processes. Major irrigation projects in India.

Transportation Engineering: Highway Engineering - cross sectional elements, geometric design, types of pavements, characterization, properties and testing of pavement materials - aggregates and bitumen, different tests, Design of flexible and rigid pavements - Water Bound Macadam (WBM) and Wet Mix Macadam (WMM), Gravel Road, Bituminous construction, Rigid pavement joint, pavement maintenance, Highway drainage, Railway Engineering- Components of permanent way - sleepers, ballast, fixtures and fastening, track geometry, points and crossings, track junction, stations and yards. Traffic Engineering - Different traffic survey, speed-flow-density and their interrelationships, intersections and interchanges, traffic signals, traffic operation, traffic signs and markings, road safety.

Environmental Engineering: Quality of water, source of water supply, purification of water, distribution of water, need of sanitation, sewerage systems, circular sewer, oval sewer, sewer appurtenances, sewage treatments. Surface water drainage. Solid waste management - types, effects, engineered management system. Air pollution - pollutants, causes, effects, control. Noise pollution - cause, health effects, control. Study of micro-organisms and its quantification.

Structural Engineering: Elasticity constants, types of beams - determinate and indeterminate, bending moment and shear force diagrams of simply supported, cantilever and over hanging beams. Moment of area and moment of inertia for rectangular & circular sections, bending moment and shear stress for tee, channel and compound sections, chimneys, dams and retaining walls, eccentric loads, slope deflection of simply supported and cantilever beams, critical load and columns, Torsion of circular section.



RCC Design: RCC beams-flexural strength, shear strength, bond strength, design of singly reinforced and double reinforced beams, cantilever beams. T-beams, lintels. One way and two-way slabs, isolated footings. Reinforced brick works, columns, staircases, retaining wall, water tanks (RCC design questions may be based on both Limit State methods).

Steel Design: Properties and classification of structural steel, bolts, design of steel connection (welded and bolted), steel design and construction of steel tension member, compression member, columns, beams roof trusses plate girders.



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