INSTITUTE OF DISTANCE AND OPEN LEARNING
Gauhati University

H O M E A S S I G N M E N T
M. A./M.Sc. in Mathematics
(PREVIOUS – 2009-2010)

***Guidelines for Submission*:**

1. Write your name, session, roll number, the topic selected and the title of the answer *clearly on the top*.
2. Each answer (essay) carries a weightage of **10 marks**. (10 marks x 2 essays = 20 marks).
3. Keep a margin of about 1 inch on each side of the page.
4. You can submit the essay written in your own hand-writing on clean, foolscap sheets, or A-4 sized paper.
5. In case you prefer to submit type-written answers, make sure that there are no typing errors which will deduct from the overall impression.
6. Do not submit commercially purchased answers as such a practice is deemed to be unfair.
7. You are permitted to submit your assignment by 31st January, 2010. Please note that if you submit beyond the last date of submission, as mentioned in the IDOL prospectus i.e., after 31st March, 2010, it may not be considered.

Paper I : Real and Complex Analysis

1. (a) Write a note on power series and its properties. 10

(b) Write a note on conformal transformations. 10

Or

2. (a) Write a note on surface integrals – Definition, properties and Green's theorem. 10

(b) Write a note on Cauchy's theorem, Cauchy's integral formula with applications. 10

Paper II : Topology and Functional Analysis

1. (a) Write a note on continuous mappings in topological spaces with special reference to metric spaces. 10

(b) Write a note on spectrum of an operator and discuss spectral theorem. 10

Or

2. (a) Write a note on connectedness in topological spaces. 10

(b) Write a note on Hahn-Banach Theorem ad its various applications. 10

Paper III : Algebra

1. (a) Write an essay on solvable groups and solvability of a subgroup. 10

   (b) Discuss Caylay-Hamilton theorem with examples. 10

Or

2. (a) Write a note on algebric field extensions. 10

   (b) Write a note on direct product of a finite set of groups and their properties. 10

Paper : IV Tensor, Statics, Particle and Rigid Dynamics

1. (a) Write a note on covariant differentiation of tensors and laws of covariant differentiation. 10

   (b) Discuss Kepler's laws of planetary motion and two body problem. 10

Or

2. (a) Write an essay on Christoffel's three index symbols, transformation of Christoffel's symbols, illustrative examples. 10

   (b) Write a note on Poinsot's central axis, wrench and cylindroid. 10

Paper V : Differential Equations, Numerical Analysis and Computer Programming

1. (a) Write a note on 'Existence and uniqueness Theorem for solutions' of first order differential equations. 10

   (b) Discuss different interpolation formulae with remainder terms. Also mention advantage and disadvantage (if any) of each formula. 10

Or

2. (a) Write a note on singularities of ordinary differential equations and method of series solution with special reference to Legendre, Bessel and Gauss, Hypergeometric equations. 10

   (b) Write a note on algorithm, flowcharts and decision tables with different examples. 10

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