RITES LIMITED
(A Govt. of India Enterprise)

"Recruitment of GRADUATE EXECUTIVE TRAINEES (GET)-2012"

RITES Ltd. is an ISO 9001: 2000 certified premier International multi-disciplinary consultancy organization in infrastructure sector rendering comprehensive professional services in various sectors including Metro Rail Systems, Railways, Highways, Airports, Ports & Harbour etc, under the Ministry of Railways.

2. A Competitive examination for recruitment to the post of **GRADUATE EXECUTIVE TRAINEES (GET) in RITES will be held on 25.11.2012 at the centres indicated in para 3 below.** Applications are invited from young, dynamic, energetic and motivated persons of Indian Nationality for the position of 'Graduate Executive Trainee' (GET) in RITES for its different projects. The number of vacancies is liable to alteration. Reservations will be made for candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes and Physically Disabled Categories in respect of vacancies as may be fixed by the Government of India. The community wise breakup of these vacancies is as under:-

VC No	Name of Post / Discipline	Vacancies*	Caste/Community-wise break up of vacancies			
			UR	OBC	SC	ST
78/12	Civil Engineering	26	15	07	03	01
79/12	Mechanical Engineering	08	05	02	01	00
80/12	Electrical Engineering	16	07	04	02	01
81/12	Architecture	04	03	01	00	00
82/12	Information Technology (IT)	04	03	01	00	00
83/12	Metallurgy & Chemical Engineering (M&C)	05	04	01	00	00
84/12	Signal &Telecommunication Engineering (S&T)/Electronics Engineering	04	03	01	00	00

*All vacancies are provisional and subject to increase/decrease. Out of above posts, two posts shall be reserved for Persons with Disabilities (PWDs) which shall be operated, as per Government of India instructions, on horizontal reservation basis.

3. **Examination Centers:**

The examination will be conducted at following Centres:-

Centre	Code
Bangalore	01
Bhopal	02
Delhi	03
Kolkata	04
Lucknow	05
Mumbai	06
Ranchi	07

THE CENTRES AND THE DATE OF HOLDING THE EXAMINATION AS MENTIONED ABOVE ARE LIABLE TO BE CHANGED AT THE DISCRETION OF RITES. WHILE EVERY EFFORT WILL BE MADE TO ALLOT THE CANDIDATES TO THE CENTRE OF THEIR CHOICE FOR EXAMINATION, THE COMPANY MAY, AT THEIR DISCRETION, ALLOT A DIFFERENT CENTRE TO A CANDIDATE WHEN CIRCUMSTANCES SO WARRANT. CANDIDATES ADMITTED TO THE EXAMINATION WILL BE INFORMED OF THE TIME TABLE AND PLACE OR PLACES OF EXAMINATION.

The candidates should note that no request for change of centre under any circumstances will be considered.

4. Eligibility Conditions:-

i- **Nationality:-** A candidate must be a citizen of India.

ii- **Minimum Educational Qualification:-** Graduate in the relevant Engineering discipline i.e. Civil/ Mechanical/ Electrical/ Architecture/ Metallurgy or Chemical/ Electronics & Telecommunication Engineering with 60% marks (50% for SC/ST/OBC candidates) from a AICTE/Govt. approved University/Institute.

For IT Discipline, Graduate Degree in Engineering in Computer Science/ Information Technology, or, Full time Masters in Computer Applications (MCA) with 60% marks (50% for SC/ST/OBC candidates) from a AICTE/Govt. approved University/Institute.

iii- **Age-Limit:-** A candidate for this examination must have attained the age of 21 years and must not have crossed the age of 30 years as on 01.08.2012 i.e he/she must have born not earlier than 02.08.1982 and not later than 01.08.1991.

iv- **Relaxation in upper age-limit:-**

(a) No Relaxation is allowed in the stipulated minimum age.

(b) The upper age limit prescribed above will be further relaxable upto a maximum of five years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe;

(c) Upto a maximum of three years in the case of candidates belonging to Other Backward Classes who are eligible to avail of reservation applicable to such candidates.

(d) Upto a maximum of five years if a candidate had ordinarily been domiciled in the State of Jammu & Kashmir during the period from the 1st January, 1980 to the 31st December, 1989.

(e) Upto a maximum of three years in the case of Defence Service personnel disabled in operations during hostilities with any foreign country or in a disturbed area, and released as a consequence thereof;

(f) Upto a maximum of five years in the case of ex-servicemen including Commissioned Officers and ECOs/SSCOs who have rendered at least five years Military Service as on 1st August, 2012 and have been released (i) on completion of assignment (including those whose assignment is due to be completed within one year from 1st August, 2012) otherwise than by way of dismissal or discharge on account of misconduct or inefficiency, or (ii) on account of physical disability attributable to Military Service or (iii) on invalidment;

(g) Upto a maximum of five years in the case of ECOs/SSCOs who have completed an initial period of assignment of five years of Military Services as on 1st August, 2012 and whose assignment has been extended beyond five years and in whose case the Ministry of Defence issues a certificate that they can apply for civil employment and they will be released on three months' notice on selection from the date of receipt of offer of appointment;

(h) Upto a maximum of 10 years in the case of Persons With Disabilities (PWDs). (15 years in case of SC/ST and 13 years in case of OBC candidates).

NOTE (I) - Candidates belonging to the Scheduled Castes and the Scheduled Tribes and the Other Backward Classes who are also covered under any other clauses of Para 4 (iv) above, viz. those coming under the category of Ex-servicemen, persons domiciled in the State of J & K, and Persons with Disabilities (PWDs) etc. will be eligible for grant of cumulative age relaxation under both the categories.

Note (II) - The term ex-servicemen will apply to the persons who are defined as Ex-servicemen in the Ex-servicemen (Re-employment in Civil Services and Posts) Rules, 1979, as amended from time to time.

Note (III) - The age concession under Para 4 (iv)(f) and (g) will not be admissible to Ex-Servicemen and Commissioned Officers including ECOs/SSCOs, who are released on own request.

Note (IV) - Notwithstanding, the provision of age-relaxation under Para 4 (iv) (h) above, a physically handicapped candidate will be considered to be eligible for appointment only if he/she (after such physical examination as the Government or appointing authority, as the case may be, may prescribe) is found to satisfy the requirement of physical and medical standards for the posts concerned to be allocated to the physically handicapped candidates by the Government.

(i) SAVE AS PROVIDED ABOVE THE AGE LIMITS PRESCRIBED CAN IN NO CASE BE RELAXED.

(j) The date of birth accepted by the Company is that entered in the 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 and that extract must be certified by the proper authority of the University or in the Higher Secondary or an equivalent examination certificate.

(k) No other document relating to age like horoscopes, affidavits, birth extracts from Municipal Corporation, service records and the like will be accepted. The expression Matriculation/Secondary Examination Certificate in this part of the instruction includes the alternative certificates mentioned above.

NOTE 1:- CANDIDATES SHOULD NOTE THAT ONLY THE DATE OF BIRTH AS RECORDED IN THE MATRICULATION/SECONDARY EXAMINATION CERTIFICATE OR AN EQUIVALENT CERTIFICATE ON THE DATE OF SUBMISSION OF APPLICATION WILL BE ACCEPTED BY THE COMPNAY AND NO SUBSEQUENT REQUEST FOR ITS CHANGE WILL BE CONSIDERED OR GRANTED.

