NSEA - 2016

A Detailed Analysis by Resonance

INTRODUCTION

On 27nd November 2016, NSEA (National Standard Examination in Astronomy) – 2016 exam was conducted by the Indian Association of Physics Teachers (IAPT) at many centers all over the country. NSEA is the stepping stage for selection of aspiring and talented students in the astronomy Olympiad Program. The student can move forward to other stages only after clearing this stage.

Eligibility: Only Indian citizens with date of birth between 1 July 1997 and 30 June 2002, both days inclusive and studying in Class XII or lower as of November 30, 2017, can apply and appear for NSEP 2016. The student has to himself re-assure his eligibility. At any stage if the student is found to be not eligible for the exam, he/she may be disqualified from the program.

Syllabus: The syllabus for National Standard Examination in Astronomy (NSEA) is almost similar as the curriculum of senior secondary level (Class XI and Class XII) of CBSE. However, only basic guideline for the course is mentioned. No detailed syllabus is given for NSEA. There is greater emphasis on physics and mathematics (calculus not asked) and elementary astronomy.

Question Paper: The medium of test was English only and it comprised of 80 objective type questions, each with only one of the four options correct with 3 marks each and -1 negative marking for incorrect answer.

Qualifying for the Second Stage: The basic objective of conducting this test is not focusing on merit but to involve as many students from the country to participate in the exam and try to show and expose their talent. Hence the selection to the stage II examinations i.e. Indian National Olympiad Examinations (INOs) is based on the following scheme.

- **Cutoff:** To be eligible to get to the next level, i.e. the second stage, it is necessary that a student scores at-least a Minimum Admissible Score (MAS) which is 40% of the maximum score.
- **Proportional Representation Clause:** The maximum number of students that can get to Stage II (INO) in each subject is around 300. These many students are not selected only on the merit basis but also on proportionate basis. This proportion is decided on the base of the number of candidates who appeared for NSE in the previous year from that center in each State or Union Territory (UT). In case there is a tie at the last position, then all the students competing for the last position will be eligible to move to stage II. However it's necessary that the selected students fulfill the eligibility clause laid out above. The total number to be selected from centers in each State for each subject will be displayed on the IAPT and HBCSE website.

- **Minimum Representation Clause:** Notwithstanding the proportional representation clause the number of students selected for INO from each State and UT must be at least one, provided that the eligibility clause is satisfied.
- **Merit Clause:** As stated above, approximately 300 students are to be selected for second stage. If this does not happen according to MAS, then after selection as per merit, the shortfall from 300 students will be selected based purely on merit without further consideration to proportional representation and minimum representation clauses. In the event of a tie at the last position in the list all students with the same marks at this position will qualify to appear for the Stage II examination.

There will be no other criterion or provision for selection to the Indian National Olympiad Examinations (INOs). All students who qualify to appear for the INAO get a certificate of merit from IAPT.

Overall Marks Distribution

The paper pattern was same as last year. The paper had 80 questions each worth 3 marks. All questions were objective type with single correct option each carrying 1 negative mark for incorrect attempt. The subject wise breakup is as follows:

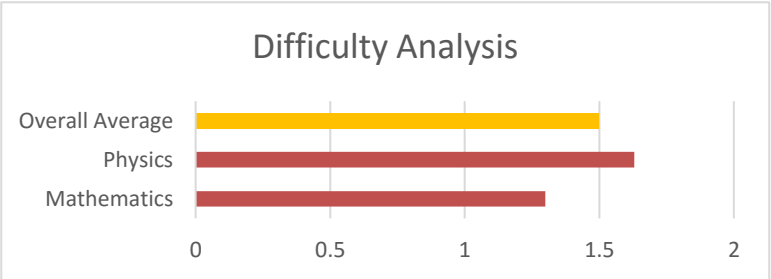
SUBJECT	Class 11		Class 12		Total	
	No of Questions	Total Marks	No of Questions	Total Marks	No of Questions	Total Marks
Mathematics	25	75	8	24	33	99
Physics	21	63	26	78	47	141
Grand Total	46	138	34	102	80	240

Overall Difficulty Level Analysis

In this analysis we have rated every question on a scale of 1 to 3. The ratings are done by expert faculty of Resonance. The individual ratings are then averaged to calculate overall difficulty level.

- 1: Easy
- 2: Moderate
- 3: Difficult

Subject	Difficulty Level
Mathematics	1.30
Physics	1.63
Overall Average	**1.5**



Difficulty Level Analysis: No of Questions

Subject	Easy Level		Medium Level		Difficult Level	
	No of Questions	Total Marks	No of Questions	Total Marks	No of Questions	Total Marks
Maths	23	69	10	30		
Physics	20	60	24	72	3	9
Grand Total	43	129	34	102	3	9

Resonance Experts feel that all subjects were of similar difficulty level, while Mathematics was on tougher side compared with Physics. While around 129 Marks can be considered easy overall, 102 marks are moderately difficulty and 9 marks are considered difficult by Resonance Team.

Overall, it is felt by Resonance Faculty Team that paper was on easier side compared to last year.

