

**HOME ASSIGNMENT (2023 Batch)**  
**M.A./MSC IN MATHEMATICS**  
**(THIRD SEMESTER)**  
**CENTRE FOR DISTANCE AND ONLINE EDUCATION**  
**DIBRUGARH UNIVERSITY**  
*(Full Marks 20 for each course.)*

**(ALL THE QUESTIONS GIVEN BELOW ARE COMPULSORY)**

**Course : MATH – 301 (Topology)**

Assignment - 1

*Marks - 5+5*

- (i) A set  $F$  is closed if no point outside  $F$  is a limit point of  $F$ . Prove.
- (ii) Prove that any continuous image of a separable space is separable.

Assignment - 2

*Marks - 5+5*

- (i) State and prove Heine-Borel theorem.
- (ii) Prove that any two components are either identical or disjoint.

**Course : MATH – 302 (Measure Theory)**

Assignment - 1

*Marks - 10*

- (i) Prove that outer measure of an interval is its length.

Assignment - 2

*Marks - 10*

- (i) State and Prove Fatou's Lemma

**Course : MATH - 303 (Advanced Fluid Dynamics)**

Assignment - 1

*Marks - 10*

- (i) Derive the equation for the rate of change of vorticity.

Assignment - 2

*Marks - 10*

- (i) Discuss Stokes's first problem.

**Course : MATH – 304 (Numerical Analysis)**

Assignment - 1

*Marks - 10*

- (i) Describe the Secant method for solving a system of equations.

Assignment - 2

*Marks - 10*

- (i) Describe the fourth order Runge-Kutta method for solution of differential equation