NOTE 2:- CANDIDATES SHOULD ALSO NOTE THAT ONCE A DATE OF BIRTH HAS BEEN CLAIMED BY THEM AND ENTERED IN THE RECORDS OF THE COMPANY FOR THE PURPOSE OF ADMISSION TO AN EXAMINATION, NO CHANGE WILL BE ALLOWED SUBSEQUENTLY ON ANY GROUNDS WHATSOEVER.

NOTE 3. CANDIDATES SHOULD EXERCISE DUE CARE WHILE ENTERING THEIR DATE OF BIRTH IN RESPECTIVE COLUMN OF THE APPLICATION FORM. IF ON VERIFICATION AT ANY SUBSEQUENT STAGE, ANY VARIATION IS FOUND IN THEIR DATE OF BIRTH FROM THE ONE ENTERED IN THEIR MATRICULATION OR EQUIVALENT EXAMINATION CERTIFICATE, DISCIPLINARY ACTION WILL BE TAKEN AGAINST THEM BY RITES UNDER THE RULES.

v- <u>Physical Standards:-</u> A candidate should be physically and mentally fit. For being considered as PWDs, the candidate should have disability of Forty per cent (40%) or more. However, such candidates shall be required to meet one or more of the following physical requirements/abilities which may be necessary for performing the duties in the concerned posts:-

Code	Physical Requirements
F	Work performed by manipulating (with Fingers)
PP	Work performed by pulling & pushing
L	Work performed by lifting
KC	Worked performed by kneeling and crouching
B	Work performed by bending

S	Work performed by sitting (on bench or chair)
ST	Work performed by standing
W	Work performed by walking
SE	Work performed by seeing
H	Work per formed by hearing/ speaking
RW	Work performed by reading and writing.

The functional classification in their case shall be, one or more of the following, consistent with the requirements of the concerned Posts:

Functional Classification:-

Code	Functions
OL	one leg affected (R or L) a . impaired reach b. weakness of grip c. ataxic
OA	one arm affected a. impaired (R or L) reach b. weakness of grip. c. ataxic
MW	Muscular weakness and limited physical endurance
PB	Partially blind
PD	Partially deaf

5. Fees:-

Candidates who wish to apply against this vacancy notification are required to pay non-refundable fees, as specified below, through a crossed Demand Draft **in favour of 'RITES LIMITED' payable at Gurgaon :-**

General/OBC candidates-	**Rs. 500**
SC/ST candidates	**Rs.100**
Persons with Disabilities (PWDs)	**Nil.**

(ii) PWDs are given concession in the fee provided they are otherwise eligible for appointment as **GRADUATE EXECUTIVE TRAINEE to be filled on the results of the examination(Written and Interview/ Personality Test) on the basis of the standards of medical fitness for this post(including any concessions specifically extended to the physically handicapped). A PWD claiming age relaxation/fee concession will be required to submit along with their Detailed Application Form, certified copy of the certificate from a Government Hospital/Medical Board in support of his claim for being a person with disabilities.**

NOTE: Notwithstanding the aforesaid provision for age relaxation/concessional fee, a PWD will be considered to be eligible for appointment only if he/she (after such physical examination as the Company or the appointing authority, as the case may be, may prescribe) is found to satisfy the requirements of physical and medical standards for the concerned Posts to be allocated to PWD candidates by the Company.

(iii) CANDIDATES SHOULD NOTE THAT THE FEE SENT THROUGH any other mode except the mode specified, WILL NOT BE ACCEPTED BY RITES AND SUCH APPLICATIONS WILL BE TREATED AS WITHOUT FEE AND WILL BE SUMMARILY REJECTED.

(iv) Applications not accompanied by the Prescribed Fee shall be summarily rejected.

(v) Fee once paid shall not be refunded under any circumstances nor can the fee be held in reserve for any other examination or selection.

6. Selection Process:-

i- The selection process consists of written test and Interview. Eligible candidates will have to appear in the written test comprising of two parts viz. Part I(objective) and Part II(Subjective part).

ii- (a)- Part I(Objective part) will be a screening test.

(b)- Copies of Part II(Subjective part) of only those candidates shall be evaluated who succeed in the Part I(Objective part).

(c)- Number of such candidates will be 20 (twenty) times the number of vacancies, in the order of merit on the basis of marks obtained in the Part I (Objective part).

(d)- The candidates to the extent of 6 (six) times the number of vacancies will only be shortlisted for the interview/personality test on the basis of their performance in the Part II(Subjective part) only.

(e)- The candidates will be empanelled as per their performance/rank secured on the basis of aggregate of marks secured in Part-II of written examination(subjective part) and Interview/Personality test strictly as per the merit and statutory reservation provisions.

(f)- Marks obtained in the Part I(Objective part) of written examination will not be taken into account for short listing the candidate for interview/Personality test or final empanelment .

(g)- The offer of appointment will be issued to the suitable candidates in the order of merit and based on the requirement keeping in view statutory reservation provisions.

(h)- Appointment of selected candidates will be subject to their being found medically fit in the Medical Examination to be conducted as per RITES Rules and Standards of Medical Fitness for the relevant post.

7. Plan of Examination:-

(a)- The Examination shall be conducted according to the following plan:-

The Written Examination and Interview/Personality test.

(i)- **The Written Examination** will comprise two parts viz. Part I(Objective part) and Part II(Subjective part). Part I(Screening test) consisting only of multiple choice objective types of questions and Part II of conventional papers.

(ii)- Part I (objective part) consists of questions relating to General Ability, Reasoning, General Science, General Knowledge and Engineering Discipline concerned.

(iii)- Part II (Subjective part) consists of questions on the technical subjects of relevant Engineering Discipline i.e. Civil/ Mechanical/ Electrical/ Architecture/ IT/ M&C/Electronics & Telecommunication.

(iv)- The details of the written examination i.e. subject, no. of questions, duration and maximum marks allotted to each subject are as below.

Part I- (Objective Part)

General Ability Test, Reasoning, General Science, General Knowledge and Engineering Discipline concerned	100 questions	90 minutes	100 marks

Part-II- (Subjective Part)

Engineering Discipline	*******	120 minutes	80 marks

concerned			

(v)- **Interview** carrying a maximum of 20 marks of such of the candidates who get shortlisted on the basis of the Part II (Subjective Part) of written examination only.

(c)- IMPORTANT INSTRUCTIONS TO CANDIDATES FOR EXAMINATION:

i) Candidates are advised to read carefully special instructions supplied to them alongwith the admit card for Part(I)- Objective part and Part(II)-Subjective Part including the procedure regarding filling in the Answer Sheet of Part(I)-Objective Part in the Examination Hall.

ii) In the Interview special attention will be paid to assess the candidate's capacity for leadership, initiative and intellectual curiosity, tact and other social qualities, mental and physical energy, powers of practical application and integrity of character, potential for the job.

iii) Subjective papers must be answered in English.

iv) Question papers will be set in English only.

v) Candidates must write the papers in their own hand writing. In no circumstances will they be allowed the help of a scribe to write the answers for them.

vi) Marks will not be allotted for mere superficial knowledge.

vii) Deduction upto 5(five) percent of the maximum marks in the written papers will be made for illegible handwriting.

viii) Credit will be given for orderly, effective and exact expression combined with due economy of words in the conventional papers of the examination.

ix) In the question papers, wherever required, SI units will be used.

x) Candidates are permitted to bring and use battery operated pocket calculators for Subjective (essay) type papers only. Loaning or inter-changing of calculators in the Examination hall is not permitted**. In no case, scientific calculators will be allowed. Also, Mobile Phones are not permitted in the examination hall.**

xi) It is also important to note that candidates are not permitted to use calculators for answering Objective Type Paper (Test booklets). They should not, therefore, bring the same inside the Examination Hall.

xii) Candidates should use only International form of Indian numerals (e.g. 1,2,3,4,5,6 etc.) while answering question papers.

