

**RAMANUJAN INSTITUTE FOR ADVANCED STUDY IN MATHEMATICS
UNIVERSITY OF MADRAS**

M.Sc. MATHEMATICS ENTRANCE EXAMINATION - 2024

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| Date | 10 - 07 - 2024 |
| Time | 10.00 AM - 12.00 Noon |
| Venue | All Candidates Ramanujan Institute for Advanced Study in Mathematics University of Madras, Chepauk, Chennai - 600 005. Wallajah Road (Opposite M.A. Chidambaram Stadium) |

- ❖ *There will be no interview after the examination.*
- ❖ *No Calculators, Cell Phones or any other electronic devices will be allowed in the examination Hall.*
- ❖ *Candidates must bring the writing pad.*

Multiple choice questions at the B.Sc. Mathematics level from the following topics:

Classical Algebra , Modern Algebra, Real Analysis , Complex Analysis, Statics, Dynamics, Vector Calculus, Differential and Integral Calculus, Ordinary Differential Equations, Partial differential Equations, Coordinate Geometry 2D & 3D, Trigonometry.

(Total Number of Questions 25)

Model Questions

1. Which of the following defines a group homomorphism from $(\mathbb{Z}, +)$ into $(\mathbb{Z}, +)$?


- (A) $x \mapsto x + 7$ (B) $x \mapsto x^2 + 8$ (C) $x \mapsto x^3 + 9$ (D) $x \mapsto 3x$.

2. If v is the imaginary part of an analytic function f in a region $D \subset \mathbb{C}$, then v satisfies

- (A) $v_{xx} + v_{yy} = 0$ (B) $v_x^2 + v_y^2 = 0$ (C) $v_{xx} - v_{yy} = 0$ (D) $(v_x + v_y)^2 = 0$

3. If the vector $4x.\bar{i} + (x + y).\bar{j} - az.\bar{k}$ is solenoidal, then a is equal to

- (A) 2 (B) 3 (C) 4 (D) 5


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