

On JEE



Milind Sohoni
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Terms of Reference

- A. To recommend structure of a single exam that tests the **understanding, conceptual clarity, and innovative thinking** of students for admission to IITs and NITs.
- B. To find means in the exam structure that would reduce the pressure on students and reduce dependence of students on the coaching centres, without diluting the quality of testing.

Their Recommendations

R1. Formation of a National Testing Agency on the lines of ETS, an agency of the USA.

R2. Formulation and administration of of an aptitude test. Use of this test to select about 4 lakh students who will write the JEE for admission into IIT, NIT and CFTI system.

R3. No significant change in the content and mode of the JEE.

R4. More official test material from JEE office to counter coaching.

R5. Improvement in school curricula and pedagogy.

R6. Preparing a continuum of institutions from CFTIs to state government institutions and lower down to lower stress and reduce coaching

Lets see...

A. To recommend structure of a single exam that tests the understanding, conceptual clarity, and innovative thinking of students for admission to IITs and NITs.

R3. No significant change in the content and mode of the JEE.

R6. Preparing a continuum of institutions from CFTIs to state government institutions and lower down to lower stress and reduce coaching

The data

	JEE 2011		JEE 2012		JEE (Advanced) 2014	
Cohort	Registered	Qualified	Registered	Qualified	Registered	Qualified
Village	19%	10%	19%	11%	13%	10%
Town	29%	25%	29%	26%	19%	14%
City	52%	65%	52%	63%	68%	76%

	JEE 2012			JEE (Advanced) 2013		
	Appeared	Qualified	Pass %-age	Appeared	Qualified	Pass %-age
Boys	337916	21226	6.28	103660	18468	17.8
Girls	168568	2886	1.71	23089	2366	10.2
%-age of Girls	33.2	11.9	-	18.2	11.4	-

More: 50% students from CBSE! Creating CBSE-fication of urban and peri-urban areas. Interfering with state agenda!

More data

CBSE 2013 Statistics.						
	Appeared	Secured marks	90% %age of total	Secured marks	95% %age of total	
Boys	512210	22596	4.4	2855	0.56	
Girls	376410	22053	5.8	3237	0.86	
%-age of Girls	42.4	49.3	-	53.1	-	

- Other data: Students with family income over 5 lakhs p.a. are 6 times more likely to succeed than those with income less than 1 lakh p.a.
- Analysis: Group coaching experience seems essential.

Conclusion

The JEE: Systematic Exclusion!

What can MCQ test?

How can MCQ rank?

1. JEE Advanced 2015: Question 6, Paper 1. A nuclear power plant supplying electrical power to a village uses a radioactive material of half life T years as the fuel. The amount of fuel at the beginning is such that the total power requirement of the village is 12.5% of the electrical power available from the plant at that time. If the plant is able to meet the total power needs of the village for a maximum period of nT year, then the value of n is: (suggested correct answer is 3).
2. JEE Advanced 2014: Question 33, Paper 1, Code 1. Among PbS , CuS , HgS , MnS , Ag_2S , NiS , CoS , Bi_2S_3 and SnS_2 , the total number of BLACK coloured sulfides is: (Suggested correct answers are 5 and 6).
3. JEE Advanced 2014: Question 14, Paper 1, Code 1. Two parallel wires in the plane of the paper are distance X_0 apart. A point charge is moving with speed u between the wires in the same plane at a distance X_1 from one of the wires. When the wires carry current of magnitude I in the same direction, the radius of curvature of the path of the point charge is R_1 . In contrast, if the currents I in the two wires have directions opposite to each other, the radius of curvature of the path is R_2 . If $X_0/X_1=3$ then the value of R_1/R_2 is? (suggested correct answer is 3).

understanding, conceptual clarity, and innovative thinking?
Engineering aptitude?

Is Ranking statistically sound?

Can it test?

How to draw the region's map? How to understand spatial systems?

How to test a chulha? How do decide on the attributes? How to set up an experiment?

How to describe a situation-say a water-supply scheme? Or a railway station?

How to construct an argument?

Can it test scientific temper?

Yet we claim it can test understanding of Gauss's law, Reimer-Teiman reaction!

Placements

Placements IIT Bombay 2013				
Sector	Engineering	Finance	Consulting	IT
Super-GG	25 (27.7)	10 (35.0)	7 (54.0)	42 (51.3)
GG	116 (7.9)	82 (11.7)	110 (9.6)	102 (10.0)
IG	54 (6.5)	19 (7.2)	11(5.8)	28 (7.2)
GI	24 (9.3)	10 (14.2)	10 (5.2)	5 (9.3)
II	64 (6.5)	13 (9.5)	8 (5.8)	22 (7.9)

- BCR and others: wide-spread disinterest
- GATE: same story.
- *IIT Mandi has 5 students from HP!*

Conclusion

Admissions need fixing!

Our training need fixing!! Most students have not been out of IIT, cannot set up an experiment, cannot write a report, have not seen a factory. Cannot design for society!

Side-effect: NSSO data on spending

Table 5. Average household spending on education by families having one studying member (our analysis of 68th round, NSSO, 2012).

		Andhra Pradesh Urban	Andhra Pradesh Rural	Rajasthan Urban	Rajasthan Rural	Odisha Urban	Odisha Rural	Tamil Nadu Urban	Tamil Nadu Rural
Households with one studying male	Mean (Rs.)	9919	5706	19096	4362	5765	1787	11046	8493
	Number of Samples	365	373	235	263	143	291	373	293
	Gini	0.61	0.58	0.56	0.64	0.65	0.70	0.64	0.67
Households with one studying female	Mean (Rs.)	9233	3752	9369	3431	4278	2292	12653	6949
	Number of samples	281	245	98	126	94	191	321	259
	Gini	0.61	0.55	0.60	0.56	0.82	0.76	0.65	0.69

Coaching is endemic and spending is highly unequal

Other Side-Effects of Poor Testing Regimes

- Bad curricula - Poor science at the school level and later. CBSE-fication and English medium.
- Bad practices - Poor engineering outcomes in society at large.
- Centralization of Engineering-in contravention of Article 65

“Co-ordination and determination of standards in institutions for higher education or research and scientific and technical institutions”.

- *JEE may qualify students. Can it rank? That is the state's prerogative.*
- *CFIs : behaving like rogue elephants-huge funding, huge side-effects, no accountability. Sorry-publish papers in international journals-*

living on borrowed rigour.

Suggestion

Must move two pieces simultaneously

- Curricula and research
 - *Real and practical*
 - Regional industry, problems, collaborations, development
 - See e.g., UDCT of the 1980s
 - National and strategic
- Admissions - the right students to do it

Academics, Admission and Research

- CFTIs have a major role to play in:

R6. Preparing a continuum of institutions from CFTIs to state government institutions and lower down to lower stress and reduce coaching

- Recognize that gap between IITB, IITD, other IITs, NITs and state colleges not as much as branding indicates. Break vicious cycle.
- Make academics and research regional-**real engineering and scientific temper. Focus on real outcomes.**
- Eventually, let state, GoI and IITs together decide on how and what to teach and research, how to fill seats-**priorities of regional and industrial development**

My recommendation

- Have a single JEE in MCQ format to short-list top 20%, i.e., roughly 2 lakhs.
- Advanced JEE non-MCQ to test coverage and argument.

Qualify, Dont Rank

Qualify to sit in IIT courses, NIT courses

- **Intermediate step:** 50% by Advanced JEE ranks, 50% to state for qualified candidates-*watch and measure!*
- Eventually base selection based on (i) engineering uptake after graduation, (ii) regional needs.

Thanks