7(d)- Standard and Syllabi of Examination:-

The standard of paper of General Ability Test and Reasoning will be such as may be expected of an Engineering/ Science Graduate. The standard of paper in Engineering Discipline will approximately be that of an Engineering Degree Examination of an Indian University. There will be no practical examination in any of the subjects.

7(e) Syllabi of papers:- As per Appendix – I

8. How to apply:-

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i- Interested Candidates fulfilling the eligibility criteria are required to apply online using the link http://www.rites.com. All candidates should procure Demand Draft of requisite value before attempting to apply on line.

ii- On submission of valid application online, the system will generate 'Registration Slip' with Registration no., which has to be downloaded, signed, photograph affixed and sent the same along with demand draft of requisite fees drawn in favour of 'RITES LIMITED' payable at Gurgaon through ordinary post only in an envelope superscribed with VC No. and

"APPLICATION FOR THE GRADUATE EXECUTIVE TRAINEE" on or before 1700 hrs of 20.10.2012 {last date of receipt of hard copy of Application(Registration slip) by ordinary post} at the following address:-

"The Advertiser(RITES),
Post Box No. 9248,
Krishna Nagar Head Post Office,
Delhi-110051

iii- Applications received after due date will not be entertained. The applicants should enclose certified copies of qualifications, testimonials, category to which they belong(SC/ST/OBC/PH/Ex-serviceman) and his/her recent passport size photograph. Those not conforming to the prescribed format or without/unclear certificates or having ambiguity will be summarily rejected.

iv- The admit card indicating roll number, name of the test venue and guidelines for the test will be made available through candidate login, to the candidates found eligible based on the information submitted by the candidate.

v- All candidates, whether already in Government Service, or in Government owned industrial undertakings or other similar organizations or in private employment, should submit their applications directly at the specified address. If any candidate forwards his application through his employer and it reaches late, the application, even if submitted to the employer before the closing date, will not be considered. Persons, already in Government service whether in a permanent or temporary capacity or as work-charged employees other than casual or daily rated employees or those serving under public enterprises are, however, required to submit an undertaking that they have informed in writing their Head of Office/Department that they have applied for the Examination. Candidates should note that in case communication is received from their employer by RITES withholding permission to the candidates applying for/appearing at the Examination, their application will be liable to be rejected/candidature will be liable to be cancelled.

vi- The original testimonials/documents will have to be produced at the time of interview. If any of their claims is found to be incorrect, their candidature shall be summarily rejected.

vii- Departmental Candidates of RITES are also required to apply online. However, they will have to forward the Hard copy of the Resume through their controlling officer and Personnel Department to Recruitment cell, without which the candidature will not be considered.

viii- Candidates working in Govt./PSUs are required to produce "No Objection Certificate" at the time of Interview/Personality test.

ix- All Candidates are requested to ensure that the Hard Copy of the application generated after submission of online Application along with enclosures is sent by Ordinary Post and NOT by any other means like Courier, Speed Post etc, since the Resume is being received in a Post Bag where only Ordinary Post is accepted.

x- Candidates should submit only single application and application once submitted cannot be altered. A valid e-mail ID is essential for submission of the online application. RITES will not be responsible for bouncing of any e-mail sent to the candidates.

xi- Candidates should write their Name, Registration No., Post Applied for on the reverse of the bank draft.

xii- All information regarding this recruitment process would be made available in the **'Recruitment'** section of RITES website only. Applicants are advised to check the web site periodically through the Candidate Login.

xiii- Candidates are advised to make a note of their e-mail ID as entered at the time of on-line submission of application form and Registration Number generated at the top right hand corner of the 'Application'. These would be required for accessing information during the later stage of the recruitment process made available through Candidate Login.

xiv- Candidates should ensure that the same Coloured passport size photograph is used throughout this recruitment process.

xv- For any queries regarding this recruitment please send email to ritesrecttquery2012@rediffmail.com.

Note 1: WHILE FILLING IN HIS APPLICATION FORM, THE CANDIDATE SHOULD CAREFULLY DECIDE ABOUT HIS CHOICE FOR THE CENTRE OF THE EXAMINATION. MORE THAN ONE APPLICATION FROM A CANDIDATE GIVING DIFFERENT CENTRES WILL NOT BE ACCEPTED IN ANY CASE. EVEN IF A CANDIDATE SENDS MORE THAN ONE COMPLETED APPLICATION, RITES WILL ACCEPT ONLY ONE APPLICATION AT ITS DISCRETION AND THE DECISION TAKEN BY RITES' IN THIS REGARD SHALL BE FINAL. CANDIDATES WILL BE ALLOWED TO APPEAR IN THE WRITTEN EXAMINATION ONLY AT THE CENTRE INDICATED IN THE ADMISSION CERTIFICATE.

Note 2: SINCE THESE APPLICATION FORMS ARE TO BE PROCESSED IN A COMPUTERISED SYSTEM, DUE CARE SHOULD BE TAKEN BY THE CANDIDATES TO FILL UP THEIR APPLICATION FORM CORRECTLY. NO COLUMN OF THE APPLICATION SHOULD BE LEFT BLANK. APPLICATIONS INCOMPLETE IN ANY ASPECT (Category certificate, Demand draft, educational Qualification certificate etc.) SHALL BE SUMMARILY REJECTED. NO REPRESENTATION OR CORRESPONDENCE REGARDING SUCH REJECTION SHALL BE ENTERTAINED UNDER ANY CIRCUMSTANCES. CANDIDATES ARE REQUIRED TO SUBMIT ALONG WITH THEIR APPLICATIONS CERTIFICATES IN SUPPORT OF THEIR CLAIMS REGARDING AGE, EDUCATIONAL QUALIFICATIONS, SCHEDULED CASTES/SCHEDULED TRIBES/OTHER BACKWARD CLASSES/ Ex-Serviceman AND PHYSICALLY HANDICAPPED ETC.

Note 3: The candidates applying for the Examination should ensure that they fulfill all the eligibility conditions for admission to the Examination. Their admission at all the stages of examination for which they are admitted by RITES viz. Written Examination and Interview/Personality Test will be purely provisional, subject to their satisfying the prescribed eligibility conditions. If on verification at any time before or after the written examination or Interview Test, it is found that they do not fulfill any of the eligibility conditions; their candidature for the Examination will be cancelled by RITES.

Note 4. Candidates are requested to keep ready the attested **(attestation by a Gazetted Officer of Central/State Govt.)** copies of the following documents for submission to the RITES soon after the declaration of the results of the written Examination which is likely to be declared in the month of December, 2012.

1. Certificate of Age.
2. Certificate of Educational Qualification.
3. Certificate in support of claim to belong to Scheduled Caste, Scheduled Tribe and Other Backward Classes, Ex-Serviceman or Physically Handicapped, where applicable.
4. Certificate in support of claim for age/fee concession, where applicable.

