**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. |  |  |  |
| 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. |  |  |  |
| 1. Spanning Tree Problems | * Prim’s and Kruskal’s algorithm to find minimum spanning trees. * Relative advantage of 2 algorithms * Greediness |  |  |  |
| 1. Matching | * Use bipartite graphs, and use of alternating paths. * Improvement of matching of algorithm |  |  |  |
| 1. Shortest Paths Networks | * Dijkstra’s algorithm, including labelling technique to identify shortest path. |  |  |  |
| 1. Route Inspection Problem | * Chinese Postman Problem, looking at odd vertices of no more than 4. |  |  |  |
| 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. |  |  |  |
| 1. Linear Programming | * Graphical solution of two-variable problems. * Formulate problems as linear programmes with a maximum of 3 variables. |  |  |  |
| 1. Mathematical Modelling | * Application of mathematical modelling to situations that relate to the topics covered above. |  |  |  |