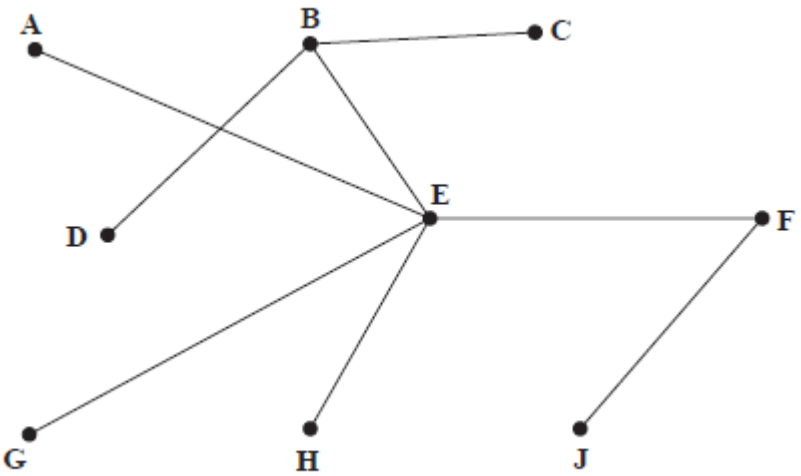
Question Number	Scheme	Marks
2. (a)(i)	A tree is a connected graph with no cycles	B1
(ii)	A minimum spanning tree is a tree that contains all vertices The total length of its arcs is as small as possible	B1 B1 **(3)**
(b)	Kruskal: FJ(11), EG(13), EF(15), EH(17), not GH (18), BC (19), not HJ (20), BD (22), not FH(23), AE (25), BE (29) (not AD, DE, DG, AB, BH)	M1 A1 A1 **(3)**
(c)	 (Weight of the tree is) 151	B1 B1 **(2)**
		8 marks

Notes for Question 2

ai1B1: **Connected** + **no cycle(s)** (must contain these two points – do not allow 'circle', 'loop' etc. for cycle(s)) – if not using the word 'connected' then allow 'a graph that connects the vertices/nodes' (condone issues with plural or singular e.g. cycle for cycles)
aii2B1: Contains **all vertices/nodes** (must be clear that all vertices (or nodes) are in a MST)
aii3B1: Total **length** of **arcs** is **minimised** (must contain the three points regarding weight/length, arcs/edges and minimised/smallest (oe))

b1M1: Kruskal's algorithm - first four arcs (FJ, EG, EF, EH) correctly chosen **and** at least one rejection seen at some point
b1A1: All arcs in tree selected correctly in the correct order (FJ, EG, EF, EH, BC, BD, AE, BE) with no additional arcs included in MST
b2A1: CSO including all rejections correct and at the correct time (do not need to see AD, DE, DG, AB, BH rejected but if they are they must be rejected correctly (i.e. in this order) but note that AD, DE have the same weight as do DG and AB so they could appear in either order)

Note that stating all the arcs in order (e.g. FJ, EG, EF, EH, GH, BC, HJ, BD, FH, AE, BE, AD, DE, DG, AB, BH) and then stating only those in the tree in the correct order is fine for all three marks in this part

c1B1: CAO (tree)
c2B1: CAO (151)