Note 5: Candidates are requested to go through the FAQ (Frequently Asked Questions) which is placed at Appendix-II for any query/doubts.

9. <u>Last date of receipt of application:-</u>

(a) The Online Applications can be filled upto 13.10.2012 till 11.59 PM after which the link will be disabled.

(b) All candidates should note that the hard copy of Registered Application (Registration slip) will be accepted only by ordinary post till 1700 hrs of 20.10.2012.

(c) No application will be entertained after the expiry of last date of receipt of Registered Application(Registration Slip).

(d) The company will not be responsible for any sort of delay in receipt of Hard copy of REGISTERED APPLICATION (Registration slip). The candidates are also requested to keep a copy of their REGISTERED APPLICATION (Registration slip), as mentioned in para 8(ii) of the notification.

NOTE (i): Candidates should clearly note that the Company will in no case be responsible for non-receipt of their application or any delay in receipt thereof on any account whatsoever. No application received after the prescribed last date will be entertained under any circumstances and all the applications received late i.e. after the last date of receipt of hard copy of the will be summarily rejected. They should, therefore, ensure that their applications reach the Company's Office on or before the prescribed last date.

10. Compensation Package:

Candidates selected and appointed as Graduate Executive Trainees will be placed in the IDA pay scale of Rs. 20600-46500 during the one year training period with starting basic pay of Rs.20600/-. Besides basic pay, they will be paid dearness allowance (DA) and House Rent Allowance (HRA) during training period. The candidates will also be required to successfully clear the examination to be conducted at the end of training. On successful completion of training and passing the examination as mentioned earlier, the candidates will be engaged as Assistant Manager, scale Rs. 20600-46500(IDA) on probation. Besides the said basic pay the compensation package includes Dearness Allowance, Performance Related Pay, HRA/Leased Accommodation and other allowances as admissible from time to time. Total cost to the Company comes to Rs. 10 Lacs per annum approximately.

11. FACILITATION AND WEBSITE FOR GUIDANCE OF CANDIDATES:

In case of any guidance/information/clarification regarding their applications, candidature etc. candidates can obtain information by sending an email at ritesrecttquery2012@rediffmail.com

Candidates can obtain details of the examination as well as information about registration of their applications, venue of the examination and results etc at http://www.rites.com.

12. SPECIAL INSTRUCTIONS:

(i) **Mobile Phone/Electronic devices of any sort are not allowed:**

(a) Mobile phones, pagers or any other communication devices are not allowed inside the premises where the examination is being conducted. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.

(b) Candidates are advised in their own interest not to bring any of the banned item including mobile phones/pagers to the venue of the examination, as arrangement for safekeeping cannot be assured.

(ii) A candidate who is found or has been declared by RITES to be guilty of:

(a) obtaining support for his candidature by any means; or

(b) impersonating; or

(c) procuring impersonation by any person; or

(d) submitting fabricated documents or documents which have been tampered with; or

(e) making statements which are incorrect or false or suppressing material information; or

(f) resorting to any other irregular or improper means in connection with his candidature for the examination; or

(g) using unfair means during the examination; or

(h) writing irrelevant matter including obscene language or pornographic matter in the script(s); or

(i) misbehaving in any other manner in the examination hall; or

(j) harassing or doing bodily harm to the staff deployed by the Company for the conduct of their examinations; or

(k) being in possession of or using any cellular/mobile phone/pager or any other electronic equipment or device or any other equipment capable of being used as a communication device during the examination.

(l) violating any of the instructions issued to candidates along with their admission certificate permitting them to take the examination; or

(m) attempting to commit or as the case may be abetting the company of all or any of the acts specified in the foregoing clauses, may in addition to rendering himself liable to criminal prosecution,

be liable- (1) to be disqualified by RITES from the examination for which he/she is a candidate; and/or to be debarred either permanently or for a specified period-;

(2) to be disqualified by RITES from any examination or selection held by them;

(3) to be disqualified by RITES from any employment under them; and

(4) if he is already in service under Government, disciplinary action under the appropriate rules.

(iii) Management reserves the right to cancel / restrict /enlarge / modify / alter the recruitment process, if need so arises, without issuing any further notice or assigning any reason thereafter.

(iv) Candidature of a candidate is liable to be rejected at any stage of recruitment process or after recruitment or joining, if any information provided by him/her is not found in conformity with the eligibility criteria mentioned in the detailed advertisement given in the website.

(v) Candidates selected in RITES are liable to be posted anywhere in India and abroad.

(vi) Complaints attributable to the incompatibility of the Client Systems, ignorance of users, non availability of internet connectivity or any other aspects beyond the direct control of RITES employees or systems will not be entertained by RITES. No correspondence made in this recruitment will be entertained by RITES.

(vii) Legal jurisdiction will be Delhi in case of any cause / dispute.

13. Correspondence with RITES:

RITES will not enter into any correspondence with the candidates about their candidature except in the following cases:

(i) Every candidate for this examination will be informed at the earliest possible date about the status of his application. Admit Card, indicating the Roll Nos. will be issued to the eligible candidates who are admitted to the examination. Any Information with regard to the recruitment of Graduate Executive Trainee can also be obtained from the RITES by sending email at ritesrecttquery2012@rediffmail.com.

No candidate will ordinarily be allowed to take the examination unless he holds a proper admit card for the examination. On receipt of Admit card, check it carefully and bring discrepancies/errors, if any, to the notice of RITES immediately. The candidates should note that their admission to the examination will be purely provisional based on the information given by them in the application form. This will be subject to verification of all the eligibility conditions by RITES.

(ii) The mere fact that a certificate of admission to the Examination has been issued to a candidate will not imply that his candidature has been finally cleared by RITES, or that the entries made by the candidate in his application for the Examination have been accepted by RITES as true and correct. Candidates may note that RITES takes up the verification of eligibility conditions of a candidate, with reference to original documents, only after the candidate has qualified for interview for personality test on the result of the written part of the examination. Unless candidature is formally confirmed by RITES, it continues to the provisional. The decision of RITES as to the acceptance of the application of a candidate and his eligibility or otherwise for admission to the Examination shall be final. Candidates should note that the name in the Admit card, in some cases may be abbreviated due to technical reasons.

IMPORTANT: ALL COMMUNICATIONS TO RITES SHOULD INVARIABLY CONTAIN THE FOLLOWING PARTICULARS:

i. NAME AND YEAR OF THE EXAMINATION.

ii. REGISTRATION/ROLL NO.

iii NAME OF CANDIDATE IN FULL AND IN BLOCK LETTERS.

iv. Valid email address as given in the application

N.B. (i) COMMUNICATIONS NOT CONTAINING THE ABOVE PARTICULARS MAY NOT BE ATTENDED TO.

N.B. (ii) IF A LETTER/COMMUNICATION IS RECEIVED FROM A CANDIDATE AFTER AN EXAMINATION HAS BEEN HELD AND IT DOES NOT GIVE HIS FULL NAME AND ROLL NUMBER, IT WILL BE IGNORED AND NO ACTION WILL BE TAKEN THEREON.

14. Important dates:-

Date of commencement of submission of applications	23.09.12
Date of closing of submission of Online applications	13.10.12
Last date of receiving the physical copy of Registered Application(Registration slip) alongwith DD/Testimonials	20.10.12
Tentative date for downloading the admit card	05.11.12
Date of written test (tentative)	25.11.12
Date of Personal Interview (tentative)	19.01.13

15. Service Agreement:

The selected candidates will be required to execute a service agreement bond to successfully complete the prescribed training period and thereafter serve the organization for at least three years. The amount of the bond is 1,00,000/- for General/OBC (NCL) candidates and 50,000/- for SC/ST/PWD candidates.

