

***Alternate Admission System for
Engineering Programmes in India***

Expert Committee

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Background

The current system based on multiples of entrance examinations for admission into engineering programmes has no parallel in other parts of the world. Most nations employ just one test, mostly, for assessment of scholastic aptitude instead of a plethora of evaluation tests.

The current selection systems in India have, no doubt, resulted in visible benefits; but, the future of Indian youth might need a paradigm shift in admission systems in engineering programmes for ensuring opportunity for larger sections of the society.

The extreme level of competitiveness in the screening processes employed for deciding access to professional education is not without its psychological or sociological implications for the society. They do influence the mindset and behavioural changes among the youth.

The Ministry of Human Resource Development is grappled with the need to design and develop an alternative to the current systems of multiple examinations for deciding admission of students to the engineering programmes in the country. A committee was constituted under the Chairmanship of Professor D Acharya, Director IIT Kharagpur. The Acharya Committee presented in its interim report an alternative to the present examination system for admission into engineering colleges, including IITs. While there was unanimity that the present examination system of JEE and AIEEE etc has to change to reduce the burden on students on account of the multiplicity of entrance examinations, there was emphasis that any new system has to recognize the diversity of learning within the country.

In order to address comprehensively the reality of diversity of learning within the country, the Ministry enlarged the committee with Dr T Ramasami, Secretary, Department of Science and Technology, Government of India as the Chair and Prof Acharya as the expert member from IIT. The enlarged committee consisted of some alumni of IITs including one who passed from an IIT within the last five years. The composition of the committee is as given in **Annexure 1**.

Underlying Philosophy behind Alternatives to current Test Scheme

“Unity in diversity” is the Indian brand value. Unification, while retaining the diversity of educational and learning systems in the country is the underlying strategy of the proposed alternative Test Scheme for deciding admission into engineering colleges, including IITs in the country. An overarching philosophy behind development test schemes taking for reducing the multiplicity of entrance examinations is presented in **Annexure 2**.

Lessons from Acharya Committee Report

The interim report of the Acharya Committee **Annexure 3** formed the main basis on which this alternative test scheme for engineering colleges including IITs has now been developed. Some key recommendations of Acharya committee are:

- Screening based on normalized Board scores at Standard X and/or Standard XII and Multiple Choice examination replacing the two stage JEE from 2006.
- Entry barrier is to be raised to 60% in the +2 examinations.
- Factors, other than the Standard XII marks and All India Rank (AIR) based on Physics, Chemistry and Maths (PCM) testing, such as raw intelligence, logical reasoning, aptitude, comprehension and general knowledge need to be considered.
- Need to factor in school performance more significantly into the selection process.

From the discussions held by this committee the following additional desirable features of the admission process were identified:

- Decision based on one time test needs to be re-examined. Opportunities to improve must be built in.
- Students must be relieved of the pressure of multiple JEEs. Currently a student appears on an average at 5 JEEs all within a few days of the Board Examinations.
- Influence of coaching for JEE needs to be minimised.

- Urban-rural and gender bias has to be eliminated or at least minimised.
- The objective type of examination lends itself to undue influence of coaching. The conventional pen and paper examination with well designed long and problem solving oriented questions should be revived by keeping numbers in any JEE within reasonable limits.
- JEEs, especially the IIT-JEE, have become a huge money spinning activity for coaching centres with attendant undesirable consequences.

Recognising the realities of the current situation in admission system in engineering programmes

The present system of multiple competitive examinations, as observed by Acharya Committee has emerged because of the large demand-supply gap in access to high-quality education in engineering discipline and unevenness in levels of excellence in education in various centres. Diversity challenge associated with various school boards is one of the reasons for the emergence of multiples of entrance examinations for deciding admission into engineering programmes.

