**Graph theory**

Modelling problems

Isomorphism

Bipartite graphs

Connected graphs

Planar graphs (circle-chord method)

or configurations of non-planar graph

Euler’s theorem

**Euler cycles, Hamilton circuits and graph colouring**

Euler cycle/trail (find in graph, find if present)

Hamilton circuit (rules, Dirac’s theorem, Grinberg’s theorem)

Proper Colouring – Colouring the Graph G

**Trees and minimal spanning trees**

Modelling problems

Tree – leaves, vertices, spanning trees,

**basic counting principles and binomial identities (counting problems)**

**generating functions, recurrence relations and**

**the inclusion-exclusion formula.**

Ordinary generating functions