Katwa College

Department of Physics

Internal Examination – 2024

B.Sc (Hons) Semester – V CBCS

Paper – DSE – 1 (Advanced Mathematical Physics)

Time: 1hr. **F.M.- 10**

Answer any five

1. **Prove that the eigen-values of any Hermitian matrix are real.**
2. **Prove that orthogonal matrices must be non-singular.**
3. **Prove that sum of the eigen-values of any matrix is equal to the trace of that matrix.**
4. **Prove that the product of the eigen-values of any matrix is equal to the determinant of the matrix.**
5. **Find the eigen-values of σ_x and σ_y ; σ_x and σ_y are pauli spin natrices.**
6. **If λ be the eigen-value of a non-singular matrix A, belonging to the eigen-vector x, what will be the eigen-value of A^{-1}?**
7. **Prove trace of a matrix remains invariant under similarity transformation.**