It must be recognised that some competitive examinations, such as for example, joint entrance examination conducted by the IITs have proved their process integrity and gained global acclaim. IIT-JEE is a proven system that works. AIEEE is another large scale entrance examination which has gained social acceptance of high levels. Any alternative proposed should match the process integrity and robustness of JEE and AIEEE.

Since millions of talented youngsters compete for less than tens of thousands of slots in elite engineering institutions, the use of high band filters like IIT-JEE or AIEEE may, perhaps, seem essential.

Nevertheless, even while it must be recognised that most high performers in such competitive examinations are extremely talented, it is not clear as to whether IIT-JEE type examinations are not missing a section of talent base, which should not be missed.

Concerns are expressed that the guessing behaviour could be promoted among students seeking admission into engineering programmes by the models being employed by the current examination systems. Psychological and sociological dimensions of such testing and evaluation systems that focus on extremely narrow-width high band-filters are not unimportant. The unintended consequences of asymmetries in the types of clientele and challenges of social behaviour mooted by such extremes cannot be discounted.

Vast majority of youth living in smaller towns and far flung places as well as economically weaker segments of society are not able to join the competitive stream today. For the youth, the future seems to be decided just by success or otherwise in one competitive examination or other. The present system seems to be unwittingly promoting a societal behaviour and a mind set towards differentiation rather than integration.

Alternative test schemes for admission: What should they aim at?

The Alternative Test Scheme should ideally

1. evaluate the ability of the learners rather than their preparedness and competitiveness
2. reveal in a transparent, the latent potentials of the learners to match the emerging opportunities in engineering education sector and link to the development of National economy
3. aim to provide for more proportional representation of various regions and parent income levels without causing rural-urban divides
4. reduce the burden of education administration on faculty in elite engineering institutions so that their higher participation in research and academic roles could be further facilitated

5. match the rigour and process integration of best global models into the currently employed admission systems in engineering programmes in the country and
6. Offer opportunities to retain the “unity in diversity” principle of the country by permitting scientific methods of providing allowance to scholastic performances in various board examinations into deciding admission criteria into engineering programmes in the country.

Process adopted for the developing the Alternative Test Scheme

Education is much too important for any committee to overlook the consequences of inadvertent errors in decision making. Therefore, the committee chose to engage as many stakeholders as possible in designing the Alternative Test Scheme for admission into engineering programmes.

There are many state school boards which conduct their own examination for assessing their students for issuing certificates. Shear diversity of these examinations pose challenges of normalization and deciding eligibility for admission into national centres of excellence.

The multiplicity of competitive examinations leading to duplicity of efforts may be a direct result of diversities and complexities involved in the evaluation of inter-comparison of scoring systems of various school boards. As a result, most elite institutions disregard the performance in school examinations. They develop their own competitive test methods and depend too heavily on ranks and scores. Consistency of performance in different examinations is not considered necessary. Performance in single examination starts to influence the entire career opportunities leading to social implications.

While competitive examinations of the types of IIT-JEE etc based on multiple choices and negative scoring are celebrated, a recent analysis points out inherent limitations

of such systems on the one hand and the benefits of non-negative scoring methods on the other. (See Karandikar, Current Science, 99, No 8, 25th October 2010)

Alternative admission systems for engineering programmes should find innovative ways of retaining the diversity of many school boards and yet derive value from the test scores for making decisions by educational institutions. Such an innovation seems now possible and realistic. In order to select best possible alternatives, a wide spread consultations and a research study were undertaken.

Consultation

Several consultations with stake holders were made. The process of consultation included those with

1. Public through opinion poll
2. States and school boards
3. Educators from elite institutions like IITs
4. Professional Experts in Evidence-based criteria selection and
5. Statistical experts for a Modeling Study for reconstruction of past Scenario

Research Plan

Past data of scores in examinations of different school boards were sourced and analyzed for designing methods for normalization based on sound statistical tools. Evidence based and objective criteria for assessing the inter-operability of test scores of various school boards have been examined by availing the professional help of experts. Different statistical models have been constructed and investigated for reliability and ease of implementation. Systems of evaluation based on technology tools have been prioritized.

