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School of Basic Sciences

Master of Science in Mathematics

Mid Term Examination - Nov 2023

Duration : 90 Minutes

Max Marks : 50

Sem I - C1PM101T - Advanced Abstract AlgebraGeneral Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Explain that every normal subgroup is kernel of some homomorphism. K2 (2)
- 2) Find the automorphism group of the symmetric group K_4 . K1 (3)
- 3) Estimate the conjugacy classes of a non-abelian group of order 8. K2 (4)
- 4) Show the first Isomorphism theorem for groups. K2 (6)
- 5) Using class equation, show that a group of prime power orders must have a non-trivial centre. K3 (6)
- 6) Verify that the class equation for the symmetric group S_3 is $1+2+3$. K3 (9)
- 7) Categorize the groups of following order into the simple group and non simple group and justify your answers. (i) 30, (ii) 21, K4 (8)
- 8) Examine the conjugacy classes of Z_4 . K4 (12)

OR

- Examine the conjugacy classes of D_8 . K4 (12)