NSEA - 2017

A Detailed Analysis by Resonance

INTRODUCTION

On 26th November 2017, NSEA (National Standard Examination in Astronomy) – 2017 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 1998 and 30 June 2003, both days inclusive and studying in Class XII or lower as of November 30, 2017, can apply and appear for NSEA 2017. 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. The student must not be appearing in NSEJS 2017.

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
Astronomy	8	24	1	3	9	27
Mathematics	24	72	7	21	31	93
Physics	20	60	20	60	40	120
Grand Total	52	156	28	84	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
Astronomy	1.33
Mathematics	1.71
Physics	1.42
Overall Average	**1.54**

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
Astronomy	6	18	3	9		
Mathematics	13	39	14	42	4	4
Physics	22	66	15	54		
Grand Total	41	123	35	105	4	4

SUBJECT WISE ANALYSIS

ASTRONOMY ANALYSIS

Unit & Topic Name	No of Questions	Total Marks	% Weightage
Astronomy	9	27	100.00%
Gravitation	8	24	88.89%
escape velocity	1	3	11.11%
Gravitational Field	3	9	33.33%
Kepler's law	1	3	11.11%
Miscellaneous	3	9	33.33%
Miscellaneous	1	3	11.11%
Astronomy	1	3	11.11%
Grand Total	**9**	**27**	**100.00%**

MATHEMATICS ANALYSIS

Unit & Topic Name	No of Questions	Total Marks	% Weightage
Mathematics	31	93	100.00%
Basics	1	3	3.23%
Number Theory	1	3	3.23%
Circle	3	9	9.68%
Miscellaneous	1	3	3.23%
Orthogonally	1	3	3.23%
Parametric	1	3	3.23%
Complex Numbers	1	3	3.23%
Geometry(SL line, Circle,triangle,conic)	1	3	3.23%

Conics	2	6	6.45%
Ellipse	1	3	3.23%
Parabola	1	3	3.23%
Definite Integrals	1	3	3.23%
Definite Integration standard properties	1	3	3.23%
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Definite Integration standard properties	1	3	3.23%
Limits	2	6	6.45%
L-Hospital Rule	1	3	3.23%
Use of expansion	1	3	3.23%
Method of Differentiation	1	3	3.23%
General	1	3	3.23%
Permutation & Combination	5	15	16.13%
Arrangement of given no. of objects from distinct objects	2	6	6.45%
DE arrangement, exponent of prime, principle of inclusion and exclusion	1	3	3.23%
General Equation	1	3	3.23%
General Questions	1	3	3.23%
Probability	2	6	6.45%
Classical diff. (fundamental), Coin, dice, cards	1	3	3.23%
Others (P & C based)	1	3	3.23%
Quadratic Equation	2	6	6.45%
Nature of roots	1	3	3.23%
Theory of Equation	1	3	3.23%
Sequence & Series	1	3	3.23%
Misc.	1	3	3.23%
Solution of triangle	6	18	19.35%
Length of Altitude	1	3	3.23%
Misc.	1	3	3.23%

Radii-In radius, circumradii etc.	2	6	6.45%
Sine rule-cosine rule, Napier's Analogy	2	6	6.45%
Straight Line	2	6	6.45%
Equation of line various form (except parametric)	1	3	3.23%
Point and line (Distance, Foot, Image)	1	3	3.23%
Trigonometry	1	3	3.23%
Trigonometric ratio & identities	1	3	3.23%
Grand Total	**31**	**93**	**100.00%**

PHYSICS ANALYSIS

Unit & Topic Name	No of Questions	Total Marks	% Weightage
Physics	40	120	100.00%
Capacitance	2	6	5.00%
Energy stored in a capacitor	1	3	2.50%
Parallel Plate Capacitor	1	3	2.50%
Circular Motion	1	3	2.50%
Kinematics of circular motion	1	3	2.50%
Current Electricity	2	6	5.00%
Temperature dependence	1	3	2.50%
Use of KCL and KVL	1	3	2.50%
Electromagnetic Wave	1	3	2.50%
Electromagnetic Wave	1	3	2.50%
Electrostatics	2	6	5.00%
Electric field	1	3	2.50%
Potential	1	3	2.50%
Error in measurement	1	3	2.50%
Maximum Permissible error	1	3	2.50%
Fluid Mechanics	1	3	2.50%
Archimedes Principle	1	3	2.50%

Geometrical Optics	4	12	10.00%
Mirror	1	3	2.50%
Miscellaneous	1	3	2.50%
Optical instrument	1	3	2.50%
Plane mirror	1	3	2.50%
Heat Transfer	5	15	12.50%
Conduction	1	3	2.50%
Miscellaneous	1	3	2.50%
Radiation, Steffen's law and wein's law	2	6	5.00%
Rotation Steffens law	1	3	2.50%
Kinematics	3	9	7.50%
Projectile from a tower	1	3	2.50%
Rectilinear motion	1	3	2.50%
Trajectory	1	3	2.50%
KTG & Thermodynamics	2	6	5.00%
Adiabatic process	1	3	2.50%
Kinetic theory of gases	1	3	2.50%
Magnetic effect of current	1	3	2.50%
Force on a current carrying wires	1	3	2.50%
Modern Physics-2	2	6	5.00%
Mass defect & binding energy	1	3	2.50%
Miscellaneous	1	3	2.50%
Newton's Law of motion	1	3	2.50%
Action reaction pair	1	3	2.50%
Optical Instruments	1	3	2.50%
Eye defects	1	3	2.50%
Projectile Motion	3	9	7.50%
Ground to Ground Motion	1	3	2.50%
Motion in a plane	1	3	2.50%
Projectile from moving objects	1	3	2.50%

Relative motion	1	3	2.50%
Relative motion in two dimension	1	3	2.50%
Rigid Body Dynamics	1	3	2.50%
Toppling	1	3	2.50%
Rigid Body Dynamics (Rotation)	1	3	2.50%
Torque	1	3	2.50%
Sound Wave	2	6	5.00%
Doppler effect	1	3	2.50%
Organ pipe & resonance	1	3	2.50%
Surface Tension	2	6	5.00%
Force due to surface tension	1	3	2.50%
Surface energy	1	3	2.50%
Unit & Dimension	1	3	2.50%
Finding Dimensions	1	3	2.50%
Grand Total	**40**	**120**	**100.00%**