Interim report of the Acharya committee has made some important observations and recommendations on Alternative Test System (**Annexure 3**) after their own research findings. Some attempt has been made to reconstruct past scenario using data on students who have passed entrance examinations of IIT-JEE during the last five years.

The committee recommends also a research study involving a pilot test among a select group of students and evaluation of various test models for minimizing number of examinations but not rigor and challenge. It is considered necessary to consult also experts in social sciences in devising a system of reporting test results which ensures sufficient inputs to institutions for decision making and selection of the candidates without leading to negative psychological and sociological outcomes on the youth.

Public Participation in Opinion Survey

On-line opinion survey was carried out among the people of India and public opinions were sought on current competitive examination systems, employed for admission into engineering programmes. Specific views were sought on:

- Multi parametric grading system as against single test models and
- Screening out as against selection strategies

A special questionnaire, presented in **Annexure 4**, was designed and hosted on the national portal of India website maintained by NIC. The survey period remained open for three weeks during 1st and 21st June 2011. More than 2000 people responded to the study. Social network through face book was also established. There were about 400 hits for face book. Detailed report of findings from public opinion has been presented in **Annexure 5**.

The survey sought also information on responder profiles and opinion polls on various models and suggestions for alternative national test systems and on risk mitigation strategies for implementation. Suggestions received are compiled in the report on public opinion presented in **Annexure 5**.

Analysis and Internalization of Some Key Recommendations emanating from Public Opinion

An overwhelming majority of respondents (more than 70%) for the public opinion poll express their support for Alternative Test Schemes recommending avoidance of multiples of entrance examinations for admission into engineering education in the country. Support is evidenced from public opinion for a) weighing in some

transparent manner scores obtained in school board examinations, b) a mix of aptitude (like Scholastic Aptitude Test, SAT of USA) and advanced test (like IIT Joint Entrance Examination), c) offering more than one chance for candidates to take the National Level Test and d) conducting the national level test more than once in each year.

One of the serious concerns expressed by public with respect to both National Level Test and School Board Examinations is the level of process integrity in setting the question papers and in the conduct of the examinations. These are presented in **Annexure 5**.

Consultation and Cooperation with School Boards

Consultations were made with school boards for seeking permission for access to data access and enrolment of boards for undertaking research. An attempt was made to learn the concerns of states and school boards. The committee believes that it is necessary to build social trust for the alternative admission systems among the stake holders. Innovations are required for managing the diversity challenges of school board scores before they could be employed for deriving inputs for alternative systems to admission systems in elite engineering institutions like IITs.

Consultation with faculty of Elite Institutions and Opinion Leaders in Academic Bodies

Consultation with faculty of some elite institutions and opinion leaders in academic bodies has been made in the process of development of an alternative admission system. This consultation process, at various stages, focused on a) learning about their concerns, b) gathering experience, c) debating alternatives and d) building trust. The faculty and Directors of IITs participated in the selection of various approaches. Results of the public opinion survey were presented to a committee of Directors of IITs. A copy of report contained in **Annexure 5** was provided to Directors of IITs for their study. The committee believes that enrolment of faculty involved in some of the competitive examinations is critical because they form truly important share holders.

The consultation attempted to a) address the concerns of senior faculty, b) test some of the hypothesis, c) convince faculty with opposite views, if any, and d) enroll some of the faculty in implementation work.

Research on Examination Methodologies for Screening for Admission into engineering programmes

1. Work of experts of Indian Statistical Institute for normalization of scores of various school boards

Selection of evidence-based and objective criteria is critical for the acceptance of alternatives in preference to the currently established admission systems, which enjoy a high level of acceptance of the stake holders and share holders. Application of rigorous research methodologies based on open minded research has been considered necessary. A team of experts was assembled to work on a time bound manner. Evidence-based identification of criteria was the focus for development of alternatives to the current admission systems.