Appendix – I
Syllabi of papers

The Written examination tentatively scheduled to be conducted on 25.11.2012 comprises of two parts viz. Part(I)-Objective part and Part(II)-Subjective Part.

Part(I) will have questions comprising of General Ability, Reasoning and subjects pertaining to concerned disciplines and Part(II) will have questions on concerned subjects only(For detailed information refer to para 6 and 7 of the notification). Subject wise syllabus for the proposed examination for Graduate Executive Trainee is as under:-

1- **General Ability**(For Part I– Objective part only):- The question paper will be designed to test the candidate's understanding of current events and of such matters as of everyday observation and experience in their scientific aspects as may be expected of an educated person.

Logical and analytical Reasoning(For Part I– Objective part only):- The paper will be designed to test the reasoning capacity of the candidate.

General Science and General Knowledge:-(For Part I– Objective part only):- The paper will be designed to test the reasoning capacity of the candidate.

CIVIL ENGINEERING *(For both objective and subjective type papers)*

1. BUILDING MATERIALS

1.1 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, codal provisions for design, Plywood.
1.2 Bricks : Types, Indian Standard classification, absorption, saturation factor, strength in masonry, influence of morter strength on masonry strength.
1.3 Cement : Compounds of, different types, setting times, strength.
1.4 Cement Mortar : Ingredients, proportions, water demand, mortars for plastering and masonry.
1.5 Concrete : Importance of W/C Ratio, Strength, ingredients including admixtures, workability, testing for strength, elasticity, non-destructive testing, mix design methods.

2. SOLID MECHANICS – Elastic constants, stress, plane stress, Mohr's circle of stress, strains, plane strain, Mohr's circle of strain, combined stress; Elastic theories of failure; Simple bending, shear; Torsion of circular and rectangular sections 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 principle and application.
Plastic analysis of indeterminate beams and simple frames - shape factors.

4. DESIGN OF STEEL STRUCTURES
Principles of working stress method. Design of connections, simple members, Built-up sections and frames, Design of Industrial roofs. Principles of ultimate load design. Design of simple 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, materials, methods of prestressing, losses. Design of simple members and determinate structures. Introductions to prestressing of indeterminate structures.
Design of brick masonry as per I.S. Codes.

6. CONSTRUCTION PRACTICE, PLANNING AND MANAGEMENT

6.1 Concreting Equipment:
Weight Batcher, Mixer, vibrator, batching plant, concrete pump.
Cranes, hoists, lifting equipment.

6.2 Earthwork Equipment :
Power shovel, hoe, dozer, dumper, trailers and tractor, rollers, sheep foot rollers, pumps.

6.3 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.

7. FLUID MECHANICS, OPEN CHANNEL FLOW, PIPE FLOW:

Fluid Properties, Pressure, Thrust, Buoyancy; Flow Kinematics; Integration of flow equations; Flow measurement; Relative motion; Moment of momentum; Viscosity, Boundary layer and Control, Drag, Lift; dimensional Analysis, Modelling; Cavitation; Flow oscillations; Momentum and Energy principles in Open channel flow, Flow controls, Hydraulic jump, Flow sections and properties; Normal flow, Gradually varied flow; Surges; Flow development and losses in pipe flows, Measurements; Siphons; Surges and Water hammer; Delivery of Power Pipe networks.

8. HYDRAULIC MACHINES AND HYDROPOWER:
Centrifugal pumps, types, performance parameters, scaling, pumps in parallel; Reciprocating pumps, air vessels, performance parameters; Hydraulic ram; Hydraulic turbines, types, performance parameters, controls, choice; Power house, classification and layout, storage, pondage, control of supply.

9. HYDROLOGY :
Hydrological cycle, precipitation and related data analyses, PMP, unit and synthetic hydrographs; Evaporation and transpiration; Floods and their management, PMF; Streams and their gauging; River morphology; Routing of floods; Capacity of Reservoirs.

10. WATER RESOURCES ENGINEERING :
Water resources of the globe: Multipurpose uses of Water: Soil-Plant-Water relationships, irrigation systems, water demand assessment; Storages and their yields, ground water yield and well hydraulics; Waterlogging, drainage design; Irrigation revenue; Design of rigid boundary canals, Lacey's 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 dissipators and tailwater rating; Design of headworks, distribution works, falls, cross-drainage works, outlets; River training.

ENVIRONMENTAL ENGINEERING

11. WATER SUPPLY ENGINEERING :
Sources of supply, yields, design of intakes and conductors; Estimation of demand; Water quality standards; Control of Water-borne diseases; Primary and secondary treatment, detailing and maintenance of treatment units; Conveyance and distribution systems of treated water, leakages and control; Rural water supply; Institutional and industrial water supply.

12. WASTE WATER ENGINEERING:
Urban rain water disposal; Systems of sewage collection and disposal; Design of sewers and sewerage systems; pumping; Characteristics of sewage and its treatment, Disposal of products of sewage treatment, streamflow rejuvenation Institutional and industrial sewage management; Plumbing Systems; Rural and semi-urban sanitation.

13. SOLID WASTE MANAGEMENT
Sources, classification, collection and disposal; Design and Management of landfills.

14. 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.

15. SOIL MECHANICS:
Properties of soils, classification and interrelationship; Compaction behaviour, methods of compaction and their choice; Permeability and seepage, flow nets, Inverted filters; Compressibility and consolidation; Shearing resistance, stresses and failure; soil testing in laboratory and in-situ; Stress path and applications; Earth pressure theories, stress distribution in soil; soil exploration, samplers, load tests, penetration tests.

16. FOUNDATION ENGINEERING :
Types of foundations, Selection criteria, bearing capacity, settlement, laboratory and field tests; Types of piles and their design and layout, Foundations on expansive soils, swelling and its prevention, foundation on swelling soils.

17. 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 levelling; Relief representation; Contours; Digital elevation modelling 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.

18. 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.
Tunnelling, alignment, methods of construction, disposal of muck, drainage, lighting and ventilation, traffic control, emergency management. Planning of railway systems, terminology and designs, relating to gauge, track, controls, transits, rolling stock, tractive power and track modernisation; Maintenance; Appurtenant works; Containerisation.

19. Harbours - layouts, shipping lanes, anchoring, location identification; Littoral transport with erosion and deposition; sounding methods; Dry and Wet docks, components and operational Tidal data and analyses.

20. Airports - layout and orientation; Runway and taxiway design and drainage management; Zoning laws; Visual aids and air traffic control; Helipads, hangers, service equipment

MECHANICAL ENGINEERING *(For both objective and conventional type papers)*

PAPER-I

1. Thermodynamics, Cycles and IC Engines: Basic concepts, Open and Closed systems. Heat and work. Zeroth,First and Second Law, Application to non-Flow and Flow processors.Entropy, Availability, Irreversibility and Tds relations. Claperyron and real gas equations, Properties of ideal gases and vapours. Standard vapour, Gas
power and Refrigeration cycles. Two stage compressor. C-I and S.I. Engines. Pre-ignition, Detonation and Diesel-knock, Fuel injection and Carburation, Supercharging. Turboprop and Rocket engines, Engine
Cooling, Emission & Control, Flue gas analysis, Measurement of Calorific values. Conventional and Nuclear fuels, Elements of Nuclear power production.

