Mathematical Methods II (PH41008)

Spring Mid-Semester Examination 2013-2014

No. of students: 67 M. Sc./Department of Physics and Meteorology

M.M: 36] [Duration: 2 hrs.

Q. 1: a) Cyclic permutations on four symbols form a subgroup $\mathcal{H}$ of S_4. Resolve S_4 into left cosets with respect to $\mathcal{H}$. [4]

Q. 1: b) Find an invariant proper subgroup of S_4. [2]

Q. 1: c) Does S_4 have a subgroup of order 8? If the answer is in affirmative then find its elements. [4]

Q. 2: a) Find the number of conjugate classes for the symmetric group S_5 and number of elements in each class. [4]

Q. 2: b) Find the number of irreducible representations of S_5 and also obtain their respective dimensionalities. [6]

Q. 2: c) Find one non-trivial representation of S_5. [2]

Q. 3: a) Find the regular representation for the group S_3. [4]

Q. 3: b) Find the characters for different conjugate classes for the regular representation of S_3. [4]

Q. 3: c) Is regular representation of S_3 reducible? If yes, decompose it into irreducible representations of S_3. [6]