One of the most important points considered necessary by both this committee and Acharya Committee is that there should be a rigorous and scientific approach to factor-in scores of school boards into admission systems for engineering programmes in the country.

Indian Statistical Institute (ISI) the leading institution was assigned the task of developing methods for normalization of data on scores emanating from a various school boards. For the pilot testing of normalization concepts, data from Central Board of Secondary Education (CBSE), Tamil Nadu State School Board Examination (TNSSBE), West Bengal State Board examination (WBSSBE) and Indian Council for School Examination (ICSE) were selected. The findings of experts from ISI are presented in **Annexure 6 and 6A**.

ISI carried out all the required research investigations. For the same school board, data were analyzed as per equations 1 and 2.

$$\frac{X_1 - X_2}{X_3 - X_2}$$

eq. 1

Where X_1 = is the mark obtained by each candidate, X_2 = is the mark of the selected percentile rank holder, X_3 = is the maximum mark scored by any candidate. In this correlation, scores will range between 0 and 1 as shown in **Figure 1**(Anexure-6). In the correlation of ratios of scores obtained by candidate and score of the percentile cutoff selected as in **Eq.2** seems to maintain linearity over a larger range as in **Figure 2**. (Anexure-6).

$$\frac{X_1}{X_2} \quad \text{eq. 2}$$

Stability of scores of each board over different years was first tested out by examining the profiles of percentile scores over a period of time. Experts of ISI reported that through monotone transformation, it will be possible to map the profiles of all boards onto one selected board and create a normalization routine. Profiles for the four boards are presented in **Figure 3 and 4** (Anexure-6).

Normalized percentile ranks with different cut offs for all boards have been computed (as for example 75%) as in eq 3

$$\frac{(\text{Percentile rank of student} - 75)}{100-75} \times 100 \quad \text{eq.3}$$

When normalized percentile rank is correlated against percentile rank with say cut-off at 75%, a linear relation is obtained as in **Figure 5** (Annexure-6). Experts from ISI report that the same linear correlation as in **Figure 5** (Annexure-6) will be the same for any board for any year.

2. Some Recent Work on Selection of Types of Examinations for Screening

Recently Karandikar (Current Science, 99, no 8, October 2010, **Annexure 7**) has analyzed the consequences of multiple choice tests and negative marking as practiced recently in several screening examinations. Such methods are employed also in the entrance examinations employed for admission into engineering programmes in the country. Impact of marking schemes with negative scoring and multiple choices has been examined using principles of statistics. Models were

postulated for distribution of marks and guessing behavior of the candidates when they do not know the correct answer. The work has simulated statistical outcome of such tests and probabilities of candidates who should not have been selected getting selected because of random guessing. Probabilities of gate-crashing into the selection list through multiple choice examinations with unique right answer and negative marking have been examined.

The work highlights the value of traditional question-answer tests where the candidate is required to write down the solution along with steps rather than objective tests with multiple choices and one right answer. The work recommends that if for practical reasons, screening tests were to resort to multiple choice tests where evaluation is done through the use of computers, a better alternative would be to design tests with more than one correct answers and give credits based on students selecting all right answers and not select any wrong answer.

The recent work of Karandikar further reiterates and supports the position of the Committee that some weighting of the school board examinations would be gainful. Since School boards could deploy the traditional question-answer tests where a candidate is required to write down solutions, any weighting scheme which allows considerations for the scores obtained in school boards would be valuable based on the recent work of Karandikar.

The merits of conducting objective tests based on multiple choices for testing advanced knowledge of candidates for admission into education programmes are to be evaluated in light of other factors as well. Whereas such tests are useful for assessing the aptitude, proficiency in advanced knowledge is perhaps better tested out through tests where the candidates are expected to write down the solutions, as was the case in IIT-JEE in earlier years and school board examinations currently.

