Complexity Theory
Past Papers by topic

NP class:

- **[2021P6Q4 (a), (b)]** Closure under complementation, Closure under input renaming

- **[2018P6Q3 (a)]** Definition of NP, co-NP, NP-complete, co-NP-complete

- **[2017P6Q1 (a)]** From $\text{TIME}(2^n)$ to P

- **[2012P6Q1]** Intersection, union, complement of NP

- **[2012P6Q2 (b),(c)]** Definition of NP-Hard, NP-Complete

- **[2006P6Q2]** DTIME(f) in DTIME(f^4)

Polynomial time reductions and NP completeness:

- **[2021P6Q3 (b)]** 2SAT in polynomial time

- **[2021P6Q4 (c)]** system of linear equations mod 2

- **[2020P6Q3 (a)-(c)]** definition of polynomial time reductions, Exact Cover

- **[2019P6Q3]** Quantified boolean formulas

- **[2019P6Q4]** 3NAE, CNF-SAT, k-SAT

- **[2018P6Q3 (b),(c)]** Definition of polynomial time reducible, Implications of VAL in NP

- **[2017P6Q2]** def of polynomial time reductions, NP, NP-hardness, NP-completeness, closure of polynomial time reductions, Double-SAT

- **[2016P6Q1]** Range of a function is in NP, factorization with two factors

- **[2016P6Q2]** NP, co-NP, P and Graph isomorphism

- **[2015P6Q1]** NP, polynomial time reduction, NP-complete, LIP hardness

- **[2014P6Q1]** NP definitions (both with verifier and TM), some T/F statements, P-Complete problems

- **[2014P6Q2 (b)]** clique-like problems hardness

- **[2013P6Q1]** Prime, Factor, Subset Sum problems

- **[2013P6Q2]** 3-colouring

- **[2012P6Q2 (c)]** Simulating TM is hard

- **[2011P6Q2]** 3SAT, 3VAL, 3-DNF-SAT, 3-DNF-VAL

- **[2010P6Q1]** polynomial-time reductions, NP-completeness, Vertex Cover and Independent Set

- **[2009P6Q1]** Euler Tour, Hamiltonian Path

- **[2009P6Q2]** polynomial-time reductions, NP-completeness, NP-hardness, 3-colouring/3-SAT

- **[2008P5Q12]** polynomial-time reductions, HamCycle, Euler Tour

- **[2007P5Q12]** polynomial-time reductions, NP-completeness, Subset sum NP-completeness

- **[2007P6Q12]** bounded factor

- **[2006P6Q12]** 3SAT and k-clique problem

Space complexity classes:

- **[2021P6Q4]** NTIME contained in NSPACE, ordering of L, NL, P, NP, PSPACE, NPSPACE, Reachability problem

- **[2021P6Q3 (c)]** 2SAT

- **[2018P6Q3 (a),(b)]** Reach is NL-complete, Reachability in logarithmic space

- **[2017P6Q1 (b)-(d)]** L, NL, Reachability implications

- **[2015P6Q2]** P, L, NL definitions, Space Hierarchy Theorem, L2

- **[2014P6Q1]** co-NP complete, NL, PSPACE

- **[2010P6Q2]** NL, L definitions, Directed Reachability, CVP

- **[2008P6Q12]** SPACE(f), L, NL definitions, Reachability

Other classes:

- **[2016P6Q1 (a)]** Range of a function is in UP

- **[2011P6Q1]** Cryptography systems and NP hardness