2. Heat Transfer and Refrigeration and Airconditioning: Modes of heat transfer. One dimensional steady and unsteady conduction. Composite slab and Equivalent Resistance. Heat dissipation
from extended surfaces, Heat exchangers, Overall heat transfer coefficient, Empirical correlations for heat
transfer in laminar and turbulent flows and for free and forced Convection, Thermal boundary layer over a flat plate. Fundamentals of diffusive and connective mass transfer, Black body and basic concepts in Radiation, Enclosure theory, Shape factor, Net work analysis. Heat pump and Refrigeration cycles and systems, Refrigerants. Condensers, Evaporates and Expansion devices, Psychrometry, Charts
and application to air conditioning, Sensible heating and cooling, Effective temperature, comfort indices, Load calculations, Solar refrigerations, controls, Duct design.

3. Fluid Mechanics. Properties and classification of fluids, Manometry, forces on immersed surfaces, Center of pressure, Buoyancy,Elements of stability of floating bodies.Kinematics and Dynamics.Irrotational and incompressible. Inviscid flow. Velocity potential, Pressure field and Forces on immersed bodies.Bernoulli's equation, Fully developed flow through pipes, Pressure drop calculations,
Measurement of flow rate and Pressure drop. Elements of boundary layer theory, Integral approach, Laminar and tubulent flows, Separations. Flow over weirs and notches. Open channel flow, Hydraulic jimp. Dimensionless numbers, Dimensional analysis, Similitude and modelling. One-dimensional isentropic flow, Normal shock wave, Flow through convergent - divergent ducts, Oblique shock-wave, Rayleigh and Fanno lines.

4. Fluid Machinery and Steam Generators. Performance, Operation and control of hydraulic Pump and impulse an reaction Turbines, Specific speed, Classification. Energy transfer, Coupling, Power transmission, Steam generators Fire-tube and water-tube boilers. Flow of steam through Nozzles and Diffusers, Wetness and condensation. Various types of steam and gas Turbines, Velocity diagrams. Partial admission. Reciprocating, Centrifugal and axial flow Compressors, Multistage compression, role of Mach Number, Reheat, Regeneration, Efficiency, Governance.

5. THEORY OF MACHINES Kinematic and dynamic analysis of planer mechanisms. Cams. Gears and gear trains. Flywheels. Governors. Balancing of rigid rotors and field balancing.Balancing of single and
multicylinder engines, Linear vibration analysis of mechanical systems. Critical speeds and whirling of shafts Automatic controls.

6. MACHINE DESIGN Design of Joints : cotters, keys, splines, welded joints, threaded fasteners, joints formed by interference fits. Design of friction drives : couplings and clutches, belt and chain drives, power screws. Design of Power transmission systems gears and gear drives shaft and axle, wire ropes.
Design of bearings : hydrodynamics bearings and rolling element bearings.

7. STRENGTH OF MATERIALS
Stress and strain in two dimensions, Principal stresses and strains, Mohr's construction, linear elastic materials, isotropy and anisotropy, stress-strain relations, uniaxial loading, thermal stresses. Beams : Bending moment and shear force diagram, bending stresses and deflection of beams. Shear stress distribution. Torsion of shafts, helical springs. Combined stresses, thick-and think-walled pressure vessels. Struts and columns. Strain energy concepts and theories of failure.

8. ENGINEERING MATERIALS Basic concepts on structure of solids. Crystalline materials. Detects in crystalline materials. Alloys and binary phase diagrams. Structure and properties of common engineering materials. Heat treatment of steels. Plastics, Ceramics and composite materials. Common applications of various materials.

9. PRODUCTION ENGINEERING Metal Forming : Basic Principles of forging, drawing and extrusion; High energy rate forming; Powder metallurgy. **Metal Casting :** Die casting, investment casting, Shall Moulding, Centrifugal Casting, Gating & Riser design; melting furnaces. **Fabrication Processes :** Principles of Gas, Arc, Shielded arc Welding; Advanced Welding Processes, Weldability: Metallurgy of Welding. **Metal Cutting :** Turning, Methods of Screw Production, Drilling, Boring, Milling, Gear Manufacturing, Production of flat surfaces, Grinding & Finishing Processes. Computer Controlled Manufacturing Systems-CNC, DNC, FMS, Automation and Robotics. Cutting Tools Materials, Tool Geometry, Mechanism of Tool Wear, Tool Life & Machinability; Measurement of cutting forces. Economics of Machining. Unconventional Machining Processes. Jigs and Fixtures. Fits and tolerances,
Measurement of surface texture, Comparators Alignment tests and reconditioning of Machine Tools.

10. INDUSTRIAL ENGINEERING Production Planning and Control : Forecasting - Moving average, exponential smoothing, Operations, scheduling; assembly line balancing, Product development, Break-even analysis, Capacity planning, PERT and CPM. Control Operations : Inventory control ABC analysis, EOQ model, Materials requirement planning. Job design, Job standards, Work measurement, Quality Management - Quality analysis and control. Operations Research : Linear Programming - Graphical
and Simplex methods, Transportation and assignment models. Single server queueing model. Value Engineering : Value analysis for cost/ value.

11. ELEMENTS OF COMPUTATION Computer Organisation, Flow charting, Features of Common computer Languages - FORTRAN, d Base III, Lotus 1-2-3, C and elementary Programming.

ELECTRICAL ENGINEERING: *(For both objective and conventional types papers)*

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

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

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

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

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

6. Electrical Machines and Power Transformers Magnetic Circuits - Analysis and Design of Power transformers. Construction and testing. Equivalent circuits. Losses and efficiency. Regulation. Auto-transformer, 3-phase transformer. Parallel operation. Basic concepts in rotating machines. EMF, torque, basic machine types. Construction and operation, leakage losses and efficiency. D.C. Machines. Construction, Excitation, methods. Circuit models. Armature reaction and commutation. Characteristics and performance analysis.Generators and motors. Starting and speed control. Testing, Losses and efficiency.Synchronous Machines. Construction. Circuit model. Operating characteristics and performance analysis. Synchronous reactance. Efficiency. Voltage regulation. Salient-pole machine,
Parallel operation. Hunting. Short circuit transients. Induction Machines. Construction. Principle of operation. Rotating fields. Characteristics and performance analysis. Determination of circuit model. Circle diagram. Starting and speed control. Fractional KW motors. Single-phase synchronous and induction motors.

7. Power systems Types of Power Stations, Hydro, Thermal and Nuclear Stations. Pumped storage plants. Economics and operating factors. Power transmission lines. Modeling and performance characteristics. Voltage control. Load flow studies. Optimal power system operation. Load frequency control. Symmetrical short circuit analysis. Z-Bus formulation. Symmetrical Components. Per Unit representation. Fault analysis. Transient and steady-state stability of power systems. Equal area criterion.
Power system Transients. Power system Protection Circuit breakers. Relays. HVDC transmission.

8. ANALOG AND DIGITAL ELECTRONICS AND CIRCUITS Semiconductor device physics, PN junctions and transistors, circuit models and parameters, FET, Zener, tunnel, Schottky, photo diodes and their applications, rectifier circuits, voltage regulators and multipliers, switching behavior of diodes and transistors. Small signal amplifiers, biasing circuits, frequency response and improvement, multistage amplifiers and feed-back amplifiers, D.C. amplifiers, coupling methods, push pull amplifiers, operational amplifiers, wave shaping circuits. Multivibrators and flipflops and their applications. Digital logic gage families, universal gates combinational circuits for arithmetic and logic operational, sequential logic
circuits. Counters, registers, RAM and ROMs.