General Approach Suggested for Alternative Admission System for engineering programmes

The committee suggests an approach to employ scores obtained by the same candidate in different types of examinations rather than to rely entirely upon the performance in one screening type examinations like IIT-JEE or AIEEE

Now that a reasonable model has been devised by professional experts from ISI for normalization of score from different boards, the committee recommends one of the two possible specific approaches.

Approach 1

- weighing consistency of performance in school board examinations and employ them for testing ability to write solutions and
- One objective screening test with two sections; one for testing the aptitude and the other advanced knowledge in domain areas.

Approach 2

- weighing consistency of performance in school board examinations and employ them for testing ability to write solutions and
- one objective aptitude test based on multiple choices and computer based correction systems

Objective tests for assessment of aptitude employing multiple choices and evaluation using computer assisted testing could be designed in the general pattern of Scholastic Aptitude Test of the USA.

Advanced tests for evaluating knowledge in domain areas could be designed and fashioned in the shape of Joint Entrance Examination of IITs with one improvement suggested by Karandikar, namely choices of answers bearing more than one right answer and avoiding Gate-crashing of the wrong candidates into the selection list.

Both Aptitude and Advanced tests could be included in the same paper, giving the option of choosing to take both aptitude and advanced knowledge or not to the candidate.

Each candidate might be permitted a maximum of three chances to take the National Level Screening Test. The committee recommends that National Level Screening Test could be conducted at least twice a year.

Individual institutions could be given the liberty of choosing weighting factors for different examinations within a specified guideline. For example, IITs could choose about 40% weighting for school board scores and 30% each for aptitude and advanced tests respectively whereas some other state based institution could weigh school board scores as per the revised normalized system as high as 70% and National Level Screening Aptitude test at 30%.

The committee believes that it is important to avoid multiple screening tests and proportional weighting of multiple types of tests already being conducted which would avoid outweighing one mode of testing, where preparedness and gate crashing of non-ideal candidates could not be ruled out.

Suggestions for Factorizing Normalization of board scores into screening process

Aggregate percentage scores of candidates in class XII examination of their respective boards could be first converted into percentile ranks of their own respective boards and then normalized through percentile ranks as in eq.3 for common cut off and each candidate is accorded normalized percentile rank irrespective of the board which conducted the examination. This could be expressed in the form of normalized grade for school board and termed as **A₁**.

A similar exercise could be carried out also for the aggregate percentage in the subject examinations of relevance to the higher education desired by the candidate for example all science subjects for seeking admission into engineering and termed as **A₂**.

By according equal weighting to both aggregate percentages and subject scores, half of $(A_1 + A_2)$ could be computed for each candidate and **A₃** reported as corresponding to class XII performance.

Performance at the National Level Screening Test in the aptitude section could be evaluated separately and accorded a national score A_4 .

Performance at the National Level Screening Test in the advanced section could be evaluated and each candidate is accorded a National score A_5 .

Suggestion of different options

Option 1: Deployment of Scores as criteria based on class XII performance only

- Equal weighting of school board scores A_1 and A_2
 - Equal weighting of aptitude scores A_4 and advanced scores A_5
- Normalized score $= \{A_1 + A_2 + A_4 + A_5\}/4$

Option 2: Deployment of Scores as criteria based on class XII performance only

- Equal Weighting of board score A_3
 - Equal Weighting of Aptitude scores A_4 and A_5
- Normalized score $= \{A_3 + A_4 + A_5\}/3$

Option 3: Deployment of Scores as criteria based on consistency of performance at class X and Class XII levels as well as in National Level Aptitude and Advanced Tests

- Equal weighting for aggregate as well as subject performance at class X and Class XII levels where $0.1X$ (normalized score at class X in aggregate + normalized score at class X in subjects of choice + normalized score at class XII + normalized score at class XII in subjects of choice)
 - One third weighting of aptitude score $0.3 A_4$
 - One third weighting of advanced score $0.3 A_5$
- Normalized score $= 0.1\{ \text{Normalized aggregate class X} + \text{normalized class X subject score} + \text{Normalized class XII aggregate} + \text{Normalized class XII subject score} \} + 0.3 A_3 \text{ and } 0.3 A_5$

