13th National Undergraduate Mathematics Olympiad (NUMO) 2022
১৩তম জাতীয় স্নাতক গণিত অলিম্পিয়াড ২০২২
Modality of the Olympiad contest

Subjects of the contest

The competition is planned for students completing their first, second, third or fourth year of university for the regional education with a maximum age of participants being 23 years of age at the time of the competition, although exceptions can be made. There is no minimum age limit. Problems are from the fields of Algebra, Analysis (Real and Complex), Analytic Geometry and Combinatorics. The working language is English. The Short course contents are as follows:

1. **Algebra:** Real & Complex Number Systems; Polynomials and algebraic equations; Summation of algebraic and trigonometric series; Inequalities; Applications of DeMoivre's theorem; Linear Algebra (Matrices and determinants, Basis and Dual basis, Linear transformations, Eigensystem, Annihilators, Adjoints, Operators, Applications); Groups, Rings and fields.
2. **Analysis (Real and Complex):** Infinite Series; Convergence; Complex Integration; Bilinear transformations; Single variable Calculus, Multivariable Calculus and Vector Calculus (Theorems of Green, Gauss, Stokes) and their applications (Differentiation and integration). Modelling with first and second order differential equations; Special functions.
3. **Analytic Geometry:** Second degree equations; Conics; Planes and straight lines in 3D; Conicoids; Applications of geometry.
4. **Combinatorics:** Permutations and Combinations; Primes; Arithmetic functions; Congruence; Recurrence relations; Generating functions; Complexity.

Selection of the Problems

The problems are chosen by the National Undergraduate Mathematics Olympiad Committee from those received in advance by the Member-Secretary of the NUMO.

Questions setting & Evaluation

The students' work will be evaluated by Script Evaluation Committee using criteria provided by the NUMO committee. There will be 8 problems (Regional Olympiad) and 5 problems (Final Round of the Olympiad) each carrying 10 marks respectively. All questions are to be answered. The time allotted for each Regional Olympiad as well as the Final Round of the Olympiad, is 120 minutes.

For Regional Olympiad, we would request to maintain the following suggestions from the committee of NUMO 2022:

- Select TOP 10 students (including 2 female contestant, if not included in order of merit)
- Arrange workshop before the regional Olympiad
- Ask your students to solve the International Mathematics Competition (IMC) type questions (https://www.imc-math.org.uk/?year=2022&item=problems) using the theories learned from each level of undergraduate

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