SUBJECT WISE ANALYSIS

MATHEMATICS ANALYSIS

Unit & Topic Name	No of Questions	Total Marks	% Weightage
MATHEMATICS	**33**	**99**	**100.00%**
Application of Derivative	**3**	**9**	**9.09%**
Geometrical problem	1	3	3.03%
Maxima/Minima	2	6	6.06%
Binomial Theorem	**1**	**3**	**3.03%**
Expansion	1	3	3.03%
Circle	**1**	**3**	**3.03%**
Circumcircle	1	3	3.03%
Complex number	**2**	**6**	**6.06%**
Angle	1	3	3.03%
Introduction (iota)	1	3	3.03%
Conic	**1**	**3**	**3.03%**
Introduction	1	3	3.03%
Continuity & Derivability	**1**	**3**	**3.03%**
Differentiability	1	3	3.03%
Definite Integration	**1**	**3**	**3.03%**
Properties	1	3	3.03%

Function	**2**	**6**	**6.06%**
Inverse function	1	3	3.03%
Periodic function	1	3	3.03%
Fundamental of mathematics	**9**	**27**	**27.27%**
Graph	1	3	3.03%
Logarithms	2	6	6.06%
Number system	6	18	18.18%
Limit of function	**1**	**3**	**3.03%**
Standard limit	1	3	3.03%
Mathematical Reasoning	**2**	**6**	**6.06%**
Negation	1	3	3.03%
Statement	1	3	3.03%
Permutation combination	**1**	**3**	**3.03%**
Geometrical	1	3	3.03%
Quadratic equation	**1**	**3**	**3.03%**
Theory of equation	1	3	3.03%
Sequence & Series	**1**	**3**	**3.03%**
A.M. ³ G.M	1	3	3.03%
Set & Relation	**4**	**12**	**12.12%**
Cartesian product	4	12	12.12%
Trigonometric Ratio & identities	**1**	**3**	**3.03%**
Ratio	1	3	3.03%
Vector	**1**	**3**	**3.03%**
Dot product	1	3	3.03%
Grand Total	**33**	**99**	**100.00%**

PHYSICS ANALYSIS

Unit & Topic Name	No of Questions	Total Marks	% Weightage
PHYSICS	**47**	**141**	**100.00%**
Calorimetry	**2**	**6**	**4.26%**
Calorimetry	1	3	2.13%
Calorimetry	1	3	2.13%
Circular motion	**1**	**3**	**2.13%**
Kinematics of circular motion	1	3	2.13%
COM	**1**	**3**	**2.13%**
Oblique collision	1	3	2.13%
Current electricity	**2**	**6**	**4.26%**
Instruments	1	3	2.13%

Resistance	1	3	2.13%
EMF	**1**	**3**	**2.13%**
Magnetic field due to a straight wire	1	3	2.13%
Fluid	**4**	**12**	**8.51%**
Archimedes principle and force of buoyancy	3	9	6.38%
Miscellaneous	1	3	2.13%
Friction	**1**	**3**	**2.13%**
Static Friction (General)	1	3	2.13%
Geometrical optics	**5**	**15**	**10.64%**
Lens	1	3	2.13%
Dispersion of Light	1	3	2.13%
Plane Mirror	1	3	2.13%
Refraction in general , Refraction at plane surface and T.I.R.	1	3	2.13%
Spherical Mirror	1	3	2.13%
Gravitation	**16**	**48**	**34.04%**
Kepler's law for Satellites, Orbital speed and Escape speed	10	30	21.28%
The Earth and Other Planets Gravity	1	3	2.13%
Universal law of gravitation	5	15	10.64%
KTG	**1**	**3**	**2.13%**
Root mean square velocity, Kinetic Energy and equation of state	1	3	2.13%
Mathematical Tools	**1**	**3**	**2.13%**
Miscellaneous	1	3	2.13%
Miscellaneous	**2**	**6**	**4.26%**
Miscellaneous	2	6	4.26%
Newton's laws of motion	**2**	**6**	**4.26%**
Constrained motion	2	6	4.26%
RBD	**1**	**3**	**2.13%**
Rotational Equilibrium	1	3	2.13%
Rectilinear Motion	**1**	**3**	**2.13%**
velocity, acceleration, average acceleration	1	3	2.13%
Rigid Body Dynamics	**3**	**9**	**6.38%**
Combined translational & Rotational Motion (Dynamics)	2	6	4.26%
Torque	1	3	2.13%

Sound wave	**2**	**6**	**4.26%**
Doppler Effect	1	3	2.13%
Speed of sound	1	3	2.13%
UNITS AND MEASUREMENT	**1**	**3**	**2.13%**
UNITS AND MEASUREMENT	1	3	2.13%
Grand Total	**47**	**141**	**100.00%**

EXPECTED CUTOFF

To be eligible to get to the next level, i.e. the second stage, it is necessary that a student scores at-least a Minimum Admissible Score (MAS) which is 40% of the maximum score. However, all students scoring 80% of the average of top 10 students will be considered qualified (Merit Clause).