Option 4: Deployment of School Board Performance as screening but not as determinant for National ranks

- Specify a Cut-off normalized percentile rank score for school performance say as 80 or 85 percentile rank
- 50% weighting of National Level Aptitude score A_4 for candidates passing the cut off of percentile rank
- 50% weighting of National Level Advanced Score A_5 for candidates passing the

$$\text{Normalized score} = 0.5 A_4 + 0.5A_5$$

Option 5: Deployment of School Board performance as subject score and National Level Aptitude Test as a combination and avoid the Advanced Testing system according freedom for the individual institutions to select mixing proportions within a pre-specified guideline

Option 6: Equal weighting of School Board performance as subject score and National Level Aptitude Test as objective test system where

$$\text{Normalized score} = 0.5 A_2 + 0.5A_4$$

Further Work Suggested

1. There are as many as 42 school boards in the country conducting examinations at school levels. They conduct examinations in slightly varying schedules. Such differing schedules may pose challenges. Some work may be required to align the time schedules of board examinations and National Screening Tests.
2. Although ISI seems to have developed a scientific methodology for normalization of school boards' scores based on a pilot study involving four typical school boards, it may be necessary to access data from all the 42 boards and test run the findings of the experts of ISI.

3. It will be beneficial to apply the recommended methodology on candidates selected for admission into IITs, NITs during the last four years using the data on current students sourcing data from IIT-JEE and AIEEE as well as school boards scores at class X and XII levels. This will help us ground truthing and revalidation of proposed methods.

Recommendations of the Committee

The committee makes the following recommendations for the consideration of the IIT council

A. Normalization of School Board Scores

- ISI has proposed a method for normalization of scores of candidates of various school boards and demonstrated its potential to derive normalized scores. This method seems to offer possibility to factorize performance in school board examination as a criterion for merit-ranking of students for admission into higher education.
- ISI may be commissioned by IIT Council to further refine the methodology and establish it's potential by proving its utility for normalization of all board scores over a period of time based on past data.
- The method of ISI may be revalidated by some other institution as well for ease of application

B. National Screening Test Scheme

- One National Screening Test (NST) with two sections namely Aptitude and Advanced could be designed and developed.
- The test could be of 3.5 to 4 hour duration with an option for the candidates to opt out of advanced test after examining the paper for say 15 minutes.
- Aptitude test section could employ multiple choice questions which enable evaluation using a computer
- Advanced Test section could involve multiple choices with multiple right answers and minimization of Gate-crashing by candidates with limited merit
- An expert committee of educators could be constituted for designing best fit models of National Screening Test methodologies

C. Testing and Evaluation related Organizational matters

- IITs may be assigned the task of designing the Alternative Screening Test
- While question papers may be set-up by experts drawn from educational institutions like IITs, IISc, NITs etc, the logistics support for conducting and evaluating examination papers may be assigned to a specialist organization taking into account of the large scale of the operation and need for professionalization.

D. Enrollment of Policy Bodies

- A project for creating past scenario may be commissioned to IITs, NITs and leading universities based on employing methods developed through research.

E. Order of Preference of the Committee

The committee has considered various options. Some order of preference is indicated for discussion and finalization by the council of IIT for making decisions.

