HOME ASSIGNMENT 2026
MA/MSc in MATHEMATICS
(FIRST SEMESTER)
CENTRE FOR DISTANCE AND ONLINE EDUCATION
DIBRUGARH UNIVERSITY
(Full Marks : 20 for each course)

(ALL THE QUESTIONS GIVEN BELOW ARE COMPULSORY)

Course : MATH – 101 (REAL ANALYSIS)

Assignment – 1 *Marks –5+5=10*

1. Prove that $\boldsymbol{R}$ with usual metric is complete.
2. Show that, a metric space $\boldsymbol{X}$ is connected iff the set which are both open and closed are $\boldsymbol{X}$ and φ

Assignment – 2 *Marks –5+5=10*

1. State and prove the First mean value theorem.
2. Prove $U(P^*, f, \alpha) \leq U(P, f, \alpha)$

Course : MATH – 102 (ALGEBRA AND LOGIC)

Assignment – 1 *Marks –5+5=10*

1. Prove that a group of order 5 must be cyclic
2. Prove or disprove : Every PID is UFD.

Assignment – 2

Write short notes on the following *Marks –5*

1. (a) Bi-conditional statement.
   (b) Truth table
   (c) Tautology
2. (a) What are the types of quantifiers exists in mathematical logic ? *Marks –3+1+1=5*
   (b) Translate into symbols
   "Anyone can do that"
   "some numbers are rational".

Course : MATH – 103 (DIFFERENTIAL GEOMETRY)

Assignment – 1 *Marks –2+8=10*

1. Define a surface. Find the equation of the tangent plane to a surface at a given point

Assignment – 2 *Marks –10*

2. Derive the equation of evolute and involute of a curve.

Course : MATH – 104 (MECHANICS)

Assignment – 1 *Marks –10*

1. Derive Lagrange equation of motion using D'Alembert's principle for the case when the forces in action are conservative only.

Assignment – 2 *Marks –2+8=10*

2. Define the Branchistochrone problem. Solve the Branchistochrone problem by considering x-axis along the vertical.

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