**AS Level Decision 1**

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|  | **What You Need To Know** | pe03020_[1] | pe03018_[1] | pe03019_[1] |
| 1. Simple Ideas of Algorithms
 | * Correctness, finiteness and generality.
* Stopping conditions
* To trace, correct, complete or amend a given algorithm.
* Bubble, shuttle, shell and quicksort algorithms and the number of iterations required.
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| 1. Graphs and Networks
 | * Vertices, edges, edge weights, paths, cycles and simple graphs.
* Adjacency/distance matrices.
* Connectedness
* Directed and undirected graphs.
* Degree of a vertex, odd and even vertices, Eulerian trails and Hamiltonian cycles.
* Trees
* Bipartite graphs.
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| 1. Spanning Tree Problems
 | * Prim’s and Kruskal’s algorithm to find minimum spanning trees.
* Relative advantage of 2 algorithms
* Greediness
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| 1. Matching
 | * Use bipartite graphs, and use of alternating paths.
* Improvement of matching of algorithm
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| 1. Shortest Paths Networks
 | * Dijkstra’s algorithm, including labelling technique to identify shortest path.
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| 1. Route Inspection Problem
 | * Chinese Postman Problem, looking at odd vertices of no more than 4.
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| 1. Travelling Salesperson Problem
 | * Conversion of a practical problem into classical problem of finding a Hamiltonian cycle.
* Determination of upper bounds by nearest neighbour algorithm.
* Determination of lower bounds on route length using minimum spanning trees.
* Comment on the appropriateness of solution in its context.
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| 1. Linear Programming
 | * Graphical solution of two-variable problems.
* Formulate problems as linear programmes with a maximum of 3 variables.
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| 1. Mathematical Modelling
 | * Application of mathematical modelling to situations that relate to the topics covered above.
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