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

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

11. POWER ELECTRONICS
Power Semiconductor devices. Thyristor. Power transistor, GTOs and MOSFETs. Characteristics and operation. AC to DC Converters; 1-phase and 3-phase DC to DC Converters. AC regulators. Thyristor controlled reactors; switched capacitor networks. Inverters; single-phase and 3-phase.Pulse width modulation. Sinusoidal modulation with uniform sampling. Switched mode power supplies.

SIGNAL & TELECOMMUNICATION/ELECTRONICS ENGINEERING *(For both objective and conventional type papers)*

1. Materials and Components Structure and properties of Electrical Engineering materials; Conductors,
Semiconductors and Insulators, magnetic, Ferroelectric, Piezoelectric, Ceramic, Optical and Super-conducting materials. Passive components and characteristics Resistors, Capacitors and Inductors; Ferrities, Quartz crystal Ceramic resonators, Electromagnetic an Electromechanical components.

2. Physical Electronics, Electron Devices and ICs Electrons and holes in semiconductors, Carrier Statistics, Mechanism of current flow in a semiconductor, 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; basic of Opto Electronics.

3. Signals and Systems Classification of signals and systems: System modelling in terms of differential
and difference equations; State variable representation; Fourier series; Fourier representation; Fourier series; Fourier transforms and their application to system analysis; Laplace transforms and their application to system analysis; Convolution and superposition integrals and their applications; Z-transforms and their applications to the analysis and characterisation of discrete time systems; Random signals and probability, Correlation functions; Spectral density; Response of linear system to random inputs.

4. Network theory Network analysis techniques; Network theorems, transient response, steady state sinusoidal response; Network graphs and their applications in network analysis; Tellegen's theorem. Two port networks; Z, Y, h and transmission parameters. Combination of two ports, analysis of common two ports. Network functions : parts of network functions, obtaining a network function from a given part. Transmission criteria : delay and rise time, Elmore's and other definitions effect of cascading. Elements of network synthesis.

5. Electromagnetic Theory Analysis of electrostatic and magnetostatic fields; Laplace's and Piossons's equations; Boundary value problems and their solutions; Maxwell's equations; application to wave propagation in bounded and unbounded media; Transmission lines : basic theory, standing waves, matching applications, misconstrue lines; Basics of wave guides and resonators; Elements of antenna theory.

6. 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, application. Transducers; Electronic measurements of non electrical quantities like temperature, pressure, humidity etc; basics of telemetry for industrial use.

7. Analog Electronic Circuits Transistor biasing and stabilization. Small signal analysis. Power amplifiers.Frequency response. Wide banding techniques. Feedback amplifiers. Tuned amplifiers. Oscillators. Rectifiers and power supplies. Op Amp PLL, other linear integrated circuits and applications.
Pulse shaping circuits and waveform generators.

8. Digital Electronic Circuits
Transistor as a switching element; Boolean algebra, simplification of Boolean functions, Karnaguh 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 converters. Semiconductor memories.

9. 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.

10. Communication Systems Basic information theory; Modulation and detection in analogue and digital
systems; Sampling and data reconstructions; Quantization & coding; Time division and frequency division multiplexing; Equalization; Optical Communication : in free space & fiber optic; Propagation of signals oat HF, VHF, UHF and microwave frequency; Satellite Communication.

11. Microwave Engineering Microwave Tubes and solid state devices, Microwave generation and amplifiers, Waveguides and other Microwave Components and Circuits, Misconstrue circuits, Microwave Antennas, Microwave Measurements, Masers, lasers; Microwave propagation. Microwave Communication Systems terrestrial and Satellite based.

12. 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 organisation, I/o System Organisation. Microprocessors : Architecture and instruction set of Microprocessors 8085 and 8086, Assembly language Programming. Microprocessor
Based system design : typical examples. Personal computers and their typical uses.

METALLURGY AND CHEMICAL ENGINEERING: *(For both objective and conventional types papers)*

1. Thermodynamics and Rate Processes: Laws of thermodynamics, activity, equilibrium constant, applications to metallurgical systems, solutions, phase equilibria, Ellingham and phase stability diagrams, thermodynamics of surfaces, interfaces and defects, adsorption and segregation; basic kinetic laws, order of reactions, rate constants and rate limiting steps; principles of electro chemistry- single electrode potential, electro-chemical cells and polarizations, aqueous corrosion and protection of metals, oxidation and high temperature corrosion - characterization and control; heat transfer - conduction, convection and heat transfer coefficient relations, radiation, mass transfer - diffusion and Fick's laws, mass transfer coefficients; momentum transfer - concepts of viscosity, shell balances, Bernoulli's equation, friction factors.

2. Extractive Metallurgy: Minerals of economic importance, comminution techniques, size classification, Flotation, gravity and other methods of mineral processing; agglomeration, pyro- hydro- and electro-metallurgical processes; material and energy balances; principles and processes for the extraction of non-ferrous metals - aluminium, copper, zinc, lead, magnesium, nickel, titanium and other rare metals; iron and steel making - principles, role structure and properties of slags, metallurgical coke, blast furnace, direct reduction processes, primary and secondary steel making, ladle metallurgy operations including deoxidation, desulphurization, sulphide shape control, inert gas rinsing and vacuum reactors; secondary refining processes including AOD, VAD, VOD, VAR and ESR; ingot and continuous casting; stainless steel making, furnaces and refractories.

3. Physical Metallurgy: Crystal structure and bonding characteristics of metals, alloys, ceramics and polymers, structure of surfaces and interfaces, nano-crystalline and amorphous structures; solid solutions; solidification; phase transformation and binary phase diagrams including iron-carbon digrams; principles of heat treatment of steels, cast iron and aluminum alloys; surface treatments; recovery, recrystallization and grain growth; industrially important ferrous and non-ferrous alloys; elements of X-ray and electron diffraction; principles of scanning and transmission electron microscopy; industrial ceramics, polymers and composites; electronic basis of thermal, optical, electrical and magnetic properties of materials; electronic and opto-electronic materials.

4. Mechanical Metallurgy: Elasticity, yield criteria and plasticity; defects in crystals; elements of dislocation theory - types of dislocations, slip and twinning, source and multiplication of dislocations, stress fields around dislocations, partial dislocations, dislocation interactions and reactions; strengthening mechanisms; tensile, fatigue and creep behaviour; super-plasticity; fracture - Griffith theory, basic concepts of linear elastic and elasto-plastic fracture mechanics, ductile to brittle transition, fracture toughness; failure analysis; mechanical testing - tension, compression, torsion, hardness, impact, creep, fatigue, fracture toughness and formability.

5. Manufacturing Processes: Metal casting - patterns and moulds including mould design involving feeding, gating and risering, melting, casting practices in sand casting, permanent mould casting, investment casting and shell moulding, casting defects and repair; hot, warm and cold working of metals, Metal forming - fundamentals of metal forming processes of rolling, forging, extrusion, wire drawing and sheet metal forming, defects in forming; Metal joining - soldering, brazing and welding, common welding processes of shielded metal arc welding, gas metal arc welding, gas tungsten arc welding and submerged arc welding; welding metallurgy, problems associated with welding of steels and aluminium alloys, defects in welded joints; powder metallurgy; NDT using dye-penetrant, ultrasonic, radiography, eddy current, acoustic emission and magnetic particle methods.

