HOME ASSIGNMENT (2023 Batch)
MATHEMATICS
(FOURTH SEMESTER)
CENTRE FOR DISTANCE AND ONLINE EDUCAITON
DIBRUGARH UNIVERSITY
(Full Marks 20 for each course)

(ALL THE QUESTIONS GIVEN BELOW ARE COMPULSORY)

Course : MATH – 401 (Functional Analysis)

Assignment – 1   *Marks – 10*
1. Define a Banach space. When is a Banach space said to be complete? Show that closed subspace of a Banach space is complete.

Assignment – 2   *Marks – 2+8=10*
1. Define norm. Prove that norm on a vector space is a continuous mapping.

Course : MATH – 402 (Computer programme)

Assignment – 1   *Marks –5+5=10*
1. Discuss the three elements (definition, call, and declaration) that are related to user defined functions.
2. Write a short note on the three logical operators used in C.

Assignment – 2   *Marks –5+5=10*
1. Write a program to evaluate the sum of the digits of a given integer.
2. Write a short note on declaration and initialization of arrays.

Course : MATH – 403-A (Number Theory)

Assignment – 1   *Marks –10*
1. Find the number of positive solutions of the linear Diophantine equation $ax+by=c$.

Assignment – 2   *Marks –10*
2. Prove that any infinite continued fraction is represented by an irrational number.

Course : MATH – 404-A (Graph Theory)

Assignment – 1   *Marks – 2×5=10*
1. Write short notes of the following:

    (a) Euler Graph

    (b) Loop

    (b) Simple digraph

    (c) Walk, Path

    (d) Kuratowski's graphs

    (e) Planar Graph

Assignment – 2   *Marks – 10*
1. Discuss Matrix Representation of Graph.

Course : MATH – 403-B (Abstract Algebra)

Assignment – 1   *Marks –5+5=10*

1. Show that a finite extension of a finite field is separable.
2. Show that every Noetherian ring with unity has a maximal ideal

Assignment – 2   *Marks –10*
1. Define Artinian commutative Ring. Give an example to justify that subring of an Artinian ring need not be an Artinian.

Course : MATH – 404-B (Operator Theory)

Assignment – 1   *Marks –5+5=10*
1. Show that the set of all linear operators on a vector space into itself forms an algebra.
2. Show that zero operator on any normed space is compact.

Assignment – 2   *Marks –5+5=10*

1. Show that a self adjoint linear operator is symmetric.

2. Show that eigen vectors corresponding to different eigen values of a self adjoint linear operator are orthonormal.

Course : MATH – 403-C (Magnetohydrodynamics)

Assignment – 1   *Marks –10*
1. Show that body force and surface stresses are equivalent.

Assignment – 2   *Marks –10*
2. Discuss Hartmann effect. Find velocity profile for Poiseuille type flow.

Course : MATH – 404-C (Nonlinear Dynamical System)

Assignment – 1   *Marks – 10*
1. Write short note on Regular Point, Double point, singular point, cusp, bifurcation of a system.

Assignment – 2   *Marks – 10*
1. Define Julia set and state its properties. Give two examples of Julia set.

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