Recommended order of Preference of options

1st Preference: Option 2

Equal weighting of school board scores at class XII (of both aggregate and science scores) A_3 , national level aptitude, A_4 and Advanced A_5 scores, $\{A_3 + A_4 + A_5\}/3$

2nd Preference: Option 6

Equal weighting of School Board performance as subject score and National Level Aptitude Test as objective test system;

$0.5 A_2 + 0.5 A_4$

3rd Preference: Option 5

Deployment of School Board performance as subject score and National Level Aptitude Test as a combination and avoid the Advanced Testing system according freedom for the individual institutions to select mixing proportions within a pre-specified guideline

4th Preference: Option 4

Deployment of School Board Performance as screening but not as determinant for National ranks (as for example Specified Cut-off: normalized percentile rank score for school performance say as 80 or 85 percentile rank)

Equal weighting of National Level Aptitude score A_4 for candidates passing the cut off of percentile rank and Equal weighting of National Level Advanced Score A_5 for candidates passing the cut off of percentile rank; $(0.5 A_4 + 0.5A_5)$

5th Preference: Option 1

Deployment of Scores as criteria based on class XII performance

Equal weighting of school board scores A_1 and A_2 and Equal weighting of aptitude scores A_4 and advanced scores A_5 ;

$$\{A_1 + A_2 + A_4 + A_5\} / 4$$

6th Preference: Option 3

Deployment of Scores as criteria based on consistency of performance at class X and Class XII levels as well as in National Level Aptitude and Advanced Tests

Equal weighting for aggregate as well as subject performance at class X and Class XII levels where $0.1X$ (normalized score at

class X in aggregate + normalized score at class X in subjects of choice + normalized score at class XII + normalized score at class XII in subjects of choice); One third weighting of aptitude score 0.3 A₄

One third weighting of advanced score 0.3 A₅;

0.1{ Normalized aggregate class X + normalized class X subject score + Normalized class XII aggregate + Normalized class XII subject score} + 0.3 A₃ and 0.3 A₅

Concluding Remarks

Complexities of developing alternative test schemes for deciding admission in engineering programmes arise from a) diversity and b) scale of operations. The committee is conscious of the ground realities and the challenge of suggesting alternative methods for some test and evaluation systems, which have gained social esteem and trust. Therefore, the committee has relied on scientific tools for gathering evidence as much as possible and not on perception based approaches. The committee is of the view that changes in paradigms are essential in this phase of development of India.

One National Screening Test for admission into engineering programmes supported by methodologies for factorizing scores obtained in school board examinations while retaining their diversities seems the way forward. The committee does make a strong case for such a change in paradigm.

Some options have been recommended. The committee has consciously adopted a probabilistic rather than deterministic approach taking into account of complexities involved in the exercise. The committee is also conscious of the fact that some of the recommendations may have relevance outside the scope of admission into IITs into other engineering programmes.

As a measure of abundant caution, the committee recommends selection from among the six options by an expert committee taking into account of challenges of convincing the society of the security of normalization methodologies of scores of school board examinations developed by ISI on the basis of scientific tools.

Acknowledgement

The committee thanks the Ministry of Human Resource Development for the opportunity to participate in this important National endeavor. Members of the committee have consulted several experts and students individually and collectively. Many experts from NIC, DST, IITs, ISI, Chennai Mathematical Institute and general public participated in this study and in preparation of this draft report. Their support and cooperation is acknowledged. The help of Dr. Parveen Arora, Scientist, Department of Science and Technology in preparation of the report is gracefully acknowledged.

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Post Script

The draft report was presented to the IITs Council in the meeting held on 14th Sept, 2011 at IIT, Delhi. The Council has accepted and approved the principle enshrined in the report.

The Council has authorized a small group of IIT Directors to meet and select the preferred options while indicating the preference for Option 2 and 6.

The Committee recommended that an Internal Committee may analyse and select the preferred options from among those recommended in this report.

There is a latent potential to enlarge the scope of this work and embark upon a single National Test Scheme for admission into tertiary education after due consultations with States and other experts from the academic sector.

While the challenges involved in formulating a National Test Scheme would be enormous, the benefits to the next generation of learners could be significant. The Committee recommends a further examination of the possibility for a national test scheme for tertiary education after due consultations and examination.