6. Process Calculations and Thermodynamics: Laws of conservation of mass and energy; use of tie components; recycle, bypass and purge calculations; degree of freedom analysis. First and Second laws of thermodynamics. First law application to close and open systems. Second law and Entropy Thermodynamic properties of pure substances: equation of state and departure function, properties of mixtures: partial molar properties, fugacity, excess properties and activity coefficients; phase equilibria: predicting VLE of systems; chemical reaction equilibria.

7. Fluid Mechanics and Mechanical Operations: Fluid statics, Newtonian and non-Newtonian fluids, Bernoulli equation, Macroscopic friction factors, energy balance, dimensional analysis, shell balances, flow through pipeline systems, flow meters, pumps and compressors, packed and fluidized beds, elementary boundary layer theory, size reduction and size separation; free and hindered settling; centrifuge and cyclones; thickening and classification, filtration, mixing and agitation; conveying of solids.

8. Heat Transfer: Conduction, convection and radiation, heat transfer coefficients, steady and unsteady heat conduction, boiling, condensation and evaporation; types of heat exchangers and evaporators and their design.

9. Instrumentation and Process Control: Measurement of process variables; sensors, transducers and their dynamics, transfer functions and dynamic responses of simple systems, process reaction curve, controller modes (P, PI, and PID); control valves; analysis of closed loop systems including stability, frequency response and controller tuning, cascade, feed forward control.

COMPUTER SCIENCE ENGINEERING (IT): *(For both objective and conventional types papers)*

1. Digital Logic: Logic functions, Minimization, Design and synthesis of combinational and sequential circuits; Number representation and computer arithmetic (fixed and floating point).

2. Computer Organization and Architecture: Machine instructions and addressing modes, ALU and data-path, CPU control design, Memory interface, I/O interface (Interrupt and DMA mode), Instruction pipelining, Cache and main memory, Secondary storage.

3. Programming and Data Structures: Programming in C; Functions, Recursion, Parameter passing, Scope, Binding; Abstract data types, Arrays, Stacks, Queues, Linked Lists, Trees, Binary search trees, Binary heaps.

4. Algorithms: Analysis, Asymptotic notation, Notions of space and time complexity, Worst and average case analysis; Design: Greedy approach, Dynamic programming, Divide-and-conquer; Tree and graph traversals, Connected components, Spanning trees, Shortest paths; Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes P, NP, NP-hard, NP-complete.

5. Theory of Computation: Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability.

6. Compiler Design: Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization.

7. Operating System: Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock, CPU scheduling, Memory management and virtual memory, File systems, I/O systems, Protection and security.

8. Databases: ER-model, Relational model (relational algebra, tuple calculus), Database design (integrity constraints, normal forms), Query languages (SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

9. Information Systems and Software Engineering: Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project, design, coding, testing, implementation, maintenance.

10. Computer Networks: ISO/OSI stack, LAN technologies (Ethernet, Token ring), Flow and error control techniques, Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http); Basic concepts of hubs, switches, gateways, and routers. Network security basic concepts of public key and private key cryptography, digital signature, firewalls.

11. Web technologies: HTML, XML, basic concepts of client-server computing.

ARCHITECTURE: *(For both objective and conventional types papers)*

1. City planning: Evolution of cities; principles of city planning; types of cities & new towns; planning regulations and building byelaws; eco-city concept; sustainable development.

2. Housing: Concept of housing; neighbourhood concept; site planning principles; housing typology; housing standards; housing infrastructure; housing policies, finance and management; housing programs in India; self help housing.

3. Landscape Design: Principles of landscape design and site planning; history of landscape styles; landscape elements and materials; plant characteristics & planting design; environmental considerations in landscape planning.

4. Computer Aided Design: Application of computers in architecture and planning; understanding elements of hardware and software; computer graphics; programming languages C and Visual Basic and usage of packages such as AutoCAD, 3D-Studio, 3D Max.

5. Environmental Studies in Building Science: Components of Ecosystem; ecological principles concerning environment; climate responsive design; energy efficient building design; thermal comfort; solar architecture; principles of lighting and styles for illumination; basic principles of architectural acoustics; environment pollution, their control & abatement.

6. Visual and Urban Design: Principles of visual composition; proportion, scale, rhythm, symmetry, harmony, datum, balance, form, colour, texture; sense of place and space, division of space; barrier free design; focal point, vista, image ability, visual survey, figure-background relationship.

7. History of Architecture: Indian Indus valley, Vedic, Buddhist, Indo-Aryan, Dravidian and Mughal periods; *European* Egyptian, Greek, Roman, medieval and renaissance periods- construction and architectural styles; vernacular and traditional architecture.

8. Development of Contemporary Architecture: Architectural developments and impacts on society since industrial revolution; influence of modern art on architecture; works of national and international architects; art novuea, eclecticism, international styles, post modernism, deconstruction in architecture.

9. Building Services: Water supply, sewerage and drainage systems; sanitary fittings and fixtures; plumbing systems, principles of internal & external drainage systems, principles of electrification of buildings, intelligent buildings; elevators & escalators, their standards and uses; air-conditioning systems; fire fighting systems, building safety and security systems.

10. Building Construction and Management: Building construction techniques, methods and details; building systems and prefabrication of building elements; principles of modular coordination; estimation, specification, valuation, professional practice; project management techniques e.g., PERT, CPM etc;

11. Materials and Structural Systems: Behavioural characteristics of all types of building materials e.g. mud, timber, bamboo, brick, concrete, steel, glass, FRP, different polymers, composites; principles of strength of materials; design of structural elements in wood, steel and RCC; elastic and limit state design; complex structural systems; principles of pre-stressing; tall buildings; principles of disaster resistant structures.

12. Planning Theory: Regional planning; settlement system planning; history of human settlements; growth of cities & metropolises; principles of Ekistics; rural-urban migration; urban conservation; urban renewal; Five-year plan; structural and sectoral plan.

13. Techniques of Planning: Planning survey techniques; preparation of urban and regional structure plans, development plans, action plans; site planning principles and design; statistical methods of data analysis; application of G.I.S and remote sensing techniques in urban and regional planning; decision making models.

14. Traffic and Transportation Planning: Principles of traffic engineering and transportation planning; traffic survey methods; design of roads, intersections, grade separators and parking areas; hierarchy of roads and levels of services; traffic and transport management in urban areas, intelligent transportation system; mass transportation planning; para-transits and other modes of transportation, pedestrian & slow moving traffic planning.

15. Infrastructure, Services and Amenities: Principles of water supply and sanitation systems; water treatment; solid waste disposal systems; waste treatment, recycle & reuse; urban rainwater harvesting; power supply and communication systems --- network, design & guidelines; demography related standards at various levels of the settlements for health, education, recreation, religious & public-semi public facilities.

16. Development Administration and Management: Planning laws; development control and zoning regulations; laws relating to land acquisition; development enforcements, urban land ceiling; land management techniques; planning and municipal administration; disaster mitigation management; 73rd & 74thConstitutional amendments; valuation & taxation; revenue resources and fiscal management; public participation and role of NGO & CBO; Institutional networking & capacity building.